

# **Resource Management at the Watershed Level**

An Assessment of the Changing  
Federal Role in the Emerging Era  
of Community-Based  
Watershed Management

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

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## Abbreviations and Acronyms

ACIR	Advisory Commission on Intergovernmental Relations
Association	Verde Watershed Association
BLM	Bureau of Land Management
BMP	best management practices
BPA	Bonneville Power Administration
CALFED	Joint Federal-State planning organization created to provide more coordinated action in the Bay-Delta
CBIAC	Columbia Basin Interagency Committee
Center	Colorado Center for Environmental Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Clear Creek Forum	Clear Creek Watershed Forum
Commission	Western Water Policy Review Advisory Commission
Corps	U.S. Army Corps of Engineers
Council	McKenzie Watershed Council
CRM	coordinated resource management
Dialogue Group	South Fork Dialogue Group
DRBC	Delaware River Basin Commission
EPA	U.S. Environmental Protection Agency
EWEB	Eugene Water and Electric Board
FACA	Federal Advisory Committee Act
Feather CRM	Feather River Coordinated Resource Management Group
FIARBC	Federal Interagency River Basins Committee
Forum	South Platte Forum
Management Committee	Rio Puerco Management Committee
MBIAC	Missouri Basin Interagency Committee
NRC	National Resources Committee
NRCS	Natural Resources Conservation Service (formerly the U.S. Soil Conservation Service)
NRLC	Natural Resources Law Center
NWC	National Water Commission
NWPPC	Northwest Power Planning Council
PAB	Project Advisory Board
Partnership	South Fork American River Partnership
PG&E	Pacific Gas & Electric
Project	Model Watershed Project
Reclamation	Bureau of Reclamation
SRBC	Susquehanna River Basin Commission
Stakeholder Group	Animas River Stakeholder Group
Steering Committee	Lower Truckee River Restoration Steering Committee
TVA	Tennessee Valley Authority
UCRWMP	Upper Carson River Watershed Management Plan
USGS	U.S. Geological Survey
Watershed Committee	Rio Puerco Watershed Committee
WRC	Water Resources Council
WRPA	Water Resources Planning Act

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## Introduction

Since the opening of the American frontier, water resources have played a featured role in the economic and social development of the West. Over a remarkably short time period, a wide variety of innovations in the areas of water resources, engineering, law, administration, and policymaking have resulted in a complex institutional environment and a radically altered physical landscape. These innovations have come in response to equally rapid changes in technology, demographics, and boom-and-bust economies, fueled by a formidable investment of ambition and human capital. This process continues today, in response to modern concerns of ecological health, community stability, and administrative efficiency.

One of the most striking trends in recent years is a focusing of water management activities at the watershed level. The 1990s have seen a proliferation of "watershed initiatives," in which stakeholders from a variety of governmental levels and jurisdictions have joined with nongovernmental stakeholders to seek innovative and pragmatic solutions to the problems associated with resource degradation and overuse.<sup>1</sup> Although these initiatives share many common qualities, they are also notable for their variety of structures and functions, a predictable feature given that each watershed initiative is an ad hoc effort tailored to the unique institutional and physical qualities of the particular region.

In the following pages, this phenomenon will first be briefly placed within an institutional and historical context, and then 12 case studies of active watershed initiatives will be reviewed. This review will examine the extent to which the watershed management movement is a promising and innovative trend worthy of greater support. In making this assessment, the changing role of the Federal Government in regional water management will be of particular concern. After a review of findings and conclusions, some general recommendations will be offered to assist policymakers in determining the appropriate Federal role in watershed initiatives and in identifying those areas where Federal laws and practices need to be modified to reach this desired condition.

## The Watershed Movement in Context

Over the past two centuries, a sophisticated intergovernmental system has evolved in the United States establishing multiple layers and branches of government and defining the lines between the public and private sectors.

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<sup>1</sup> In this report, the term "watershed" is generally used to describe hydrologic basins that are substate in nature, either encompassing a small river basin or, more commonly, a small tributary to a much larger river basin. A "watershed initiative" is any collective effort aimed at improving the status or management of the water resources (and often other natural resources) within a geographic area primarily defined by the contours of a localized catchment basin.

The fundamentals of the American political system were well entrenched long before western settlement was a realistic goal and long before the specific elements of western water institutions evolved in legislatures, courthouses, and private sector innovations across the West and in the Nation's capital. Throughout this period, water resources have been the medium for an unusually high level of intergovernmental experimentation and innovation, primarily due to water's "transboundary" nature. The inherent "fugitive" nature of the flowing resource, when combined with the challenges posed by ever-changing political philosophies, value structures, and socioeconomic norms, has meant that identifying widely acceptable and efficient arrangements for regional water management has been a long, arduous, and generally disappointing undertaking. Water management at the scale of watersheds and river basins has not typically been accomplished in a manner that adequately considers the interconnectiveness of the resource, both in terms of natural biophysical processes and human activities.

Appendix A features a detailed assessment of the challenges of managing transboundary resources by reviewing the turbulent history of regional water management in the United States.<sup>2</sup> At this point, a much more spartan review is provided to illustrate the context within which the current watershed movement will later be evaluated. As discussed later in the document, a central hypothesis of this research is that the watershed management movement is as much a political and social experiment as an administrative strategy since watershed management, in its evolving form, involves much more than addressing chronic problems of interagency communication and competition. It also involves breaking down some of the fundamental intergovernmental barriers that have historically impeded progress in this area.

