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Water in the West Today: A States' Perspective

D. Craig Bell

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Water in the West Today

A States' Perspective

D. Craig Bell, Executive Director
*Prepared by the Western States
Water Council*

**Report to the Western Water
Policy Review Advisory Commission**

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July 1997

The Western States Water Council (WSWC) is an organization consisting of representatives appointed by the Governors of 16 Western States. Since its creation, through adoption of a resolution at the Western Governors' Conference in 1965, the WSWC has strived to fulfill its chartered purposes.

Each member governor appoints up to three representatives who serve at the governor's pleasure. The purposes of the WSWC are:

- To accomplish effective cooperation among Western States in the conservation, development, and management of water resources;
- To maintain vital state prerogatives, while identifying ways to accommodate legitimate federal interests;
- To provide a forum for the exchange of views, perspectives, and experiences among member states; and
- To provide analysis of federal and state developments in order to assist member states in evaluating impacts of federal laws and programs and the effectiveness of state laws and policies.

The WSWC was created by the governors, and the members serve at their respective governor's pleasure. For these and other reasons, the WSWC sees itself as being accountable to the Western Governors' Association (WGA). WSWC members and staff work closely with the WGA staff on water policy issues of concern to the governors.



Acknowledgments

The author wishes to acknowledge the considerable time and effort spent by Council members and their staffs in providing information which provided the basis for this report, as well as in reviewing drafts. The author also appreciates the able assistance and advice provided by Tony Willardson, WSWC Associate Director and Ricky Shepherd Torrey, WSWC Legal Counsel, and by members of the Western Governors' Association staff, as well as the Western Water Policy Review Advisory Commission staff itself, and Cheryl Redding, WSWC Office Manager, who typed, compiled the tables and otherwise prepared the report for printing.

The Western Water Policy Review Advisory Commission

Under the Western Water Policy Review Act of 1992 (P.L. 102-575, Title XXX), Congress directed the President to undertake a comprehensive review of Federal activities in the 19 Western States that directly or indirectly affect the allocation and use of water resources, whether surface or subsurface, and to submit a report of findings to the congressional committees having jurisdiction over Federal Water Programs.

As directed by the statute, the President appointed the Western Water Policy Review Advisory Commission. The Commission was composed of 22 members, 10 appointed by the President, including the Secretary of the Interior and the Secretary of the Army, and 12 members of Congress serving *ex-officio* by virtue of being the chair or ranking minority member of the 6 congressional committees and subcommittees with jurisdiction over the appropriations and programs of water resources agencies. A complete roster is provided below.

Commission Membership

Denise Fort, Chair
Albuquerque, New Mexico

Appointed Members:

Huali Chai San Jose, California	Patrick O'Toole Savery, Wyoming	Secretary of the Interior Washington, D.C. Represented by: Joe Sax, September 1995 - December 1996 Patricia J. Beneke, December 1996 -
John H. Davidson Vermillion, South Dakota	Jack Robertson Portland, Oregon	
John Echohawk Boulder, Colorado	Kenneth L. Salazar Denver, Colorado	Secretary of the Army Washington, DC Represented by: Dr. John H. Zirschky
Janet Neuman Portland, Oregon		

Members of Congress (Ex-officio Members):

U.S. Senate: Committee on Energy and Natural Resources

Hon. Frank Murkowski, Chairman
Hon. Dale Bumpers, Ranking Minority Member
Hon. J. Bennett Johnston (September 1995 to January 1997)

U.S. Senate: Subcommittee on Water and Power, Committee on Energy and Natural Resources

Hon. Jon Kyl, Chairman
Hon. Daniel K. Akaka, Ranking Minority Member
Hon. Larry E. Craig (September 1995 to January 1997)
Hon. Bill Bradley (September 1995 to January 1997)

U.S. Senate: Committee on Appropriations

Hon. Ted Stevens, Chairman
Hon. Robert C. Byrd, Ranking Minority Member
Hon. Mark O. Hatfield (September 1995 to January 1997)

U.S. House of Representatives: Committee on Resources

Hon. Don Young, Chairman
Hon. George Miller, Ranking Minority Member

U.S. House of Representatives: Committee on Transportation and Infrastructure

Hon. Bud Shuster, Chairman
Hon. James L. Oberstar, Ranking Minority Member

U.S. House of Representatives: Committee on Appropriations

Hon. Bob Livingston, Chairman
Hon. David R. Obey, Ranking Minority Member

This is an Independent Report to the Commission

The report published herein was prepared for the Commission as part of its information gathering activity. The views, conclusions, and recommendations are those of the author(s) and are not intended to represent the views of the Commission, the Administration, or Members of Congress serving on the Commission. Publication by the Commission does not imply endorsement of the author's findings or recommendations.

This report is published to share with the public the information and ideas gathered and considered by the Commission in its deliberations. The Commission's views, conclusions, and recommendations will be set forth in the Commission's own report.

Additional copies of this publication may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22161; phone 703-487-4650.

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Executive Summary

The following represents an attempt to summarize some basic points drawn from the *Water in the West* report. These observations and conclusions do not necessarily represent the position of the Western States Water Council (WSWC) or any of its member States. Rather, they consist of the author's view of salient points drawn from State responses in order to provide a sense of Westwide perspectives. They are listed in relation to questions posed to Western States by the Western Water Policy Review Advisory Commission, through the auspices of the WSWC.¹

Summary of State Responses

1. Please identify and briefly describe significant present and anticipated water problems in your State.

In the arid West, providing adequate water supplies to meet future demands continues to be a priority. Despite the fact that the West represents the most urbanized region in the country, Western States are especially cognizant of water needs of rural communities. Western States also remain concerned about the claims being exerted by Indian tribes to water resources and the potential of such claims to disrupt existing rights in non-Indian communities, underscoring the desirability of cooperative efforts with the tribes and their Federal trustee in addressing tribal needs.

While virtually every Western State identifies as an area of concern the need for additional supplies to meet growing consumptive use demands, they also recognize the need for existing water infrastructure rehabilitation. Further, many of them also recognize as a significant challenge the need to meet expanding environmental demands to sustain instream values generally, for maintaining and enhancing water quality, and for endangered species specifically.

The West is often subject to wide swings in water supply. Thus, virtually an identical number of States identify drought planning and response as a priority problem, as do those who similarly flag flood planning and response. Overlaying many of the above challenges are legal and institutional conflicts facing Western States, involving Federal/State relationships, conflicts between States, and disputes among water users, among others.

2. Identify and briefly discuss problems of rural communities in your State relating to water supply, potable water treatment, and wastewater treatment. Please briefly describe any programs in your State to provide assistance to rural communities relating to water supply, potable water treatment, and/or wastewater treatment.

¹ The original questions posed to the States are abbreviated in this report so as to clarify the State responses summarized herein and to consolidate those portions of the responses relating to the Federal role under the "Evaluation of the Federal Role" section.

Inadequate supplies of water for rural communities represent a primary concern in the West, particularly in times of drought. The need to augment water supplies for rural communities is magnified by the requirements of the Federal Clean Water Act and Safe Drinking Water Act (SDWA). There is an increased need for funding to achieve compliance with the requirements of these laws and to address other problems of aging public water systems. Several States are also concerned about the adequacy of training for operators of water and wastewater treatment facilities.

Just as the problems confronting Western States regarding rural communities are similar, Western States have much in common regarding programs to address those problems. They continue to provide financial assistance for small water supply systems in the form of various loan and grant programs. Western States also have programs to provide assistance to rural communities facing environmental compliance problems. In every State, direct financial assistance with the development of drinking water and wastewater treatment systems comes through State-administered programs under the Federal Safe Drinking Water Act and the Clean Water Act.² Other State-administered programs augment these resources. Programs to provide technical assistance to rural communities relating to the operation and management of water and wastewater treatment facilities are also common. Notwithstanding these programs, there is a need for Federal support to relieve the financial stress imposed on these communities by Federal laws and regulations.

3. Describe the need and opportunities for additional storage or other arrangements to augment existing supplies including, but not limited to, conservation.

To meet increasing demands, several States are considering additional surface reservoirs, which, for the most part, will be smaller in scale than the large projects of the past, more innovative, environmentally sensitive, and financed primarily from State and local resources. Reallocation from existing uses to other uses will likely accelerate, chiefly from agricultural uses to other uses (primarily municipal). While States will often facilitate such transfers to meet specific water supply and environmental challenges, in some cases, they may restrain market transfers, not only to protect third parties, but also the public interest.

While recognizing the limits of water conservation in providing "new" water and additional caveats relating to the site-specific impacts of water conservation measures, States will carefully consider opportunities to

² See related discussion under "Environmental Regulation."

"stretch" existing supplies of water through water conservation, reuse, and reservoir reoperation prior to the development of new storage facilities. States will further explore opportunities to cost effectively manage groundwater recharge, recognizing it as a potentially significant storage alternative, and some States will further pursue the potential of desalinization and weather modification to augment existing supplies.

4. Please provide illustrations of significant innovations in water management, water use, water law, or other areas related to water in your State at the State, regional, or local level.

As the emphasis on the importance of water conservation increases, States are developing and adopting a number of programs to encourage such measures as low water-use landscaping and water rates that encourage conservation in urban areas, and developing conservation plans and incentives and leak detection programs in rural/agricultural settings. The reuse of wastewater effluent is also increasing. Many communities are currently reusing effluent for landscape and agricultural irrigation.

Desalting research, including construction of pilot facilities, is exploring the potential for cost-effective treatment. Weather modification research is also progressing in various States. To facilitate a reallocation of existing uses to augment supplies in areas of relative scarcity, some States have established water banks, while others have adopted measures to streamline the transfer process.

Several Western States have made innovations in their laws and institutions in order to augment and protect instream flows and to incorporate consideration of the public interest in their water right application and transfer processes. States are also endeavoring to incorporate innovations in their water quality programs, particularly regarding nonpoint source pollution.

States have adopted various measures to deal with the problem of groundwater depletion. States have also strengthened their capacity to deal with floods and drought. Innovations to improve information on water availability and use are common.

Several Western States have recognized and moved to enhance the potential value of local watershed coordination initiatives. As conflicts over water use intensify in an era of both increasing and changing demands, States are also addressing the need to deal more effectively with these disputes.

5. Please discuss the manner in which Federal water-related programs and activities affect your State and water uses within your State, either positively or negatively. Provide examples where possible. Also, describe State laws and programs that are effectively facilitating the accomplishment of Federal statutory purposes.

For a variety of reasons, States are increasing their emphasis on maintaining and enhancing the environment. These reasons include, but are not limited to, Federal mandates such as the Endangered Species Act (ESA) and the Clean Water Act. Given the diminishing Federal resources available to carry out the requirements of these and other acts, and the concurrent increase in the State burden for environmental protection, States urge that increased flexibility be given regarding their implementation, so that States and others can tailor programs and prioritize resources to meet real needs. Streamlining Federal permit processes is also important. The Federal Government should encourage innovations, such as those described in the State responses, which frequently involve market incentives and nonregulatory tools, as they have often been found to work more effectively than top-down regulation.

Locally driven watershed efforts have the potential to solve complex water resource issues. The Federal Government has recognized and acted on this potential, but it must deal with the emerging possibility of conflicting and counterproductive efforts among agencies involved in such initiatives.

There is a significant need for the Federal Government to maintain and rehabilitate its existing water storage infrastructure and to work with States and others in providing reliable water data. Further, the Federal Government continues to have an important role regarding disaster response and other mitigation associated with droughts and floods.

Appendices

This report makes reference to two documents which are denoted as appendices and are separate from this report, but which represent important supplements. **Appendix I** contains the individual State responses on which this report is based. The responses are placed in alphabetical order, and each response is separately paginated. Some of the responses include their own appendices.

Appendix II consists of positions of the Western Governors' Association (WGA) and the WSWC pertaining to reauthorization of the Clean Water Act and the ESA. The WGA resolution on the Clean Water Act addresses specific

amendments of particular western concern that have been advanced and largely incorporated within the context of the National Governors' Association's position.

The WGA undertook a process to develop a broad consensus position regarding reauthorization of the ESA. The position endorses the goals and objectives of the ESA, but contains several recommendations to improve its implementation. The last document is a paper prepared by WSWC staff reflecting a consensus of thinking among WSWC members regarding changes in the administration of the existing ESA. Each of these documents should provide the reader with valuable references with regard to specific recommendations addressing key concerns of Western States.

Copies of these appendices may be obtained for a fee by contacting the National Technical Information Service, Operations Division, 5285 Port Royal Road, Springfield, Virginia 22161, (703) 487-4650. Reports should be referenced as *Water in the West Today: Appendix I* and *Water in the West Today: Appendix II*.

Introduction

The Western Water Policy Review Act of 1992 directed the President to comprehensively review Federal activities in the 19 Western States which directly or indirectly affect the allocation and use of water resources, and to submit a report to Congress with findings and recommendations. To undertake this review, the Western Water Policy Review Advisory Commission (Commission) was formed and held its first meeting in Portland on February 16-17, 1996.

Among other things, the Commission was directed to: (1) review present and anticipated water resource problems affecting the 19 Western States; (2) review the problems of rural communities relating to water supply, potable water treatment, and wastewater treatment; (3) review the need and opportunities for additional storage or other arrangements to augment existing water supplies including water conservation; (4) examine institutional arrangements to address problems of water allocation, water quality, planning, flood control, and other aspects of water development and use; and (5) review the respective roles of both the Federal Government and the States and examine Federal-State relations regarding various aspects of water allocation and use.

In subsequent discussions between Commission staff and representatives of the Western States Water Council (WSWC), it became clear that the WSWC, consisting of almost all of the Bureau of Reclamation (Reclamation) States, would be an ideal organization to provide information pertaining to the above issues. Thus, an agreement was subsequently entered into between the Commission and the WSWC to accomplish this work.

The work product consists primarily of a report summarizing responses from the Western Reclamation States to the above identified issue areas. These responses were elicited through a written request for information, as well as several subsequent telephone conversations. To a lesser extent, independent staff research supplements State responses.

In dealing with these responses, this report does not attempt to be comprehensive, but illustrative. The most important part of this report is appendix I, which contains the individual State responses. The State responses exemplify both the commonality and the diversity of challenges associated with the management of water resources in the West. The summary (chapters III - VII) is preceded by a section on context and ends with some brief concluding observations. The section on context is partially drawn from other work products of the WSWC and its staff and is offered to further illuminate the summary of State responses.

With regard to the summary itself, WSWC staff used its best judgment to characterize and illustrate the responses. In so doing, the staff assumes responsibility for any errors or omissions contained in the report that are inconsistent with the State responses. With regard to the tables, readers

should note that they indicate matters of priority as identified by States and are intended to be helpful in illustrating priorities within the region. They do not indicate, nor would it be possible in many cases to deduce from the responses, the relative priority of the problems/solutions **within a State**.

At the initial meeting of the Commission, Senator Mark Hatfield, the Commission's sponsor and mentor, expressed pride that the Commission was getting underway and his anticipation of its work "to outline a bold and visionary future for water policy in the West." The WSWC is pleased to have been asked to assist the Commission in this endeavor, particularly in light of the fact that in 1965, Senator Hatfield, then Governor of Oregon, cosponsored a resolution creating the WSWC.

The Context

The Commission work focuses primarily on the Federal role in western water management. This section discusses respective governmental roles in water resources, including that of the Federal Government, in order to provide a context for Western States' responses to the questions posed to them by the Commission.

In addressing the first meeting of the Commission, Commission Chair Denise Fort remarked as follows:

This is a critical time for western water policy and programs. Many of the Federal water institutions are in the process of changing their missions and reengineering their organizations. Conflicts over water management are numerous, but so are examples of cooperative ventures to restore watersheds and rivers. The Commission can help capture the many new initiatives in water management and thoughtfully consider the best role for Federal water agencies in the future.

Chairperson Fort correctly noted the existence of the current era of change in western water management. Difficult challenges face the West as a result. These are abundantly reflected in the responses provided by Western States that make up the bulk of this report.

It should be noted in preface something that has never changed; that is, the relative aridity of much of the West, as reflected in the following map (figure 1). Because of this general water scarcity, water laws and policies developed which were inextricably linked to the region's desire to grow crops, develop industries, extract minerals, and satisfy the thirst of its small and scattered cities. The Federal Government supported these goals by constructing massive dams to store water and supply power to farms,

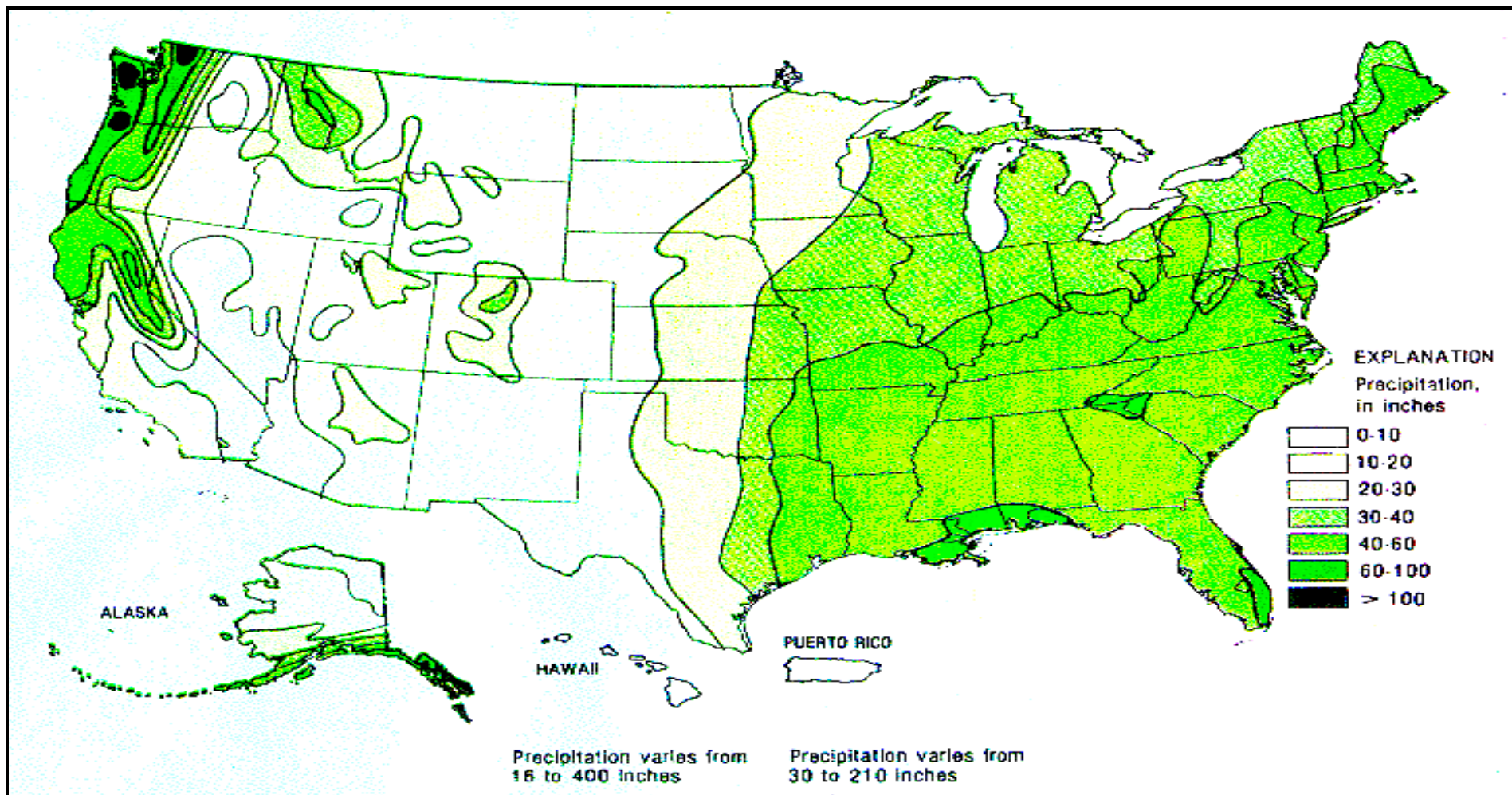


Figure 1.-Average annual precipitation in the United States and Puerto Rico
(adapted from U.S. Department of Commerce, 1968)

industries, and cities. This investment provided substantial benefits to the nation by stimulating the economy, strengthening agriculture, developing energy resources, satisfying recreational needs, and preventing floods.

However, the West has changed in several important respects. It is no longer predominantly rural. Some 90 percent of the people living in the Pacific States now reside in metropolitan areas, and 65 percent of the population in the Rocky Mountain States are city dwellers. As a result, cities now exercise greater influence on the politics of water. Nevertheless, irrigated agriculture remains the largest water user, accounting for about 85 percent of the West's water diversions. At the same time, public support is increasing for instream values—water for fish and wildlife habitat, recreation, and aesthetic values.

Support for instream values comes late, however. Most of the West's water already has been allocated, and providing new water supplies through the construction of **large** storage projects is generally³ not environmentally and economically feasible.

Western water laws, agencies, and programs have evolved to deal with new challenges. For example, the emergence of public interest criteria in evaluating new applications to appropriate water is an attempt to respond to the changing and increasing demands on western resources. In almost every Western State, the State water administrator is now required to determine whether a proposed use of water not only would not be injurious to other water users, but also whether it is consistent with the public interest or welfare. Also, the Federal Government has become increasingly involved in water resources management in the West to enforce national environmental laws.

The following is a summary of western water management in this era of change. It does not purport to be a comprehensive description, but rather an overview with particular focus on governmental roles and coordination in water resource management in the West. It should be noted, in preface, that such a general discussion of water laws, agencies, and programs tends to mask the complex institutional setting within which water institutions and water resource users function. In reading this overview, it is important to remember that every major set of competing interests in the use and management of water resources has fashioned institutions to advance those interests. In contrast with the historical development interests that dominated decisions about allocation of water among uses and users, today's decisions are also influenced, for example, by a full range of Native Americans' concerns in the resource, by water quality as a concern often matching quantity in importance, and by such specific interests as protection of free-flowing streams, riparian habitat protection and restoration, resident

³ There are, for example, two large projects under construction in California, and two or three more may be built in connection with potential solutions carried out under the auspices of the CALFED process for the San Francisco/San Joaquin Bay-Delta.

and anadromous recreational fishery values, and a variety of other recreational and aesthetic pursuits. All have some form of legal recognition and political and institutional means of pursuing actions, and all are components of the institutional context of western water management (Dave Getches, personal communication, 1991; National Research Council, 1992; Bell and Johnson, 1991).

The State Role

Planning, Funding, and Development of Water Supplies

The West was settled where water was available, and planning and developing adequate water supplies has been a continuing pursuit. Streams were diverted for mines and farms. Weirs and dams were built and rebuilt. Tremendous investments were made by private companies. Some were successful. Many were not. The overwhelming water development burden fell on private individuals and cooperatives, until the Federal Government stepped in to construct mammoth projects on mostly interstate streams and provided engineering expertise and financial security. Over the past two decades, huge Federal budget deficits and environmental concerns have reduced Federal spending for water projects. Thus, while States have been involved for many years in planning, more and more States have become important players in financing and developing water resources for a variety of uses. Virtually all western states have some type of water development/financing program.

The importance of Federal participation in water resources planning and development, however, should not be underestimated. Without billions of dollars in Federal financing, many large interstate projects could not have been built when they were, and many critical needs would have gone unmet. However, the non-Federal contribution should not be underestimated either. It has been far greater than the Federal investment.⁴ While Federal Reclamation dams stand as monuments to the development of the West, it is the myriad and almost innumerable smaller project works, built by non-Federal interests, that account for the majority of the expenditures for water

⁴ National Water Commission, 1973. In 1973, the National Water Commission prepared a comprehensive estimate of total historical expenditures for water resource development. Of the roughly \$338.6 billion dollar expenditure, Federal appropriations accounted for 26 percent; state and local government spending, 57 percent; and private expenditures, the remaining 17 percent.

resource development. Obviously, States are, and will continue to be, primarily responsible for the development of their water resources.

Early developments were undertaken out of critical necessity, and little planning was done or considered important. Streams were dammed and diverted. To a large extent, water resource planning and project designs came later, following experience and learning from trial and error. Moreover, most early projects were built for the purposes of supplying water to cities and farms—for people, livestock, crops, and power generation. In the West, flood control was another important ancillary benefit, usually secondary to water supply purposes. Relatively little weight was given to environmental costs and benefits, recreation, aesthetics, and similar purposes. However, as the West has changed, more emphasis has been placed on values related to our quality of life. Thus, more comprehensive planning and development of limited supplies have resulted.

Most States developed water plans in the 1970s, in part in response to Federal water development proposals. These plans and planning processes have been refined and revised over the years. More and more, important decisions cannot be made and implemented without communication among all parties, consensus, and compromise. Legal and political gridlock is forcing varied interests to come together and work out their differences and find grounds for mutually beneficial relationships. Rights have been defined and redefined, and most parties now realize that they must work together, and not against each other, to find win-win solutions to many water problems.

Thus, in contrast to the old river basin plans and planning commissions, watershed planning and management efforts have arisen, many of which are less well defined and more dynamic than their predecessors. Current watershed committees tend to be more oriented toward solving specific problems than creating comprehensive plans. While the success of such efforts in terms of implementation of on-the-ground solutions generally has yet to be proven, many have been found to be a practical and useful exercise of participatory government. Continuing State water planning efforts are increasingly incorporating these local watershed efforts as planning components and otherwise expanding opportunities for extensive public participation in identifying issues and alternative solutions to specific problems.

Administration of the Prior Appropriation Doctrine

A fundamental principle of the appropriation doctrine that prevails in the West is that priority is based on the proposition that first in time is first in right. The doctrine thus protects those who put water to use against impairment of their uses by subsequent appropriators. This element of certainty promotes the investment of capital to develop water supplies. An important characteristic of the appropriative water right is that, once vested,

it becomes a constitutionally protected property interest which can be sold, leased, or otherwise alienated. This characteristic imposes significant constraints on the reach of governmental regulatory powers.

Another basic prerequisite to an appropriative water right is that water must be put to a publicly defined beneficial use. Although the definition of beneficial use has changed over time, the necessity of using water beneficially has remained constant. Recognizing the relative scarcity of water to meet all demands, a related rule developed, known as the "use it or lose it" principle, that precludes speculative claims and penalizes non-use by forfeiture in order to assure protection of the public interest in the continuous beneficial use of water.

In every Western State, some public official or entity administers the State's programs for allocating the use of water resources. In the early days of settlement of the West, one could acquire a water right by diverting and using water and by posting and recording notices of intent, procedures similar to staking a mining claim. By the beginning of the 20th century, this system gave way to an application and permit system administered by a State official. In many States, this person was referred to as the State engineer. Although the title of "State engineer" has been changed in many States, that office or its counterpart continues to have responsibility for most State water development and use programs. Significantly, the Federal Government has historically deferred to Western States to administer water use.

State engineers and their counterparts are quasi-judicial officers whose responsibilities are governed by State statutes and case law. In many instances, these laws and policies give the State engineer or equivalent official broad discretion in carrying out these responsibilities. Water transfers must also be approved by the State. Historically, the primary purpose of this examination was to assure that any change in a water right's point of diversion or nature of use did not adversely affect the water rights of third parties.

Protection of the Public Interest

Traditional appropriative law gave little consideration to whether a pending application or proposed transfer would serve the public good. The public good was assumed to be served by the "beneficial use," to which allocated water would be put. The focus was on development to serve offstream uses consistent with beneficial use requirements. Such development continues to be an important feature of many State water programs, as evidenced by the number of State water development funds. Now, however, given the increasing support for instream values, almost every State requires the State engineer, or equivalent official, to review an application for a water right to determine whether it would be consistent with the "public interest" or "public

welfare" to grant the right. A few States provide the State official with a list of factors that must be considered in this regard. Several States also require an evaluation of the public interest in determining whether to approve proposed transfers or changes in use.

States employ a wide range of approaches and criteria in applying public interest criteria to their water resource decisions, producing a corresponding wide range of "public interest" determinations (Johnson and DuMars, 1989). Some States have had public interest requirements in their laws for a long time and have done a good deal to define and apply public interest criteria in approving the use of water resources. For example, the public interest standard for issuing new rights has been used in some States to import considerations of efficiency, adequacy of streamflow, water quality, public health, alternative uses that might be precluded, effects on fish and wildlife, recreational impacts, aesthetics, and even cultural values. For other States, a public interest requirement is a fairly recent phenomenon, and its impact is largely untested. In any event, such public interest criteria only apply to new applications and to approval of transfers or change applications, but not to the reexamination of existing water rights (although the related public trust doctrine has been applied to existing rights in California).

Preserving Instream Flows

Today, virtually all western states have laws to provide some type of instream protection. However, these laws generally do not preserve a minimum streamflow in the abstract. As is the case with public interest protection statutes, most often these instream flow laws are of relatively recent origin. As a result, their application prevents depletion beyond the minimum only by users with a relatively junior priority. Some States protect instream flows by putting conditions on new permits to prevent the permittee's use of water in ways that conflict with fishery or other values. Older permits may not carry any such restrictions. Still other States authorize public agencies to acquire existing rights or to appropriate new rights to instream flows to protect enumerated instream values (e.g., preservation and propagation of fish, preserving a natural environment, and minimizing pollution). A few States also have adopted procedures whereby private entities may participate in protecting instream values (MacDonnell and Rice, 1993).

Water Quality Laws

Clean Water .—Nearly every State administers a water quality program under the Federal Clean Water Act. When Congress enacted this statute, it declared the national goal to "restore and maintain the chemical, physical and biological integrity of the nation's waters." The goal was to be accomplished by enforcing two sets of standards through a permitting

system. The National Pollutant Discharge Elimination System allows discharges into waterways only under permits from the Federal Environmental Protection Agency (EPA) or a State operating its own program with Federal approval. Permits set limits on the amount of "end of pipe" discharges of pollutants according to Federal effluent standards. They also incorporate ambient water quality standards set by the State for each of its streams, based on State-designated uses of the stream.

In contrast to these point sources, "nonpoint" sources of pollution (such as runoff from mines, urban areas, and farm and irrigation return flows) are not required to be regulated by permit under the Act. Rather, States are required to adopt plans for dealing with these sources. However, such plans need not be enforceable, and there exist no Federal standards for such plans. There is no comprehensive approach under the Act to address groundwater contamination. However, many sources of groundwater pollution are regulated by various Federal and State laws.

Drinking Water.—The SDWA of 1974 established a Federal regulatory system to protect the safety of public drinking water systems. The SDWA was amended in 1986 and 1996. It requires the EPA to set maximum permissible levels for contaminants in drinking water, which now includes a balancing of costs and benefits in making determinations. The primary maximum contaminant levels for water from public water supply systems currently include levels for microorganisms, turbidity, and a lengthy list of organic and inorganic chemicals. The secondary standards are concerned with the color, odor, and appearance of drinking water. The SDWA's primary standards are enforceable by law, while the levels in the secondary standards are nonenforceable guidelines for the States to use and generally relate to the aesthetic qualities of the water.

Under the SDWA, the EPA delegates primary enforcement authority to the States, provided that the States comply with drinking water standards. Each State that assumes primacy must establish an approved underground injection control (UIC) program to prevent contamination of underground drinking water sources. The UIC program regulates injection wells, hazardous and radioactive waste disposal wells, mineral extraction and geothermal wells, oil and gas recovery wells, and industrial and municipal wells within a quarter mile of underground drinking water sources.

Under the 1996 amendments, the EPA is directed to offer to enter into an agreement with each State to make capitalization grants to establish a drinking water treatment State revolving fund (SRF). Once established, each State can determine its own priorities for allocating financial assistance through annual development of an intended use plan. The intended use plan is required, to the maximum extent practicable, to give priority to projects that address the most serious risks to human health, that are required to ensure compliance with the SDWA (including filtration requirements), and

that assist the most needy systems, as determined on a per household basis according to State affordability criteria.

The reauthorized SDWA includes a new focus on the needs of small public water systems. It provides for establishing at least five small public water systems technology assistance centers throughout the Nation. These centers will conduct research and provide training and technical assistance relating to the special needs of small public water systems, including systems serving Indian tribes. The revised SDWA also provides for grants and other concessions to small public water systems serving 10,000 or fewer people.

By the year 2000, the States are now required to develop and implement a strategy to assist public water systems in acquiring and maintaining technical, managerial, and financial capacity. States will also now be required to delineate source water protection areas for community water systems. In addition, States will now be able to establish alternative monitoring requirements for primary drinking water regulation (other than for microbial contaminants) and alternative public notification requirements. Delegated States under the SDWA will be required to submit annual reports to the EPA and the public at large on violations of national primary drinking water regulations by public water systems in the State.

The Local Role

Local and substate/regional governments and private entities within States provide the greatest variety of institutions for delivering water resource services. These services include urban and industrial water supply, irrigation, drainage, navigation, recreation, fish and wildlife enhancement, and environmental amenities. They vary in size. The Metropolitan Water District of Southern California, a large water wholesaler, has an annual operating budget that comes close to the annual operating budget of the Federal Bureau of Reclamation. The majority of these entities, however, address single purpose functions and are based on isolated nonbasinwide designs. Few have operated in the context of a comprehensive regional effort, and there is often little correlation among land and water needs. This

situation has led, in many cases, to fragmented and uncoordinated planning and development with its attendant adverse economic and environmental consequences.

However, efforts to bring together local and substate regional interests are meeting with increased success. A noteworthy example is in Oregon, where efforts to develop plans and policies on an intrastate watershed basis are well underway. Since so many of the substate entities having water management responsibilities are subdivisions or creatures of the State, States can serve to facilitate more integrated planning and policy development. Indeed, such efforts also have been successfully pursued by several other States.

The Role of Indian Tribes⁵

A treatise on the subject of water and water rights concludes as follows:

There is little question that Indian tribes may, as an aspect of their self-governing status, regulate use of reserved water rights by tribal members on reservations. Tribes may also regulate lessees of reserved rights on reservations. More difficult issues involve the regulation of non-Indians (non-members) on reservations . . . Whether a tribe may regulate non-member water use on reservation is likely to turn on the particular waters and reservations involved. (Waters and Water Rights, volume 4, 1991 edition)

Some argue that any State regulation of water on Indian reservations would impinge on tribal self-government. On the other hand, others point out that the McCarran Amendment, which gives States authority to adjudicate reserved water rights and includes a provision allowing State suits concerning the "administration" of water rights, provides a basis for State regulation of some reserved rights. Given the variety of land ownership patterns in Indian country, the courts will likely be pursuing a case-by-case, reservation-specific approach in resolving issues of State-versus-tribal regulation of water rights. The recent emphasis on negotiated settlement of Indian water right claims may also provide an opportunity to successfully address these issues.

Many tribes have enacted water codes to regulate water use on their reservations. These codes often attempt to regulate all on-reservation water use, not just tribal use, and frequently include water quality as well as water quantity regulation. Tribal codes by many tribes organized under the Indian Reorganization Act of 1934 must receive approval from the Secretary of the

⁵ Although tribal governments have been likened to State Governments in several respects, this report does not purport to speak for tribes. This section merely completes an overview of various governmental roles relative to water resources from the perspective of States.

Interior, who has imposed a moratorium on approval of tribal water codes which has lasted some 30 years. Tribes not governed by the 1934 Act presumably could adopt water codes without Secretarial approval. Further, several tribes have enacted and are attempting to enforce water codes irrespective of the moratorium.

The Clean Water Act and the SDWA, along with some other Federal statutes, authorize EPA to treat qualifying tribes as States for several delegated programs under the respective acts, including pollution control permits, water quality standards, wastewater treatment, UIC, and public water system enforcement. A number of tribes have promulgated water quality standards, and some have been approved by EPA. Thus, EPA seems prepared to sanction tribal water quality regulation, while the Department of the Interior continues its moratorium on regulation of water allocation by many tribes.

The Federal Role

Congress has repeatedly deferred to the States with regard to water rights allocation. Nevertheless, the Federal role is very important in the West. In the days when public policies encouraged settlement and development of the West, Federal programs provided funds for the construction of large dams to provide water and power to farms, industries, and cities. As a result, Federal agencies, or local districts bound to follow Federal dictates, collectively control about one-fifth of all water consumptively used in the West through the operation of these great plumbing systems. Thus, when water is transferred from present Federal project uses to new ones, the transaction requires Federal approval. Further, the ongoing operation of the projects—how much power is generated, the level of protection and enhancement of fish and wildlife, the efficiency of water use, and the terms of the contracts with individuals who use project water—can be largely federally determined.

The operation of several Federal projects in the West is now being reviewed to determine if the projects can be operated to achieve greater public benefits. Also, the Federal Government has moved, in several other ways, to protect and enhance public interest values in western water resources, as defined for its purposes by Federal public land and environmental laws. These Federal statutes reflect national interests in the management of water resources, which have their roots in Federal land ownership in the West and the United States Constitution.

One principal Federal interest is derived from the clause that gives Congress power to "regulate commerce among the several States." Historically, the Federal interest in water resource management under the clause centered on navigation. More recently, the Commerce Clause has been used as a safeguard to protect the environment, regardless of navigation. The most

expansive definition is in section 404 of the Clean Water Act, which requires that dredge and fill activities that may affect waters of the United States must be authorized by the U.S. Army Corps of Engineers, whose decision may be reviewed and vetoed by the EPA. The Clean Water Act defines the term "navigable waters" to include all waters subject to the reach of the Commerce Clause. Given the breadth of the Commerce Clause, as defined by the courts, this means, basically, that all waters in the United States are covered by the Clean Water Act.

Another Federal interest in western water management stems from Federal land ownership in the West. The Supreme Court has held that Congress implied an intent to reserve a water right when it set aside certain lands from the public domain to be used for specific purposes. The Constitution has been held to authorize such reserved rights, which are necessary to carry out the primary purposes of the reservation. The Federal interests in securing reserved water rights for Federal lands range from ensuring drinking water for military installations to providing water to fulfill the purposes of national forests, monuments, and parks. Courts have also inferred a congressional intent to provide water for use on Indian reservations.

In recent years, Federal interests in western water management have increasingly revolved around environmental protection, aesthetics, and recreational uses. Thus, Federal powers have been used to protect water quality to secure instream flows to protect and enhance fish and wildlife resources, protect aesthetic values such as wild and scenic rivers, and preserve endangered species.

The Federal effort to protect public values has occurred concurrently with increasing State efforts to protect the public interest in western water resources. In the process, conflicts have arisen between Federal environmental statutes and western water laws. These conflicts often revolve around the definition of what constitutes the public interest in a particular instance and how best to protect that interest. In this regard, the Federal approach typically differs from the State approach. The Federal expression of the public interest is found in the congressional exercise of power in enacting the law, with the related obligation to carry out that specified public or national interest through enforcement of the law's provisions. States may also act in a similar fashion through enactment of State laws. However, public interest review requirements in State administrative and judicial proceedings are broad and either explicitly or implicitly include a number of factors that might weigh in a decision

regarding the public interest. Given these and other differences in roles, the overlay of Federal laws and programs on State authority to allocate resources can present difficulties.

The Role of Basin Mechanisms

Many have felt that the answer to improving coordination and cooperation between Federal agencies and among Federal, State, and local water management entities is through basin planning and management structures. Indeed, historically, to the extent that water resource planning and coordination has been practiced, it has largely been on a river basin scale. Major Federal water resource agencies began, many years ago, to use interagency river basin committees to share information about their activities. States were invited to designate representatives. Although States were not formally recognized as members, the intensity of State participation was not defined by formal membership. More important, however, was the fact that the interagency committees had no authority, except to exchange information and opinions, and no effective access as a body to centers of power at either the Federal or State level.

The Water Resources Planning Act of 1965 provided for the establishment of truly joint Federal/State river basin commissions (although the chair was a Presidential appointee) upon request of the governors within a basin. Seven such commissions, covering about 40 percent of the area of the 48 contiguous States, were ultimately established. All were, in effect, abolished in 1981 (along with the U.S. Water Resources Council, a mechanism for Federal coordination established by the same act) by cutting off Federal appropriations, although a few survived as interstate river basin associations. The commissions were directed to prepare and keep current a "comprehensive, coordinated joint plan for the region and to recommend priorities for implementation." They were instructed to "serve as the principal agency for coordination of plans" of others and were empowered to conduct special studies.

No strong opposition to abolishing the institutions developed. However, a Government Accounting Office (GAO) report noted that it was difficult to incorporate the commissions' recommendations into national policy and program design, or use commission reports in setting national priorities for programs and projects, because most of the Nation was excluded from coverage. The GAO also pointed out that commission members had not been delegated meaningful authority; as a consequence, incentives for participation and levels of participation declined. For these reasons, the GAO concluded that, "River basin commissions have not emerged as the principal coordinators of Federal, State, interstate, local and non-governmental plans for the development of water and related land resources." Others have noted that the commissions might have been useful in addressing water management issues of the 1930s and 1940s, when

Federal water projects dominated the agenda and both State and many Federal interests were not involved in decision processes. However, they were arguably not well equipped to serve the planning and coordination needs of the 1960s and 1970s, when environmental protection had leaped to ascendancy in national goals, and the breadth and depth of State programs in natural resources management had grown with Federal grant-in-aid support for a wide range of programs.

Notwithstanding some past failures, many basin organizations continue to exist, possessing varying degrees of authority and forms of representation, depending on the legislation creating them, each tailor-made for its own situation. Generally, such entities take the form of interstate compacts or Federal-interstate compacts. In fact, since water resource problems in an interstate river basin often require a regional solution beyond the power of individual States, the compact device has been used commonly throughout the history of the country. Navigation boundaries and fishing rights were the subject of the earliest water compacts. Compacts allocating the consumptive use of interstate waters and providing for their management, including water quality, developed in the 20th century. Starting with the Colorado River Compact of 1922, the next 50 years spawned over 30 interstate compacts dealing with various water problems in a variety of ways. These included water allocation compacts, pollution control compacts, miscellaneous planning and flood control compacts, and multipurpose regulatory compacts.

Water allocation compacts are primarily a western phenomenon. The early compacts simply effected an allocation of water, but made no provision for a permanent administrative entity for future planning and management. More prevalent has been the compact for both allocating water and establishing an independent commission with certain limited powers, primarily the authority to gather information and monitor developments on the stream.

There have also been a number of compacts concerned solely with pollution control. The powers conferred in these compacts vary widely. There is also a scattered assortment of compacts which deal in a limited way with water resource planning and various aspects of flood control.

Multipurpose regulatory compacts have been the rarest creation. They generally confer broad authority on an administrative commission to regulate water resource activity within a basin and to engage in positive management programs. The most renowned and comprehensive of these are the Delaware and Susquehanna River basin compacts. These are so-called Federal-interstate compacts. They give broad powers to the compact commission in all aspects of water resource management, including authority to allocate water among States, regulate withdrawals of water, and construct projects in appropriate circumstances. The Federal-interstate compact is so characterized because the United States is a signatory party along with the affected States. In the West, the Tahoe Regional Planning Agency

represents such a federally approved interstate compact that has land use, water quality, and other regulatory functions.

The Pacific Northwest Power Planning Council was created by a compact and is charged with developing a comprehensive plan to address the need for hydropower generation in concert with the recovery and protection of fishery resources within the Columbia River Basin. The council's function is planning, not implementation. It relies for implementation of planned measures upon the cooperative action of many entities throughout the region.

Given this past experience, some urge that the design of future basin institutions should not be approached as incremental variations on earlier efforts. They favor, instead, going back to the small watersheds in which people and water resources come into most intimate contact and exploring the kinds of institutions that may be useful in problem assessments and integrating actions at that level. The next level would be to look at aggregations of watersheds which constitute the "problemshed" for emerging issues. Thus, many Federal programs, as well as State programs, are focusing on small watersheds as the most logical geographical unit to integrate natural resource management and environmental protection efforts.

Intergovernmental Coordination

The move to watersheds for integration of management and protection efforts has been generated, in part, by the perception of failure to coordinate Federal water policies, both among Federal agencies and between State and Federal agencies. Critics argue that this failure to coordinate makes a significant and unnecessary contribution to water decision gridlock at the State and local level. This was reiterated, for example, in a 1988 "White Paper" prepared by a group of State, Federal, and private sector water managers and policy leaders brought together under the auspices of the Western Governors' Association to discuss the possibilities for improving coordination. The group found that:

A principal characteristic of Federal water policy is that said policies are made in an ad hoc, decentralized manner. No agency of the Executive Branch or committee of Congress is responsible for keeping an eye on 'the big picture.' Thus, Federal water policy lacks a unifying vision or even a set of guiding principles Simultaneously, the regulatory authority of the Federal Government over water continues to expand, causing it to ever more frequently clash with State water management.

In this regard, it seems evident that congressional committee jurisdictions, departmental competition, and interest group ambition have contributed to a fragmentation in Federal programs that militates against integration.

It should be noted here that criticism regarding a lack of coordination and integration is not confined to the Federal Government. Others point with concern to the divisions of water management responsibilities at the State level. While recognizing that State leadership is the pivotal level of government in management of water and related resources, many urge that more affirmative and better integrated State responsiveness is needed to address the full range of water resource values. In speaking of the roadblocks to reducing the adverse impacts of drought, a report entitled "The National Study of Water Management During Drought," prepared by the U.S. Army Corps of Engineers, looked at all levels of government. It made the following observation:

The wide diversity of water users and responsible parties, each with their own goals, water rights, and incentive structures, often makes consensus among them difficult—even impossible at times. The organization of water management responsibilities is involved and somewhat rigid. The mismatch between political and hydrologic boundaries leads to confrontations because different levels of government naturally put the concerns of their constituency first When governments organize themselves internally, they frequently structure their departments and agencies to reflect major constituencies rather than cross-cutting issues. Furthermore, these structures tend to get frozen in time. . . .

Overview of State Responses

The following is an attempt to provide an overview of the information provided by the States to five basic and broad questions. The text of each question precedes the overview.⁶ With regard to each, some general observations will be made to indicate the general tenor of the responses. These observations will attempt to portray both perspectives that are generally shared among Western States, as well as describing important exceptions and caveats. Examples will then be used to illustrate the general observations.

This section of the report is drawn exclusively from the information provided by Western States, and contained in appendix I. To some extent, it is likely that the breadth of this information was influenced by the type and number of State agencies involved in providing it. Reference to the appendix is encouraged for this reason, as well as to further elucidate this overview.

Referencing the appendix will also be important in understanding the tables contained in this report. Given the time frame and resources of the Western Water Policy Review Advisory Commission, it did not ask the WSWC for a

⁶ The original questions posed to the States are abbreviated in this report so as to clarify the State responses summarized herein and to consolidate those portions of the responses relating to the Federal role under "Evaluation of the Federal Role."

comprehensive picture of water resource management in the West. Rather, although the questions were broadly stated, an emphasis was given to brevity. In light of this, and other factors relating to the responses, the tables should be viewed as a general indication of the Westwide priority of problems in water resources, as well as anticipated and proposed solutions to those problems.

Water Problems

Please identify and briefly describe significant present and anticipated water problems in your State.

Addressing Water Supply Needs

The need for additional supplies to meet growing and changing water supply demands for both offstream and instream needs was identified by virtually every Western State, as illustrated in table 1. It should not be surprising that in the arid West, after a decade in which virtually every Western State was affected by severe drought, that water supply continues to be a vital concern. This is further explained by projected increasing demands for the future.

For example, the State of California's Department of Water Resources notes:

From a State perspective, the Department projects that there will be chronic water shortages in the future (even in average water years) unless agencies at all levels of government take actions to improve water supply reliability for their systems. For example, although projected implementation of water conservation measures will save about 1 million acre-feet (Maf) of water by year 2020, the State's increasing population will result in an increase in urban water needs of 4 Maf by 2020. Environmental water uses—such as water supplies for wildlife refuges and fishery instream flow requirements—are estimated to increase by 1-3 Maf by 2020, depending on the implementation of legislative, regulatory, and other programs.

Table 1.—Present and anticipated major¹ water resource problems in the Western States

Major categories	A K	A Z	C A	C O	H I	I D	K S	M T	N E	N V	N M	N D	O K	O R	S D	T X	U T	W A	W Y
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Thus, the State of California Department of Water Resources concludes, "By year 2020, annual water shortages of 4-6 Maf could occur during average water years if additional facilities and water management programs are not provided." Wyoming identifies as one of its primary goals preserving "the ability to develop . . . remaining compact allocations . . ."

New Mexico states:

As elsewhere in the West, the basic problem faced by New Mexico is that supplies of fresh water are limited. Most surface water and groundwater sources within the State are fully appropriated.

Water supply is also a challenge in States that are perceived to have more water available for use. For example, demands to preserve instream flows for salmon and other anadromous fish, in addition to increased support in society for recreation, fish and wildlife, and aesthetic purposes, mean that in States like Oregon "providing an adequate water supply is one of its most pressing issues." Washington representatives explain:

Current and projected population growth is expanding the demand for water for drinking and sanitation, commercial and industrial use, and recreation and aesthetic enjoyment of water courses. At the same time, increasing numbers of anadromous fish runs are reaching a critical point, triggering the Federal Endangered Species Act (ESA) and related restrictions on water development.

While recognizing that developing additional storage opportunities will be an important component of addressing growing consumptive use demands, it is important to note here that there is broad recognition that, as the State of Utah concludes, "large projects will be very limited." Instead, projects are likely to be more innovative, environmentally sensitive, smaller in scale, and financed largely through State and local revenue sources.

In some cases, the most pressing problem is a maldistribution of supplies relative to existing and projected future demands. For example, North Dakota representatives explain:

Approximately 95 percent of North Dakota's total surface water supply comes from the Missouri River. It also contains the best quality surface water in the State. Approximately two-thirds of the State's population lives in the eastern and northern portion of the State. This is also the area experiencing the most rapid growth in the industrial and value added agricultural processing industries. Consequently, the major challenge for North Dakota is to provide Missouri River water to the portions of the State requiring water for agricultural, industrial, and municipal uses.

Rapidly growing southern Nevada is looking for reallocation of supplies both from other parts of Nevada itself and by increasing Nevada's share of the

Colorado River. Several States noted the growing trend toward conversion of senior agricultural water rights to municipal and industrial uses with a consequent loss of prime agricultural lands.

While identifying the necessity generally for additional supplies, States also underscore specific needs. Thus, States are concerned about providing supplies to rural communities. Montana underscores its problem in providing good quality drinking water to small rural water users by noting that "some rural residents must haul their own drinking water. Drinking water systems are expensive; the costs often exceed the water users' ability to pay." South Dakota representatives note that most areas in their rural State "must contend with either poor water quality or insufficient amounts of water which harms the quality of life and restricts opportunities for economic growth."

Several States emphasize the importance of providing additional supplies for Indian tribes as an area of concern. For example, Colorado describes, as a priority, completing the Animas-La Plata Project in southwestern Colorado, a critical component of which is to satisfy the outstanding reserved tribal water right claims of the Southern Ute Indians and the Ute Mountain Ute Indians. Although the project was originally approved in 1968 and is currently funded, construction has yet to begin. More generally, Oklahoma concludes that, in order to resolve Indian reserved rights claims, "it will be essential for the State to work in cooperation with Oklahoma's Indian tribes." Washington states that Indian tribal water rights "are being asserted more frequently and effectively by Washington's twenty-seven federally recognized tribes." Noting the State court's decision in the Yakima adjudication, which recognized the existence of both on-reservation "Winter's rights," as well as offstream reservation instream flow rights associated with treaty fishing rights, Washington concludes that "extension of this logic to the other tribes in the State poses a significant potential impact on all existing State law based water rights."

Arizona adds that:

In addition to increasing urban demands, there is great uncertainty regarding water allocation resulting from the extremely large claims for Winters Rights by the Indian tribes. Winters rights for most tribes will constitute the senior claims on many of the watersheds. Using the practically irrigable acreage test, it is likely that significant water rights will be granted to several tribes.

In sum, virtually every Western State expressed the need to provide additional supplies to meet current and anticipated demands. This challenge continues to be considered a preeminent concern in the arid West.

Meeting Expanding Environmental Needs

States are increasingly challenged by the need to protect and enhance the environment. Oklahoma notes that one of its most significant issues relates to providing instream flow protection. Oklahoma representatives note that "inadequate instream flow adversely affects all beneficial uses, including aquatic life, recreational activities, aesthetics, hydropower generation and navigation." Nevada representatives express a challenge that many other States face as well:

When surface water systems were adjudicated and Federal decrees imposed, no one thought to assert claims for instream flows . . . Today, the need to maintain adequate streamflows to support fish, provide recreation, and maintain riparian systems and water quality is becoming increasingly important to both Nevada's economy and quality of life.

Many of the demands for increased instream flows are being generated by implementation of Federal mandates, primarily through the Clean Water Act and the ESA. While Western States agree with the objectives of both of these acts, areas of concern revolve around implementation of their provisions. Particularly with regard to the ESA, several States express concern regarding the impacts of this act on water supply. For example, Idaho notes that the ESA (and the Clean Water Act) are often used "as an excuse to achieve agency objectives unrelated to the purposes of the Acts in an effort to force a reallocation of water supplies . . ." California noted that the "Federal application of the ESA has had negative impacts on local water agencies in terms of . . . creating uncertainties in water supplies, and reducing access to existing water supplies."

Although these concerns will be dealt with in more depth in a subsequent section of this report, they clearly pertain to the problems identified by States with regard to providing adequate water supply. For example, New Mexico representatives observe that the recent listing of the Rio Grande silvery minnow as endangered has created a new water need which may compete with existing irrigation and municipal water needs. Endangered species concerns are now competing elsewhere against existing water uses, as well as potential future water development in most surface water systems in New Mexico. In the Gila and San Juan River systems, water needs for endangered species could impede New Mexico's ability to fully develop its share of Colorado River water as authorized by Federal law.

Managing Existing Supplies

Challenges continue regarding the management of existing supplies. For example, Kansas representatives recognize "that one of the areas which needs considerable attention is the need for rehabilitation of existing dams in the State." Many of the dams in Kansas were built in the earlier part of the 20th century, and the average life of existing dams in Kansas exceeds 40 years. Montana also notes that its water storage and irrigation

infrastructure is deteriorating: "Many projects owned by the Federal Government, the State of Montana and private parties are unsafe and need rehabilitation."

Some States express a concern about the current status of efforts to gather and manage basic data. Alaska concludes that "[t]he dearth of hydrologic data in Alaska is perhaps the most limiting factor governing our ability to manage Alaska's water resources." Alaska is not alone in its lack of hydrological data. Nevada's response underscores that State's concern as follows:

While decision makers at all levels of government must make water related decisions, such as whether to expand a well-field, build miles of pipeline to import water, or allow new commercial development, decisions which involve the expenditure of millions of dollars -- there is limited detailed data to support such decisions. Further, what little water data is available is scattered among the files and databases of a variety of agencies throughout Nevada. Unfortunately, it is not collected in a uniform manner nor stored for easy accessibility.

Oklahoma representatives, recognizing the importance of such data, confirm that "much of this data is widely scattered and exists in a variety of formats. Consequently, procurement of this data by a single individual, agency or organization is often difficult, expensive and time-consuming."

The West is often subject to wide swings in water supply. Thus, virtually an identical number of States identified drought planning and response as a priority problem, as did those who similarly flagged flood planning and response. One may speculate that this priority is based on the current hydrologic conditions faced by the various States. In reality, given the wide swings in supply, the roughly equal identification likely indicates that Western States are concerned about the need to improve both drought and flood response. Nevada's experience is illustrative. Nevada representatives describe the following history:

The last 15 years have seen some historic highs and lows. We experienced back-to-back wet years in 1983 and 1984, an average year in 1985, and

another very wet year in 1986. From 1987-1994, the State experienced its worst drought ever. In 1995 and 1996, we were back into a wet cycle, recording as much as 250 percent of normal.

Responding to Legal and Institutional Challenges

In this area, several States point to what they see as inadequate or inappropriate Federal involvement. For example, California notes that "recent budget cuts in Federal programs have depleted staff resources at some Federal agencies . . . to the point where Federal performance in administering existing water projects and programs has noticeably suffered." Montana observes the Federal Government "continues to address water resource issues with a 'command and control' approach that severely restricts the development and implementation of innovative and effective solutions." Further, "Some Federal agencies do not have a clearly defined mission; in many cases, there are overlapping duties."

Alaska representatives encourage Federal agencies to use State water law to secure water rights for existing uses, both off-stream and instream, but they report that they "continue to withdraw water for management purposes without a State water right or a quantified Federal reserve water right. Managing State waters under these conditions is at best difficult and places a cloud over existing water rights where Federal lands exist, which with 60 percent of the land in Federal ownership is most often the case."

In New Mexico, attempts to negotiate settlements for all Indian water right claims are being impeded by the uncertainty created by Federal delays in implementing existing settlements, resulting in uncertainty among Indian and non-Indian users alike.

While one of Wyoming's primary goals is to preserve its ability to develop its remaining compact allocations, its representatives state:

The Federal permitting and regulatory agencies seem to have their own agenda. Particularly the Corps of Engineers in their 404 permitting process have a definite slant toward the transfer of agricultural rights to other uses as opposed to developing new storage facilities. The drying up of agricultural lands in a State as arid as Wyoming has definite impacts, both economically as well as environmentally. While some oversight at the Federal level may be appropriate, the State should have greater latitude in determining the projects they would like to pursue and construct.

Conflicts among States also represent a major challenge for several States. Nebraska notes that "the States of Kansas and Nebraska have long disagreed about the nature of each State's entitlement under the Republican River compact . . ." Nebraska also recognizes the necessity, as well as the challenge, of working with Wyoming and Colorado, in addition to the Federal

Government, in finding solutions for the endangered species problems in the Platte River basin. Uniquely situated, Colorado supplies water, in differing degrees, to 18 other States. Numerous interstate compacts and Federal decrees control the supply to those States. Colorado concludes that "as a result of these compacts and decrees, many of Colorado's present and anticipated areas of concern in relation to water necessarily revolve around her ability to deal with problems and challenges that arise as a result of these agreements."

Arizona shares its southern border with the Republic of Mexico. It therefore shares many groundwater basins and surface watersheds with Mexico. The need to manage water on an international basis creates unique and problematic situations for border communities. Water quantity and water quality issues are likely to become more critical to all parties as growth occurs.

Washington representatives list restoring the interstate Columbia and Snake Rivers as one of that State's priority problems. They conclude:

Upstream storage in Idaho, Canada and Montana has been manipulated to alter the natural hydrograph in favor of winter power production and summer irrigation. For anadromous fish to survive in a system, some water needs . . . to go back to the natural high flow period in the spring. There is a major political battle in the region over this attempt . . .

Competition among various interests for scarce water resources has been part of the history of water development and management in the West. However, given the significant decrease in Federal financial support for water supply projects, and the concomitant increase in societal support for instream uses, competition has never been greater. This invariably leads to disputes among water users. Some States include this as a priority area of concern. Thus, Idaho notes that "there are growing conflicts between surface and groundwater users, and between consumptive and non-consumptive uses." Oklahoma also discusses this trend in observing that the "resolution of disputes involving these issues (utilization and protection of water) is growing in importance." Washington representatives conclude that in their State "there has been a continuing public debate underway for over ten years regarding the relative priority of protecting water instream versus further offstream water developments. Because there is a rough balance and strength between the advocates of both positions, an ongoing political stalemate has set in."

Rural Community Needs

Identify and briefly discuss problems of rural communities in your State relating to water supply, potable water treatment, and wastewater treatment. Please briefly describe any programs in

your State to provide assistance to rural communities relating to water supply, potable water treatment, and/or wastewater treatment.

There is a great deal of commonality in the responses received from Western States addressing the above questions. Despite the fact that the West has become the most urbanized region in the country, it is quite evident that States continue to be concerned about the problems of rural communities and have a variety of programs to address their needs.

Problems

Insufficient Supplies.—Inadequate supply of water for rural communities continues to be a primary concern in the West, particularly in times of drought. Oregon reports, for example, that rural communities in Oregon face two major problems with regard to water supply: "a growing demand due to an increasing population and an aging infrastructure which is no longer able to be maintained or expanded to efficiently deliver water." California also points to two major problems facing rural communities from a water supply standpoint; namely, "limitations of their existing groundwater supplies, and increasing population pressure." In the unique circumstances facing Alaska, approximately 40 percent of rural Alaska households lack safe water hookups to their homes. Water is hand hauled from centralized spigots, creeks, or rivers.

Water supply problems are, of course, exacerbated during periods of drought. For example, Nevada points out that drought "has created hardships in emergency situations for these small rural systems. In some instances, systems have been forced to haul water for the customers' drinking water needs." Texas, experiencing one of the most prolonged Statewide droughts of the century, adds: "Many rural communities are facing severe water supply problems as the drought continues. There have been several communities whose water supply has been exhausted, and they have been forced to acquire water supplies from regional providers."

Compliance Costs.—The need to augment water supplies for rural communities is magnified by the requirements of the Federal Clean Water and Safe Drinking Water Acts. Nevada representatives conclude that, "More stringent requirements under the Federal Safe Drinking Water Act are placing large financial burdens on the rural community water systems in Nevada. The removal of minerals commonly found in rural supplies is frequently a technologically sophisticated and expensive process . . . Financing the construction and operation of new facilities is difficult for most

of the small communities."⁷ Likewise, population growth in some rural communities in Nevada "is causing existing wastewater collection, treatment and disposal facilities to become overloaded. Financing the construction and operation of expanded facilities is a problem facing many rural communities."

The Montana Department of Environmental Quality estimates that:

\$165 million will be required to address the needs identified for Montana's 180 public water systems and \$160 million for improvements to Montana's 191 public wastewater facilities . . . Small communities and rural systems often lack the resources to provide quality water supplies which meet Safe Drinking Water Act standards and to construct facilities which adequately treat wastewater.

While Montana has a wellhead protection program to prevent contamination of water supply, Montana representatives note that rural water systems lack the resources to comply with regulations and, at the same time, implement a wellhead protection program.

Nebraska's response notes that there is a "greatly increased need for infrastructure funding to achieve compliance and address other problems of aging public water systems." Aspects associated with compliance costs in meeting mandates under the Federal SDWA, according to Nebraska representatives, include: (1) sample collection costs; (2) lab analysis costs; (3) reporting costs; (4) public notification costs; and (5) system compliance costs.

Operator Training/Technical Assistance.—Several States expressed concern about the adequacy of training for operators of water and wastewater treatment facilities. For example, knowing that small communities often lack the resources of larger communities to manage water and wastewater systems, Utah notes that "oftentimes the operator of the wastewater treatment plant also operates the water treatment plant, as well as takes care of the cemetery. The problem of insufficient resources sometimes manifests itself in the less than adequate operation and maintenance of these facilities." South Dakota also observes that small communities have limited expertise available to comply with the Clean Water Act and the SDWA. Similar circumstances face Idaho, where "many communities lack the technical expertise to develop actions and programs that are understood and accepted at the local level . . ." In Washington, where the vast majority of the 20,000 separate public water systems serve 15 or fewer hookups, the

⁷ Most of the responses to the questionnaire were received prior to reauthorization of the 1996 Safe Drinking Water Act. Some States note the prospects for improvements if the act is reauthorized and sufficiently funded. One may refer, for example, to Utah's response in the appendix on page UT-6 of appendix I.

level of professional management in meeting Federal and State drinking water quality requirements "remains a major challenge."

State Programs

As with the problems confronting rural communities in the West, Western States have much in common regarding programs to address those problems.

Insufficient Supplies.—To address the problem of inadequate supply, for example, California has historically provided funding through the sale of general obligation bonds. A \$995-million bond measure that passed in November 1996 provides, among other things, further funding to small communities for water supply. Hawaii has also funded and developed water supply systems, which are then placed under county operation and maintenance. Montana's Department of Natural Resources and Conservation also provides assistance with the planning and development of rural water systems. In Texas, voters have authorized the issuance of bonds, and proceeds from their sale are loaned to political subdivisions of the State to construct water system improvements. Utah's Division of Water Resources administers three revolving loan programs which provide low-cost funds for water resources development. Alaska's Village Safe Water Program provides grants of up to 100 percent of the design and construction costs of sanitation projects in rural areas. These grants provide sanitation facilities, including piped utilities, haul systems, a safe water source at a central location, a place to dispose of honeybucket wastes, and, in some cases, laundry, sauna, and shower facilities. The Village Safe Water engineer assists the community by acting as the "city engineer." This program also develops proposals and secures Federal funding for planning, design, and construction of water and wastewater facilities.

Compliance Costs.—Western States also have programs to provide assistance to rural communities facing compliance problems. For example, the "Nebraska Mandates Initiative" established a program through which State agencies and other groups can provide onsite educational and some technical assistance to Nebraska communities that are either anticipated to be headed toward compliance problems with environmental health-related laws or have violated such laws and been directed to take corrective action.

The Kansas State Water Plan Fund provides hands-on technical assistance in management of rural water systems, including use efficiency, leak detection, systems assessment, and water treatment.

In every State, direct financial assistance with the development of drinking water and wastewater treatment systems comes through State-administered programs under the Federal SDWA and the Clean Water Act. Other State-administered programs augment these resources. For example, Montana lists six programs to provide funding for water supply and wastewater treatment projects. In 1991, the Nevada State Legislature created a grant and loan program to provide financial assistance to small communities to bring their drinking water systems into compliance. In addition, loans are available through the State's municipal bond bank.

South Dakota has a "Consolidated Water Facilities Construction Program which provides grants and low interest loans for community infrastructure projects, which include drinking water systems, wastewater systems and groundwater protection." Additionally, the Department of Environment and Natural Resources has a program which provides assistance to municipalities in identifying and ranking current and future environmental infrastructure needs. Further, the South Dakota Small Towns Environmental Program assists small communities with water and wastewater projects by using local resources to reduce costs.

Operator Training/Technical Assistance.—Programs to provide technical assistance to rural communities relating to the operation and management of water and wastewater treatment facilities are also common. Colorado administers a Statewide program to provide professional and technical assistance to help communities with potable water treatment and/or wastewater treatment. Several organizations exist in Montana to assist rural communities with technical aspects of managing drinking water systems and wastewater treatment facilities. The Nebraska Environmental Training Center provides training to operators. Further outreach assistance to specific communities and their operators is available, as well as an onsite training program administered by the Nebraska Department of Environmental Quality.

Realizing that small systems typically do not have full-time professional people operating their water systems, the Rural Water Association of Utah provides two circuit riders who travel throughout the State and provide onsite technical assistance to small water systems. The association also provides Statewide training to water operators. Further, the Department of Environmental Quality has staffed full-time positions in the Divisions of Water Quality and Drinking Water to provide assistance to small communities in the areas of training, testing for certification, and troubleshooting help for wastewater and water treatment plant operators. A small town's environmental project in Oregon helps participating communities identify

locally available expertise (engineers, technicians, and labor) to carry out small-scale wastewater improvement projects. The Rural Utility Business Advisor Program in Alaska equips communities with the necessary skills to manage their utilities like a business by providing onsite training and assistance. The Washington Department of Ecology is offering partnership projects in conjunction with other regulatory agencies to assist communities in identifying priorities and scheduling compliance. Washington also requires operator certification.

Despite the steps taken by Washington and other Western States to address the needs of rural communities through a variety of programs, Washington speaks for many Western States in underscoring the "considerable financial stress on rural communities." In 1993, the Department of Ecology prepared a needs assessment for water quality infrastructure that showed a need for local capital facilities for 1993-1999 of between \$3 and \$3.8 billion. Washington concludes:

These needs combine with other urgent community needs to exceed the financial capability of many communities. At the same time Federal funds to assist communities in meeting these needs have been shrinking as part of efforts to reduce the Federal deficit. Neither have State funds kept pace with the growing population or inflation.

Augmenting Water Supply

Describe the need and opportunities for additional storage or other arrangements to augment existing supplies including, but not limited to, conservation.

As noted in a previous section, storing water for multiple uses enabled the settlement and development of the West, with its attendant benefits for the Nation. However, the West has changed to become the most urbanized region in the country, although irrigated agriculture remains the dominant water use. At the same time, society's support for instream uses has grown, so that providing water supplies of sufficient quality to meet growing and competing demands on water resources is perhaps the preeminent challenge for water resource managers in the Western States, as evidenced in the previous overview of problems. Understandably, strategies to address that challenge are uppermost in their minds. Table 2 illustrates these strategies.

One strategy is construction of further surface reservoirs. But, for the most part, these reservoirs will be dissimilar in several respects from those constructed in the past. Oregon notes, for example, that "most new storage

Overview of State Responses

Table 2.—Anticipated significant³ opportunities to augment supplies in the Western States

Major ¹ categories	A K	A Z	C A	C O	H I	I D	K S	M T	N E	N V	N M	N D	O K	O R	S D	T X	U T	W A	W Y
1. Storage/capital improvements																			
A. Surface reservoirs		X	X	X		X	X		X		X	X		X		X	X	X	X
B. Distribution/diversion facilities ²	X		X					X			X	X		X		X			
C. Groundwater recharge projects		X				X	X			X			X	X		X	X		
D. Groundwater development				X				X	X	X							X		
2. Reoperation or modification of existing storage facilities ³			X	X				X		X	X		X	X		X		X	
3. Reallocation/transfers/banks ³		X	X	X		X	X	X	X	X	X	X		X	X		X	X	
4. Weather modification						X	X						X			X	X		
5. Water conservation ⁴		X	X	X	X	X		X		X	X		X	X	X	X	X	X	X
6. Water treatment facilities ⁴	X		X		X				X		X	X	X	X	X	X	X		
7. Reuse ⁴		X	X		X	X							X	X		X	X	X	
8. Conjunctive use ⁴			X	X		X			X	X	X								

¹ This table lists only those opportunities described in the State responses that are deemed of major significance in augmenting supplies. Further, if the measure was listed by not more than two States, it is not included because of space limitations. The table should not be used to assess the relative importance of augmentation opportunities within a State and does not distinguish between augmenting supplies for offstream and instream uses.

² This storage augmentation opportunity covers State responses that have identified the need for new distribution or diversion facilities from existing sources. The surface reservoir opportunity assumes the attendant construction of distribution facilities.

³ These measures are most often designed to augment supplies in a particular area of scarcity from an area of relative abundance.

⁴ These alternative measures result in augmentation only to the extent they produce more water for use; for example, if water conservation results in saving water otherwise lost for use. Additional benefits are cited in State responses, such as an increase in water of suitable quality.

will probably be of relatively small size compared with the major dams built in the 1940's-1970's. The new reservoirs are also likely to be multiple purpose structures with significant public benefits." Wyoming notes that "it is unlikely that any large irrigated agriculture projects will be constructed in the future. The more likely need for additional water supplies in Wyoming will be for municipal or industrial purposes." Utah concludes that "some additional water supply development will continue in some areas of the State to meet future demands, but large projects will be very limited."

Apart from distribution systems associated with the construction of new surface reservoirs, some States plan to construct new distribution facilities from existing sources. For example, North Dakota anticipates that the

Garrison Diversion Unit will further result in the construction of water diversion and supply systems to distribute Missouri River water to water-short areas of the State.

Some States are also proceeding with further development of groundwater supplies. Montana, for example, sees increased groundwater use as an inevitable result of surface water becoming more highly appropriated. Thus, Montana concludes that "in closed basins (closed to the issuance of new surface water use permits), future water supply requirements (for municipal and domestic water uses which are exempt from permitting requirements) will likely be met from groundwater sources and also the sale or leasing of existing water rights." To address long-term needs, Kansas anticipates further development in the Dakota aquifer, under a management program to guide and limit its development to assure its long-term viability.

A relatively recent storage alternative is being considered by several States: managed groundwater recharge projects. Nevada's representatives note that "with Nevada's high rate of evaporation (up to 80 inches per year in southern Nevada), underground aquifer storage seems a particularly attractive option. Currently, there are four active large-scale artificial recharge programs ongoing in Nevada. The potential is much larger." Idaho also sees the "expanded use of groundwater storage/managed recharge" as one of the components in meeting that State's future water supply requirements.

Several States see reoperation or modification of existing storage facilities as part of the solution to augmenting supplies. According to California representatives, examples include "changing a reservoir operations rule curve to increase the yield of the reservoir (at a somewhat greater risk to carry-over storage) or converting a single-purpose flood control reservoir to a year-round storage facility." The Front Range Metropolitan Water Forum, established in 1993 by Colorado Governor Roy Romer, is exploring cooperative approaches to coordinate and integrate the operations of many existing but separate water systems in the Denver metropolitan area. Oklahoma notes that the "exploration of opportunities to enhance the operations and benefits of existing reservoirs will become an increasingly attractive planning option, especially due to the current costs and environmental restraints associated with new project construction."

Given the fact that most of the water supplies in the West are already allocated for some purpose, and yet demands continue to both increase and change in response to societal demands, some have dubbed this period "the era of reallocation of water supplies." Indeed, a number of States referenced reallocation as an anticipated means to augment supplies, although it chiefly relates to augmentation in a particular area of scarcity from an area of relative abundance within the State.

New Mexico, for example, concludes:

With increasing demands on water for municipal growth, Indian water claims, and environmental purposes, New Mexico is faced with the challenge of overseeing an orderly reallocation of its water resources from traditional water uses, such as irrigation, to new uses. The challenge, and the solution, will lie in providing for the transfer and reallocation of its water within the State, in a manner that will accommodate both Federal and State water requirements.

To facilitate and, in some cases, guide such a reallocation, some States have moved to formally encourage transfers, and some have created water banks to facilitate such transfers. Arizona, California, and Idaho, for example, all have utilized formal banks to facilitate transfers. California did so primarily in response to the consequences of drought. Arizona has established a groundwater bank to meet future demands in Arizona, and also potentially as a resource available under certain circumstances to other States in the Lower Colorado River Basin. Recently, Idaho's water bank has been a means through which Reclamation has purchased water to augment flows for salmon in the Snake and Columbia Rivers.

Some States are pursuing weather modification as a means to augment supplies, although they recognize that the degree of efficacy of such measures is in dispute. For example, in Oklahoma "weather modification is considered . . . to be an effective and promising water resource management tool." While recognizing that many remain skeptical regarding weather modification technology, Oklahoma has entered into a contract with a private corporation to conduct a two-phase Statewide rainfall enhancement and hail suppression program.

The great majority of Western States list water conservation as a significant opportunity to optimize the use of existing supplies. In South Dakota, the Belle Fourche Irrigation Project rehabilitation project will result in annual water savings projected to be 15,000 to 20,000 acre-feet. Prior to the construction of any new projects, Washington states that "future water requirements will need to be met first through better use of existing developed supplies . . ." However, several caveats are included in the responses. For example, Colorado has established an Office of Water Conservation and has implemented a pilot demonstration program to promote improvements in water use efficiency. It required over 60 entities to submit water conservation plans. It also provides technical assistance and education Statewide. Nevertheless, Colorado representatives caution that "conservation has limited impacts to overall water supply unless the consumptive use is reduced. Conservation can have significant impacts on the timing of when water supplies are available and may result in a reduction of costs to municipal facilities."

Montana adds that water conservation "may be important in meeting future demands in localized areas, but is not expected to be a major source of supply." Wyoming adds another caveat, noting that "in an arid State like Wyoming, the impacts of conservation, at least from agricultural uses, need to be carefully examined. Many of the wetlands and wildlife habitat areas in the State have developed due to the use of irrigation water in the State."

Nebraska's response perhaps capsulizes an overview of the State responses relative to water conservation. It states: "Conservation is also likely to play a significant role, but the opportunities for major improvements in water supplies is limited, especially in those areas where 'excessive' water use just results in returned flows depended upon by someone else. Notwithstanding these limitations, conservation opportunities will be fully explored whenever water supply problems exist."

Many see the construction of new water treatment facilities as critical in augmenting water of suitable quality. For example, the Texas Water Development Board has identified water and wastewater infrastructure needs that could total \$63 billion within the next 50 years. Of that amount, the projected costs for water supply reservoirs and conveyance systems account for only about 8 percent of the total monetary needs. Much of South Dakota's future water supply requirements "in terms of availability and quality have been and will continue to be addressed" through development and upgrading of rural drinking water systems.

Like water conservation, reuse or recycling of water offers distinct advantages, although it is likewise recognized that water recycling creates "new" supplies only in areas where wastewater is not being put to further use. Thus, California sees particular advantages for coastal cities where wastewater is otherwise discharged to the ocean. Hawaii is looking for ways to safely utilize reclaimed wastewater and agricultural irrigation. It is being cautious in moving ahead so as to assure protection of groundwater and surface water supplies used as sources for drinking water. Oklahoma envisions that "future water shortages and cost considerations will generate increased pressure to reclaim and recycle wastewater." However, Oklahoma adds that, additionally, research is needed to determine the possible health and environmental effects of reuse and application of wastewater.

Conjunctive use is also seen as a means to increase the efficiency of current water uses, so as to stretch water availability, although it is not perceived as a means of providing "new" supplies. Nebraska, for example, expects that its comprehensive policy allowing integrated management of hydrologically connected groundwater and surface water will play a significant role in resolving water supply problems. Nevada notes that Carson City has been very innovative in their water management and planning. The city has gone from 80 percent groundwater usage and 20 percent surface water usage to 40 percent groundwater usage and 60 percent surface water usage, allowing

the groundwater reservoir to "rest" during times of adequate surface water supplies.

Western State Innovations

Please provide illustrations of significant innovations in water management, water use, water law, or other areas related to water in your State at the State, regional, or local level.

This section is the longest section in the report, reflective of the number and variety of initiatives by Western States to deal with their distinctive needs. It is, nevertheless, designed to be illustrative, not comprehensive. The innovations are divided into the four major categories (used in table 1) relating to major water resource challenges facing the Western States.

Addressing Water Supply Needs

Many Western States have programs to help fund water development. For example, in 1993, legislation was enacted to create a dedicated funding source for water development in South Dakota. Revenues from this dedicated fund are used to meet non-Federal cost share on large water development projects. In addition, smaller water infrastructure projects and wastewater projects may apply for State financial assistance through the State Consolidated Waste Facilities Construction Program.

In Oklahoma, the primary State financing provider for community water and wastewater projects is the Statewide water development revolving fund created by the State legislature in 1979 and confirmed by popular vote in 1984. It provides a reserve for the Oklahoma Water Resources Board's (OWRB) bond issues. Due to the excellent credit ratings on the issues, the OWRB's bond program offers small borrowers lower interest rates than could be obtained if they marketed their own bonds. Interest earned on the Revolving Fund is the source of funds for the OWRB's emergency grant program. Qualified projects can apply for up to \$100,000 in grant money. The program is based on a priority point system, with the type of emergency being the primary factor.

There is clearly increasing emphasis on the importance of water conservation to not only augment, but, perhaps more importantly, "stretch" existing supplies. Thus, as previously noted, the State of Washington recognizes that future water requirements will need to be met first through better use of existing developed supplies if further impacts to aquatic resources are to be avoided. In the late 1980s, legislation was passed establishing policies favoring water conservation as a source of water supply if cost effective as compared to new supply development. Some significant movement in this direction is occurring in both urban and rural settings. Larger cities in Washington have developed conservation plans and programs based on

retrofitting existing fixtures and conveyance, leak detection, and fee structures. Washington was one of the first States to adopt a water saving plumbing code. The State Departments of Ecology and Health have adopted water conservation guidelines for utilities to address in their system planning. There is increased interest in urban conservation, reclaimed water use, low water-use landscaping, and water rates that encourage conservation. With regard to agriculture, Washington's Department of Ecology has rules and regulations requiring development of conservation plans by irrigation entities seeking State financial assistance for water system improvements.

The Oklahoma Leak Detection Program is designed to identify causes of energy and water losses that diminish the efficiency and profits of many rural water suppliers throughout the State. The program provides no-interest loans of up to \$30,000 per applicant to rural systems to conduct water audits/leak detection surveys and to implement appropriate corrective actions. When a project is completed, the applicant is furnished a negotiable schedule of payment which takes into consideration the estimated savings from program participation. For example, through the program, the M&L Water District in Okmulgee County identified an estimated 51 percent annual water loss/energy savings with repairs addressing leaks, pumping operations and meters, with an estimated savings of over \$89,000.

Wyoming's city of Casper, the Casper-Alcova Irrigation District, and Reclamation, in the mid-1980s, entered into an agreement whereby the city of Casper paid for water conservation improvements in the conveyance system (irrigation canal lateral linings) and, in return, Casper was able to obtain a secondary storage permit for the "saved" water in two North Platte River reservoirs—up to a total of 8,000 acre-feet per year—that now is not diverted and lost as deep percolation and seepage out of the canal lateral system.

Honolulu's Board of Water Supply has conservation rules and regulations which are implemented when water levels in certain facilities drop below specified levels. These facilities have pump suction set within a large underground body of water that would be affected during a prolonged dry period of time. There is a water level at which the public is notified to cut back on its water usage. At a lower water level, more drastic steps are taken.

The New Mexico State Legislature passed a law permitting certain political entities within the State to place water rights in a conservation program whereby the water rights would not be subject to forfeiture through nonuse.

The Interstate Stream Commission has used this program to increase its deliveries to Texas to meet requirements of a court decree without enforcing priorities and curtailing water uses without compensation.⁸

Along with water conservation, the potential of water recycling is viewed as a way to help ease problems with limited fresh water supplies. For example, Hawaii is looking for ways to safely use reclaimed wastewater for agricultural irrigation. California is considering wastewater reclamation (water recycling), particularly for coastal cities. It is estimated that recycled water supply will increase in that State by about 1 Maf by 2020.

The reuse of wastewater effluent is also increasing in Nevada. It is anticipated that effluent reuse will continue to increase in the future. Many communities are currently reusing effluent for landscape and agricultural irrigation.

In coastal States, desalinization is also receiving increased attention. In California, desalting (either seawater or brackish groundwater) is currently limited to relatively small-scale development, due to high operational costs associated with current technologies. However, the Metropolitan Water District is conducting desalting research, including construction of a pilot scale desalting/cogeneration facility. If less energy-intensive technologies are developed and put into commercial production, there may be greater reliance on desalting in the future. Hawaii notes that "being an island State, whether acknowledged or not in the water plan, desalting of seawater, as an alternate source of supply, has to be considered as the availability of groundwater and surface water diminishes."

Reallocation of existing uses in the West is seen as a means to augment supplies in areas of relative scarcity. For example, as the water supplies in Kansas are reaching full allocation, and the primary use of water is irrigation, the only real "new source" of water to meet new demands will have to come from conversion of irrigation water rights to other beneficial uses. To facilitate this process, the State has developed a discretionary conversion process for potential conversion, based on the consumptive use for corn, which offers a streamlined approach to minimize the need for complicated, lengthy legal confrontations about the reallocation of water throughout the State. At the same time, Kansas has developed a water transfer act to help guide the transfer of water which exceeds 2,000 acre-feet in quantity a distance of

⁸ New Mexico representatives add that a similar program could be instituted in other parts of the State, such as the Rio Grande Basin to permit the Federal Government to purchase water needed for preservation or recovery of species listed as endangered or threatened under the ESA.

35 miles or more, so as to protect basins of origin as well as provide the opportunity for the basins of need to assist in improving long-term water supplies.

In Wyoming, the Cannon Land and Livestock Company/PacifiCorp transfer and exchange allows PacifiCorp to use water that is stored in Pathfinder Reservoir as industrial water in the winter at PacifiCorp's coal-fired powerplant near Glenrock. Water that had been used by Cannon Land and Livestock as direct flow irrigation water in the summer is stored as irrigation water in Glendo Reservoir, bypassing PacifiCorp's plant and replacing the borrowed water from the winter.

Conjunctive use also offers a means to stretch existing supplies. In California, the ability to expand the yield of existing facilities exists in programs which rely on the availability of surplus supply of surface water and a suitable groundwater basin in which to store it. State and local agencies are studying a large number of conjunctive use projects.

The Kansas Division of Water Resources is working with the city of Wichita on a pilot project to develop a system by which water can be withdrawn by alluvial wells along streams during periods of high streamflow and pumped into municipal well fields to recharge the aquifer.

Sierra Pacific Power Company (Reno area) has conjunctively used groundwater and surface water for many years, using about 15 percent groundwater in normal years and 25 percent in dry years. To encourage Sierra Pacific Power Company to accelerate its conjunctive use program, the State Engineer's office has recently allowed the additional use of the groundwater reserves when Truckee River supplies are insufficient to meet demand or water quality is impaired.

Nebraska's most significant innovation in water management is probably the creation of natural resources districts in 1972. They are the entities primarily responsible for groundwater management in the State, both for water quality and water quantity reasons. With the passage of LB 108 in 1996, those districts are also now being enabled, with groundwater management authorities, to protect surface water supplies. Because integrated management of groundwater and surface water is a major issue in both the Platte and Republican River Basins, the natural resources districts will be instrumental in identifying and implementing solutions for water supply problems in those basins.

Changes in water rights permitting laws are being implemented in some States to facilitate greater and more efficient use of existing supplies. The most innovative water law change in the past 10 years in Nevada has been the ability to file and approve temporary changes in water uses. This has opened the door to allow municipalities to use poor quality sources for uses such as road construction, dust control, and other temporary uses. It also

allows for short-term leases of agricultural rights by municipalities during drought periods.

Several changes have been made to South Dakota's water rights laws in recent years to improve services provided to the public. These include: (1) the authority to issue uncontested water rights permits in-house, rather than through an administrative board, shortening the length of time required to acquire a permit by as much as 90 days; and (2) allowing modifications to be made to water rights permits, such as diversion point location changes, additional diversion points and acreage changes, without needing to file an application to amend.

In the lower Rio Grande, New Mexico, as an alternative to the existing mechanism of complex, time consuming, and expensive adjudication, has proposed to all the litigants, including the Federal Government, the early negotiation, through Alternative Dispute Resolution, of a transfer mechanism which will accommodate competing claims to water.

Meeting Environmental Needs

Several Western States have made innovations in their laws and institutions in order to augment and protect instream flows. Montana's Water Use Act, for example, allows public entities to apply to the Department of Natural Resources and Conservation to reserve unappropriated water for existing or future beneficial uses or to maintain a minimum flow, level, or quality of water. Water reservations have been granted in the Missouri and Yellowstone River Basins. The water reservation is an important mechanism for planning to meet future water demands. State law permits the Department of Fish, Wildlife, and Parks and other water interests to lease water rights from water right holders for the purpose of protecting instream flows.

Washington State's Department of Ecology is working closely with the State Department of Fish and Wildlife and Indian tribes on a wild salmon policy for the State, intended to reverse the decline in wild fish populations that is prompting listings under the ESA. The policy addresses changes in the ways the State manages habitat (including water), hatcheries, and harvest, all of which have an effect on the health of wild fish. Proposed changes in the way Reclamation operates the Columbia Basin Project and the Yakima Project are important components in plans to recover Columbia Basin salmon from the brink of extinction. Changes in the way the Bonneville Power Administration operates Federal power facilities on the Columbia River are also changing, due to ESA listings in the Columbia Basin.

In adopting the sustainable yield concept, Kansas has been developing rules and regulations to allocate groundwater and surface water to provide for

maintenance of baseflow in streams and to reserve a portion of the natural recharge for streamflow maintenance.

The Scenic Rivers Act is a mechanism established by the Oklahoma Legislature to provide general protection of instream flows. For designated "scenic rivers areas" listed under the act, legislative consent is required before State agencies approve plans to construct, operate, or maintain any dam. There is an exception for municipal or domestic uses, but only when the structure would not interfere with preservation of the free-flowing stream. In addition, the OWRB has implemented low-flow restrictions on the Baron Fork River, one of six scenic rivers in the State. Idaho has a program whereby scenic rivers are designated through the State water planning process and then presented to the legislature as part of the plan. Upon approval of the legislature, they become protected State rivers.

Nevada's Washoe County and the cities of Reno and Sparks will be purchasing water rights to augment flows in the Truckee River in order to improve the water quality in the river.

In 1989 and 1991, the Washington State Legislature passed legislation drafted by the Department of Ecology allowing the State to acquire "trust water rights" to facilitate protection and enhancement of the public interest in water. Such rights may be acquired by purchase, lease, gift, or by State or Federal investments in water conservation. Although only a few such rights have been acquired to date due to funding problems, momentum is gaining in a number of areas to use this law as the basis for water exchanges, water banking, and streamflow restoration.

Protecting water quality is a high priority for Western States. States are endeavoring to incorporate innovations in their water quality programs, particularly regarding nonpoint source pollution. Thus, through the EPA-funded section 319 program for nonpoint source pollution, Nevada's Department of Environmental Protection encourages innovative solutions to water quality problems. One section 310-funded demonstration project studied the use of alum as a coagulant to remove sediment and phosphorus from a severely degraded stream. This project was very successful. Other nonpoint source projects pertain to the development of artificial wetlands to improve water quality in streams.

Several areas of the State of Nebraska now have average nitrate contaminations in groundwater which exceed the Federal health standard of 10 parts per million. Several of the State's natural resources districts already

have programs to deal with this problem. Best Management Practices are required in several areas and there are indications that these practices are preventing future increases in nitrate levels.

North Dakota's chemigation regulations were adopted to minimize the possibility of chemical, pesticide, fertilizer, or other contamination of irrigation water supplies. The State Engineer has established rules for installation and maintenance of equipment and devices for chemigation purposes.

Managing Existing Supplies

The depletion of groundwater has been a major concern in several Western States. The Groundwater Management Act of 1980 was a major innovation in dealing with Arizona's longstanding problem of groundwater overdraft. The groundwater code also was drafted to recognize the need to integrate the new Central Arizona Project water supplies into the water management system within the State. Based on several years of implementation of the target conservation goal method, alternatives have been added to the code which allow users to meet conservation requirements through the implementation of specific conservation measures and programs. The modification of the code to allow use of alternative programs is an example of how the State has attempted to keep the groundwater management program dynamic and responsive to current conditions.

Utah's State Engineer has successfully managed groundwater through groundwater management plans to guide future water use and development in a particular basin. These plans address such issues as the safe yield for the basin, water quality considerations, future appropriations of water, and other management issues needed to protect the resource.

Nebraska's natural resources districts all have groundwater management plans. State legislation authorizes natural resources districts to address groundwater mining problems. Several have management areas in place with attendant regulations which will trigger regulatory action if water levels decline by predetermined amounts.

As in other parts of the country, the West is plagued by alternating periods of flooding and drought. In dealing with flooding, South Dakota has implemented an interagency flood task force as a coordinated effort to address continuing flooding problems in the eastern part of the State. The task force State agencies are identifying flood-impacted sites and attempting to prioritize the flood-damaged areas needing assistance. Prioritizing of sites requires considering whether a permanent fix is feasible in order to get the best return on investment.

Kansas has worked cooperatively with the U.S. Army Corps of Engineers for years on flood control projects. For fiscal year 1997, the State is highlighting the development of multipurpose small lakes for public water supply, recreation, and flood control.

With regard to drought, in Montana, for example, several State agencies and local conservation districts have been working together to make portable irrigation diversion structures available for use by irrigators when streamflows are low. These portable irrigation diversion structures were designed as an alternative to temporary diversions such as gravel dikes, hay bales, logs, etc. Benefits of these structures include water conservation and reduced impacts to the fishery, streambeds, and streambanks. Irrigators can adjust the structures in order to divert only the amount of water that is needed.

"Assurance Districts" have been formed under the leadership of the Kansas Water Office on three key rivers, with eligible water rights holders along the rivers constituting the district membership. These districts assure members that their water rights will be met during low flow periods by means of a State Managed River System in which the State releases State-owned water storage from the upstream Federal reservoirs to raise water levels in the streams. The State also protects these releases from unauthorized diversion.

California's drought water bank is well known. In 1995, it moved into the area of "water futures" for the first time, developing contracts to buy or sell water options. The Westlands Water District, the Nation's largest agricultural water district (based on acreage), recently went online with an electronic intranet, to allow district water users to buy and sell water within the district.

In 1991, the Nevada State Legislature passed legislation requiring water utilities to develop water conservation plans. These plans were to include a contingency plan that ensures a supply of potable water during drought conditions. Assistance in developing these plans is available from the Nevada Division of Water Planning.

Western States also recognize the importance of reliable data on water availability and use. Innovations to improve this base of information are common. In Kansas, for example, a process is under development in the Rattlesnake Creek Basin to obtain data as to the relative level of compliance with permit conditions in that particular basin. The data obtained from this effort will then be used to establish the anticipated overall compliance throughout the State and to determine the amount of staff that needs to be allocated toward this effort. An appropriate request to the Kansas Legislature can then be developed to serve to protect the legitimate water use of the State's water resources.

Recent legislation in Oklahoma established a council of agencies and universities whose mission is to develop a strategy to implement a State geographic information system and coordinate State GIS efforts. An update of the 1980 rural water survey will use GIS technology to show the physical layout and incorporate pertinent data for communities serving 10,000 or fewer people. Once complete, this GIS will serve as a planning tool for water system managers and resources professionals. By using GIS, future updates will be quicker and less labor intensive.

Meeting Institutional Challenges

Several Western States recognize and are moving to enhance the potential value of local watershed coordination initiatives. Thus, for example, over the past 5 years, many watershed groups have been formed in Montana to solve local water problems. Most of them seek to build relationships between various water users and others interested in water so that they can achieve consensus on problem-solving strategies. Montana representatives are convinced that better decisions are made and implementation is more effective when local water interests take responsibility for solving local problems. Examples of issues that have been addressed by local watershed groups include: drought contingency planning, fish and wildlife habitat protection, nonpoint source pollution, protection of open spaces, and instream flow protection.

Nevada has initiated a variety of watershed planning efforts. The Department of Environmental Protection is now taking the lead in developing watershed plans for the Truckee and Upper and Middle Carson Rivers. These plans focus on water quality and riparian zone restoration. The Division of Water Planning has initiated a technical networking group to coordinate some 35 research projects in the Walker River Basin. Ultimately, this group will likely evolve into a comprehensive watershed planning group focusing on issues of water supply, management, flood control, and habitat protection, in addition to water quality concerns. The Nevada offices of the U.S. Geological Survey (USGS) and U.S. Fish and Wildlife Service have made efforts to form a technical working group for the Humboldt Basin, primarily to address issues related to mine dewatering and discharge. Each of these coordination and planning efforts is focused on improving resource protection, reducing overlap, identifying voids, increasing benefits, and reducing costs. Even in the early stages, State managers are beginning to see the results of these watershed planning efforts, in terms of being able to leverage dollars, develop consensus, and be more effective in resource management efforts.

Kansas' Rattlesnake Creek Subbasin has received national recognition for its unique development of a broad-based consensus approach to basin water resource management. The goal is to develop a program based on a sound and well developed hydrologic management program to maximize the water

supply through the education of water users in the area and input from the public.

A program in New Mexico allows local entities from over a dozen planning regions in the State to develop regional water plans which are to include evaluations of the water supply available to the region, the future water demands within the region, and a plan regarding how the region will meet these demands with the water supply available. Through public participation at the local and regional level, citizens and local entities participate in the development of the regional water plans, which can then be incorporated into a State water plan.

The landmark Chelan Agreement in Washington State among major water interests included a vision of locally developed watershed plans involving local governments, tribes, the State, and the full range of water interests in a consensus seeking process. The State officially sponsored and funded two such projects. Others are in various stages of progress, even though State funding has not been provided.

As conflicts over water use intensify in an era of both increasing and changing demands, States have moved to deal more effectively with these disputes. At Lake Texoma in Oklahoma and Texas, for example, where various interests clashed over operation of the lake, an advisory committee of water supply, hydropower, flood control, recreation, and fish and wildlife advocates was created to resolve the issue. After considerable study, these parties acceded to a seasonal operation plan which facilitates all reservoir uses and benefits. In addition, at Broken Bow Reservoir, the Oklahoma Water Resources Board, State Department of Wildlife Conservation, Southwest Power Administration, and the U.S. Army Corps of Engineers entered into a memorandum of understanding that set temporary conservation pool releases to facilitate operation of a downstream trout fishery. Although development of fair and mutually beneficial operation plans can be a difficult and arduous task, these successes demonstrate to Oklahoma administrators the value of dialogue, compromise, and consensus building in satisfying competing uses in Oklahoma's lakes and reservoirs.

In contrast to the lengthy and expensive litigation strategy of adjudication is a series of successful settlements of water rights claims through negotiated processes in Arizona. An important aspect of these settlements has been the inclusion of provisions which allow the long-term leases to Arizona municipalities of some of the unused portions of the Indian water rights. These provisions allowed the allocation of resources to be determined but also minimized the potential for impact by providing for lease-back opportunities.

In Washington, agreements are beginning to emerge in which water utilities are conceding some alterations in traditional water diversion practices. These are not water right settlements in the classic sense because they are

not associated with water right adjudications. Rather, they are discreet agreements over specific aspects of river management that avoid legal challenges that could be initiated by tribes. In many cases, they involve an agreement by the water utility to comply with agreed-upon instream flows, even though they are not required under the utility's water rights.

Evaluation of the Federal Role

Please discuss the manner in which Federal water-related programs and activities affect your State and water uses within your State, either positively or negatively. Provide examples where possible. Also describe State laws and programs that are effectively facilitating the accomplishment of Federal statutory purposes.

Successes

Much of the historical record involving Federal/State relationships in water resources reflects cooperation and achievement in pursuing mutual objectives. Such cooperation is important in the West, where the Federal Government owns much of the land and has developed a significant portion of the water supplies. The Federal role often becomes critical in matters involving interstate streams. The importance of cooperation has been further magnified by the significant impacts on water reallocation and use resulting from a number of environmental statutes. Many of the State responses, which provide the basis for this report, reflect the importance of the Federal role and the positive impacts resulting from various Federal laws and programs that express and implement the national interest in the management and protection of water and related resources. These positive comments are particularly prevalent within the context of intergovernmental cooperation in achieving the objectives of those laws and programs.

For example, California representatives commend the Federal Government for its participation in a State/Federal program known as CALFED, designed to resolve a number of water supply and environmental problems in the Sacramento-San Joaquin River Delta. Federal programs under the Clean Water Act and Safe Drinking Water Act are recognized by several States as making significant contributions to improving water quality and providing reliable drinking water supplies. North Dakota, for example, notes that "we have all benefitted and will continue to benefit from a cleaner and safer environment, and clean drinking water." In an agriculturally oriented State like Nebraska, the State underscores the requirements under the Federal "Insecticide, Fungicide and Rodenticide Act as especially important . . . both in terms of water quality and agricultural productivity." Nebraska also notes the valuable service to the State provided by the USGS in terms of providing water data and research and the flood prevention activities of the U.S. Army Corps of Engineers.

Despite reduced Federal funding, the Federal Government continues to play a very significant role in meeting the water resource needs of rural communities. The State responses reference many agencies and programs, including the following: (1) the Clean Water Act; Safe Drinking Water Act; Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation, and Liability Act (Superfund); and the National Environmental Policy Act; all administered by EPA; (2) the U.S. Department of Agriculture's Rural Development Program; (3) Housing and Urban Development funds, passed through to States' Community Development Block Grant programs; (4) U.S. S. Army Corps of Engineers; (5) Reclamation; (6) USGS; (7) Federal Emergency Management Agency; (8) Natural Resources Conservation Service; (9) Agricultural Stabilization and Conservation Service (administering the Conservation Reserve Program and the Agricultural Conservation Program); (10) Farmers Home Administration; and (11) U.S. Fish and Wildlife Service.

Colorado describes the success of the endangered fishery recovery program in the Upper Colorado River Basin, involving three States, three Federal agencies, and representatives from the water development and environmental communities, designed to pursue a cooperative, nonregulatory solution to endangered species concerns within the basin. In noting the accomplishments of the recovery program, Colorado underscores the importance of the State/Federal partnership.

Wyoming's response notes the economic benefits and recreational opportunities that accrue to Wyoming from Federal reservoirs constructed by Reclamation within the State. Montana notes, as a positive example of Federal involvement, Reclamation's activities involving the Agrimet program and the Flint Creek Return Flow Study. The Agrimet program helps to improve irrigation water management and energy conservation. Reclamation is working with the Department of Natural Resources and Conservation and Flint Creek irrigators in studying the effects of return flows.

Nevada representatives emphasize that the State has worked closely and cooperatively with numerous Federal agencies on many water resource issues. They cite, among other examples, the Truckee River negotiated settlement, the Carson River superfund site, and the construction and operation of four reservoirs in Nevada. Nevada's Division of Water Planning points to successful partnerships with Federal agencies in its watershed planning activities. A representative of the division states: "The Federal focus on watershed planning and integrated resource management has had a positive effect on State water planning efforts." Washington representatives commend EPA Region X's transition to a watershed approach which employs partnership relations with States and reduction of command and control mechanisms. "This promises to herald expanded cooperation and reduce tensions."

Needs for Improvement

While the above responses exemplify the positive and important role the Federal Government has played with regard to water resources in the West, there is a good deal of emphasis in the responses on needs for improvement, as can be seen in table 3. In reviewing the examples used in this report and the State responses, the reader is encouraged to identify, by the context, what is meant by "the Federal Government." The reference may refer to Congress, the Federal courts, or the executive agencies, or a combination of the three branches of the Federal Government. The balance of this section will attempt to provide an overview of these matters. The section is divided according to general categories descriptive of Federal participation in water resources management. Again, the examples are merely illustrative. For a greater understanding of the context for these recommendations, refer to appendix I.

Data Gathering/Management.—Recognizing that streamflow monitoring is important for managing water, implementing plans to resolve conflicts, and planning for future water demands, and that the USGS provides high-quality water resource data, Montana representatives note that "the costs of this program have been increasing and it is becoming more difficult for Montana to match the increased costs." Continued operation of the National Stream Quality Accounting Network is also critical.

Utah's Division of Water Rights underscores, as an area of critical need, basic surface water and groundwater data historically collected under the cooperative program with the USGS. With increasing costs and diminishing funding, "this program is in jeopardy," they conclude. "New strategies need to be developed to ensure the necessary data to make sound management and planning decisions are available." Oregon recommends that particular assistance be provided regarding data collection associated with the issues centered around the ESA. Nevada urges the Federal Government to fund new, cooperative water resource investigations and develop GIS maps and a water use database to assist local and regional water planning efforts. Alaska states:

The Federal Government as the largest landowner in Alaska (60 percent of Alaska is owned by the Federal Government) and when considering instream flow needs for fish and wildlife, the Federal Government is one of the largest water users of the State. The Federal Government should make an effort to collect continuous flow data in cooperation with the State of Alaska in order to fill the many data gaps in the existing Alaska Stream Gaging Network.

Table 3.—Priorities for improving¹ Federal programs

Major ² categories	A	A	C	C	H	I	K	M	N	N	N	N	O	O	S	T	U	W	W
	K	Z	A	O	I	D	S	T	E	V	M	D	K	R	D	X	T	A	Y

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1. Data gathering/management	F T R	F T						F		F T R	F			R	F T			F R			
2. Water projects (supply) ³																					
A. Planning ⁴						R		R		F T					F						
B. Construction ⁴									F	F T	F T	F			F T						
C. Operation and maintenance/ dam safety			F T	F T				F		F T	F							R	F T		
3. Environmental regulation																					
A. Clean Water		T R	R	F		F T R		F	R	F T	F T	F	F	F T	F		R	F	F T R	F T R	
B. Drinking water ⁵		F T R		F	R	F T			R	F T R	F T	F			F		R	F	F T R	F T R	
C. Endangered Species Act												F					R		F T	F T R	F T R
4. Other regulation/management	R	R				R	R	R	R	F T R	F T R				F				F	R	

Note: F = financial assistance; T = technical assistance; R = reform

¹ Cooperation and partnership mark much of Federal/State relationships in water resources; yet a lack of coordination and cooperation, against the backdrop of declining Federal financial support and a strong Federal regulatory presence, is often a source of conflict and inefficiency. By showing how many States identified the category as a priority area of concern, this table is designed to demonstrate the level of Westwide agreement regarding priorities for improvement and a general indication of the type of improvement needed. The table is not designed to identify the relative importance of the various categories. Although drawn primarily from the fifth question, this table also reflects relevant aspects of responses to other questions.

² Again, this table does not purport to be comprehensive but, rather, to provide a display of priorities based on the responses.

³ The term "projects" is here broadly defined and includes those defined as nonstructural, and relates to both surface water and groundwater. The category pertaining to operation and maintenance/dam safety refers to existing Federal facilities.

⁴ This category includes planning and construction that may address problems **in addition to** inadequate water supply.

⁵ The State responses, from which this table was prepared were, for the most part, submitted prior to reauthorization of the SDWA. Thus, some responses indicating a need for reform may have been addressed by the new reauthorization.

Water Projects (Supply)⁹.—Nevada representatives urge consideration of Federal assistance in investigating large-scale artificial recharge and underground storage mechanisms, as well as in evaluating some of the State's old dam and reservoir feasibility studies. Montana calls for greater participation by the Federal Government in local efforts to improve water management and resolve water resource problems in areas where the Federal Government significantly impacts water use or water management. With Oregon anticipating an increased emphasis on regional planning and the use of local watershed councils, it urges new and more active partnerships and increased flexibility on behalf of the Federal Government to work on the watershed scale and to work with local watershed councils. Idaho believes there is a need for a forum at the regional and national level requiring Federal participation with State water agencies "for the review and coordination of Federal agency, programs and the establishment of priorities which respond to State and local issues."

North Dakota sees continued Federal funding and construction of the \$200 million Garrison Diversion Unit devoted to municipal, rural, and industrial uses as a critical component in meeting the future water supply needs of North Dakotans.

Arizona explains a situation that characterizes several States:

The bill which authorized the Central Arizona Project provided for the construction of three additional dams and reservoirs. None of these dams and reservoirs are actively being pursued due to environmental considerations or the lack of economic feasibility. Rapidly rising construction costs for new dams [have] made many projects throughout the State too expensive to build. Protection of limited natural riparian habitat is also a State policy objective. New dams and reservoirs require extensive mitigation programs to offset loss of this natural habitat. Even where mitigation may be possible, replacement measures add to the cost of the project. While major new water storage projects will probably not be constructed in the foreseeable future, there is the possibility of smaller reservoirs being built for local needs.

Several States expressed the need for improvement in the Federal role relative to operation and maintenance of existing Federal facilities and a related issue of dam safety. California representatives, for example, conclude that "the Federal Government can assist in meeting future water needs by

⁹ The term "projects" is broadly defined; it includes those defined as nonstructural and relates to both surface and groundwater.

providing adequate resources to operate and maintain its own water projects." Colorado echoes this prescription. Montana recommends that the Federal Government "continue to operate dam safety programs for federally owned dams," and "maintain and repair federally owned dams and irrigation projects as needed." Representatives from Texas note that "local sponsors feel that they could operate the (Federal) projects more cost effectively than having continued Federal involvement."

Environmental Regulation.—It is in the area of environmental regulation that most States felt the need for improvements relative to the Federal role. This may be explained, in part, by reference to trends in Federal spending on natural resources and environmental protection. In a 1993 article, based on a comprehensive study of Federal and State expenditures, the author concluded that: "Over the past decade, Federal spending on environmental protection languished, but States doubled their spending." (DeWitt and Brown, 1993)

If anything, this trend has accelerated since the article was published. Thus, between 1986 and 1994, less than a decade, States doubled their spending on environment and natural resources from \$5.283 billion to \$10.750 billion, as shown on figure 2 (The Council of State Governments, 1996). The experience of the State of Texas parallels that of other Western States. Since the early 1970s, that State's role in water management has increased, and the Federal role in water planning and financing has decreased. Between 1978 and 1989, Federal funding declined from 40 percent to 17 percent of the State's total infrastructure for new water, wastewater, flood protection, and drainage facilities.

Considering these trends, the article's authors concluded that decisions about how States spend money on the environment were at a turning point. "At issue is whether the Federal Government, which contributes a small percent of that amount, will continue to call the shots or whether State and local governments will gain a greater say."¹⁰

The need for greater Federal cooperation with States, together with greater State flexibility in implementing Federal laws and regulations, is often reflected in State responses regarding improvements in Federal/State relationships in water resources.

With regard to the Clean Water Act,¹¹ for example, Wyoming argues that:

¹⁰ See Texas response in appendix I.

¹¹ Refer to the positions of the Western Governors' Association and the WSWC in appendix II.

The Corps of Engineers in their 404 permitting process has a definite slant toward the transfer of agricultural rights to other uses as opposed to developing new storage facilities. The drying up of agricultural lands in a State as arid as Wyoming has definite impacts, both economically as well as environmentally.

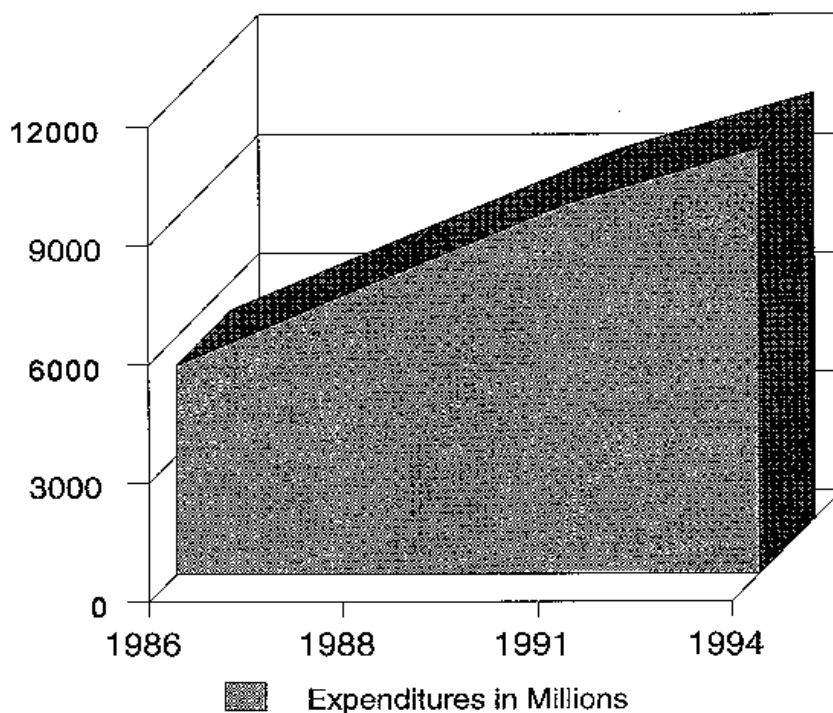


Figure 2.—State expenditures on the environment and natural resources

Wyoming, therefore, argues that States need greater latitude in determining whether a project should be pursued and constructed. South Dakota representatives urge greater flexibility in administering Federal guidelines on water quality testing. "In general," they state, "one size fits all' Federal programs are not effective for rural areas because varying problems often require unique solutions." Montana urges that the State be given "flexibility in administering the Clean Water Act so that programs can be tailored to most effectively address Montana's concerns."

In a general statement, which applies to Clean Water Act and other Federal mandates, Idaho recommends that the Federal Government can assist by not

imposing arbitrary fixed requirements to satisfy Federal objectives and by providing financial assistance and technical assistance when the requirements are to achieve national priorities. California makes the following observation:

State and local water agencies have been negatively affected by implementation of the Federal Clean Water Act. The difficulties with water quality standard setting in the (Sacramento-San Joaquin) Delta illustrate a Westwide State concern—that of the Federal Government using water quality authorities to achieve water allocation goals. The States, not EPA, are responsible for making water allocation decisions, and furthermore are mandated under State law to balance competing uses of water. EPA has no such mandate to balance uses.

Responses regarding the SDWA are similar comments to those received in response to the Clean Water Act. For example, Colorado underscores the need for adequate funding in noting that "without the proposed funding (under the proposed SDWA), the impacted communities will not be able to improve, upgrade, or meet the standards as set forth in the Act." The State of Hawaii concurs with other States regarding the need for the SDWA, "but the rigidity of the law in action creates some unnecessary expenses to water purveyors." Texas notes its concern with recent developments involving EPA guidance that prohibits the use of Drinking Water SRF funds for the purchase or lease of water rights. Texas states:

It would appear that this is counterproductive to the intent of the SRF to provide funding for cost effective solutions to the drinking water needs of the Western States. Due to the economic and environmental costs of developing new water supplies, one of the common methods used to obtain these supplies is to purchase or lease water rights. Not allowing the use of the new Drinking Water SRF for the purchase or lease of water rights runs counter to the objective of the SRF to provide cost effective financing for communities to implement the objectives of the SDWA.

Nebraska urges "that changes in standards be in response to significant health concerns," observing that "changing requirements on amounts of various constituents allowed in public water supplies can make a difference in whether these communities need to treat or the degree of treatment needed, which in turn can have very major financial implications which could affect the viability of some communities." South Dakota also emphasizes the need for adequate financial and technical assistance: "Monitoring and improvement expenses necessary to comply with Federal-mandated standards exceed the payment capacity of most small water systems," they conclude.

Several States are concerned about the impacts of the ESA with regard to water resources and include recommendations for reform in their responses. The State of Washington, for example, urges the Federal Government "to quickly and decisively render decisions on listings of anadromous fishes under the ESA and to promptly develop and announce recovery plans and other recovery and protection mechanisms." Washington also urges the government to expand its capabilities to provide technical assistance to States in the area of fishery recovery, especially habitat conservation and improvement.

Oklahoma contends that existing State laws, rules, and procedures are sufficient to protect the Arkansas River shiner and, further, that the federally identified habitat and historic range for the species are too broad. Oklahoma, therefore, recommends habitat studies should provide a basis for a more appropriate description of the range and designation of critical habitat. California cites the strong support among members of the Western Governors' Association for significant amendments to the ESA as evidence of problems with Federal implementation of the ESA in Western States.¹²

Other Regulation/Management.—The following examples are drawn from statements in the State responses that either reflect needs for improvement in Federal programs (other than those listed above), or which are general in nature and, thus, apply to the overall Federal regulatory management role regarding water resources.

With regard to other regulatory/management programs, for example, Montana argues that "the Bureau (of Reclamation) seems to emphasize planning and regulatory review at the expense of implementation." California representatives have similar concerns associated with the Central Valley Project Improvement Act "about high Federal expenditures on studies and staff support and low expenditures on actual restoration measures" Nevada observes that the Secretary of the Interior's rules and regulations pertaining to rangeland reform have brought fairly good working relationships between the land managing agencies of the United States and the State of Nevada "to a stand still." Nevada representatives argue that "because of the rangeland reform, there are no ongoing water improvement projects on federally managed lands in Nevada."

Noting that transfers from irrigation to municipal use will be essential as New Mexico's population grows, the State calls on Reclamation to redefine its policy. They observe:

Under current Reclamation policy, if an irrigator ceases to use water for irrigation use, the water reverts to the Reclamation Project for redistribution. Consequently, there appears to be no incentive for an individual irrigator to conserve or transfer water within a Reclamation Project.

¹² Refer to the position of the Western Governors' Association and implementation paper by the WSWC in appendix II.

Oklahoma representatives commend watershed management tools that can be used to identify holistic cause-and-effect water quality relationships, link upstream uses or problems to downstream effects, develop reasonable water cleanup plans, and educate the public. By cutting costs and focusing limited staff and resources on the most important water quality problems, they believe basinwide watershed management enables the State to protect waters in a more effective and consistent manner. However, while recognizing that numerous Federal and State agencies currently utilize various aspects of watershed planning and management, "many recognize conflicting watershed boundaries." Oklahoma representatives therefore call for a "holistic water resource planning and management approach . . . to merge political and geographical differences." A consensus among State and Federal agencies of watershed planning boundaries would be very helpful, they conclude.

South Dakota believes that revisions to the U.S. Army Corps of Engineers' Master Manual for Missouri River mainstem reservoir operations are needed "to reflect current water use trends and not those existing when the dams were built in the 1950s." In addressing future water supply needs, Kansas concludes that "The Federal Government should help in providing funds and technical assistance when requested to the State and local government and allow them to address the water issues at the State and local level." Montana urges standardization of procedures for implementing Federal laws and a clear definition of the missions of various Federal agencies, eliminating responsibilities that are duplicated.

Given southern Nevada's future municipal water supply needs from the Colorado River, Nevada representatives believe that the Federal Government "will need to develop, participate in and encourage the use of innovative water management strategies, such as marketing, banking, leasing, wheeling and reservoir management."

Considering the significant potential impacts of reserved rights claims in Arizona, as underscored by the responses in several other States, Arizona urges Federal agencies not to:

. . . interfere with existing private water uses in order to achieve other land management objectives such as instream flow enhancement. The agencies should also be prudent in their application of interpretations of reserved rights for Federal reservations and wilderness areas. These rights will be recognized by the State, but the agencies can create potential havoc with existing rights and uses by overzealous application of reserved rights claims.

Additionally, several State responses call for greater flexibility in administering Federal laws and programs. Colorado states that "the Federal Government can work to improve reasonableness and coordinated implementation of its regulatory programs that overlap the agencies." Further, Colorado representatives note:

Due to recent cuts in Federal programs (USBR, DOE), staffing resources [have] been cut to the point where Federal performance in administering existing water projects and programs has suffered. These acts make it difficult to accomplish water development with no dollars therefore forcing water users to avoid a Federal "nexus."

These programs have driven up the cost of water supply planning and development processes which have resulted in the shifting of water supply development to sources that do not require Federal permits. In Colorado, development of urban supplies is being driven to nonrenewable groundwater and the changing of private agriculture water rights. Often, these impacts are greater than the results of a well planned surface water supply. However, if Federal regulations continue to make it virtually impossible to develop renewable water supplies, the trend will continue towards the avoidance of any Federal programs.

California echoes the need for better coordination of Federal regulatory actions. Lack of coordination during California's most serious drought created major problems for State management of water resources, prompting a request from the governor that the Federal Government coordinate the actions of its natural resources management agencies. Idaho finds that "the clear recognition of State sovereignty is essential along with the need for consistency in Federal agency goals, programs, and objectives."

State Programs vis-a-vis Federal Purposes

Many of the conflicts in Federal/State relationships are described in terms of the inherent emphasis of the traditional appropriation doctrine on offstream utilitarian uses, as contrasted with the Federal interest in protecting the environment by preserving and enhancing instream uses. However, as demonstrated in the section of this report on "context," the appropriation doctrine has evolved so that Federal interests can be accommodated. Thus, or example, Western State laws are not inimical to instream uses, and State laws and programs provide a variety of opportunities to protect and enhance Federal interests. The following are examples of such State laws and programs, drawn from the State responses. These examples supplement those contained in the "Rural Community Needs" section of this report regarding programs to address the needs of rural communities and the discussion of changes in the appropriation doctrine regarding instream flows and the public interest contained in "The Context" section.

Colorado has entered into an agreement with the Department of the Interior with the broad goal of preventing future listings under the ESA through coordinated conservation efforts. For species that are declining, but not yet threatened or endangered, the agreement envisions the development of "conservation agreements" between State and Federal agencies to prevent listings. Efforts have already begun, pursuant to this agreement, to preserve many native fish species. Montana lists several programs that are being administered by the State to facilitate the accomplishment of the Clean

Water Act and the SDWA. These consist of delegated programs, as well as independent State programs. Montana's listing is exemplary of Western States, in general, with regard to protecting water quality and drinking water supplies.

In another example, Washington notes its efforts to protect instream flows pursuant to water quality certifications for new hydropower projects and where ESA listings have been or are likely to be proposed. Since 1991, the State has placed a moratorium on the establishment of new water rights from the Snake or Columbia Rivers due to ESA listings. In 1988, North Dakota became the first State in the Nation to develop a pesticide-endangered species management program. The State program delineates areas where the listed pesticides may not be applied without prior technical review, if at all. A majority of the mapped sites are adjacent to water areas.

In several cases, States such as California have environmental regulatory statutes in place that are more stringent than their Federal counterparts. South Dakota is encouraging rural water systems that are requesting funding from the State to reserve funds for maintenance and replacement. Capital improvement planning encourages the systems to look to regionalization of water and wastewater systems so as to maximize reliability, efficiency, and economies of scale in the treatment and distribution of drinking water.

Conclusion

It is clear that the West faces many challenges in managing its water and other natural resources. These challenges have become more complex in light of increasing and changing demands by society, as expressed in both State and Federal legislative and other forums. The importance of the State role in meeting these challenges has likewise been magnified, as States represent the pivotal level of government regarding water resources allocation, management, and protection. Nevertheless, the Federal role continues to be significant.

It seems clear from reviewing the State responses, that many of the successful efforts to address complex water resource challenges in the West involve Federal/State partnerships. An underlying theme of the State responses is that such cooperation and coordination will be increasingly vital and that opportunities to engage in such cooperative efforts should be maximized.

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¹⁴ This report has not been published, but a copy may be obtained by contacting the Western States Water Council.