## **The Institutional Context**

Effectively addressing the management challenge posed by regional water resources requires addressing a host of interagency, intra-agency, and intergovernmental considerations. Among the more easily recognizable interagency considerations that have long hindered efforts at integrated regional water management are the establishment of agencies and programs along narrow functional lines, such as water development, resource preservation, or water quality management. Specialization of this nature not

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<sup>2</sup> Consult appendix A for a full discussion of the relevant literature.

only ignores the physical interrelationships between water uses and between land and water management, but hides the fact that agencies, and the programs they implement, are often based on fundamentally different value structures and assumptions about what constitutes good resource management. Instead of reconciling these differences, agencies tend to develop close relationships with those interest groups and academic disciplines sharing the narrow functional perspective of the agency, and often are reluctant to coordinate with or accommodate other agencies and interests involved with the same resources but pursuing different goals. As shown by the historical record, addressing this problem requires providing both an incentive and a process for interagency coordination—something that has proven difficult to accomplish.

Parties concerned with addressing the barriers to interagency coordination have increasingly come to recognize the need to simultaneously address those intergovernmental factors that discourage an integrated resource management perspective. Three intergovernmental considerations are of primary concern: the fragmentation of government into three major levels (Federal, State, and local); the balancing of governmental decisionmaking authorities among three branches (the executive, legislative, and judicial); and the delineation of responsibilities among the public and private sectors. Early interpretations of the commerce and property clauses, combined with the Federal orientation of the western water development program and other natural resource programs, over time worked to ensure a strong Federal role in western natural resources, concentrated primarily in the legislative and executive branches. However, in recent decades, as the emphasis has shifted from water development to integrated resource management, the dominant trends in Federalism have encouraged a partial transfer of responsibility from Federal to State, from legislative and executive to judicial, and, more recently, from public to private. Each of these trends is much broader than the natural resources realm, and none has been fully or systematically expressed. This is especially true in the realm of western water where Federal water development and land management programs and Federal-State water quality programs have never been satisfactorily integrated with the State-private orientation of western water allocation arrangements. The result is a situation in which decisionmaking authority is now more widely fragmented than ever and where crafting viable policy requires including more parties, interests, and values than most existing decisionmaking methods can readily accommodate. An additional complication is presented by the modern realization that resource management efforts must become increasingly more holistic, recognizing the transboundary and interrelated

nature of water resources and the water-land connection. The result is gridlock, the most dominant feature of the current intergovernmental landscape. The watershed management movement is an attack on gridlock.

## **The Historical Context**

Understanding the institutional and philosophical underpinnings of the modern watershed movement requires at least a cursory familiarity with the United States' history of regional water management. In the Eastern United States, the needs of interstate navigation prompted a variety of regional water studies and initiatives in the nation's first century that helped to establish a strong legal and political role for the Federal Government in regional water management. That perspective was later imported to the West by continued pro-Federal constitutional interpretations of the commerce and property clauses and by the eventual establishment of the Federal reclamation program developed to aid otherwise unviable private water development programs.

One of the few individuals to question this direction of western institutional development was John Wesley Powell, a man best known for his exploration of the Colorado River and later service as the first director of the U.S. Geological Survey (USGS). Writing in the late 19th century, Powell argued that communities in the arid and semi-arid West needed to jointly control their own water and land resources, following the precedents of Hispanic pueblo communities and the Mormons. Powell urged the western territories and States to abandon proposals for a Federal water reclamation program and to reject the adoption of the prior appropriation system, actions that can hinder community control and that ignore the close relationship between land and water management. Powell also urged that the social and political institutions of the West be organized along self-governing geographic units described as "hydrographic" districts—i.e., watersheds and river basins.

Although many components of Powell's philosophy have considerable support in the 1990s, they were not highly influential a century earlier in shaping national water policy.<sup>3</sup> The only fundamental element of Powell's "Grand Plan" to be adopted in the following Progressive Conservation movement (circa 1890-1920) was the idea that water development and management

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<sup>3</sup> These ideas were more warmly received by scientific and political organizations concerned with issues of forest management, urban planning, and soil conservation.



activities should be focused at hydrologically defined units. This concept, combined with the emerging technology of multipurpose water projects, formed the core of the western water development philosophy for many years. These ideas were elevated to new heights in the depression era (circa 1929-1942) as illustrated by construction of the West's four largest multipurpose dams—Hoover, Shasta, Bonneville, and Grand Coulee—and by a series of studies and initiatives aimed at promoting regional water development and administration. The most ambitious of these experiments was the Tennessee Valley Authority (established in 1933), the epitome of regional and federally driven resource development and administration.

Just as water development helped to break the nation out of the economic collapse of the depression, additional water development was seen in the post- World War II era (circa 1943-1960) as necessary to fuel the rise of the United States to superpower status. Several interstate compacts cleared the way for massive interstate water development schemes, eagerly orchestrated by the Bureau of Reclamation (Reclamation) and U.S. Corps of Engineers (Corps) in conjunction with a variety of other Federal agencies. This era saw an explosion in the use of Federal interagency river basin committees allegedly designed to coordinate regional water development activities; however, most of these committees were not successful in promoting rationally integrated programs, nor did they broaden the decisionmaking community to provide a meaningful role for State Governments or conservation interests. Instead, the committees proved useful only as a tool for authorizing and implementing new projects, using the tripartite political subsystem of agencies, interest groups, and congressional committees known as the "iron triangle." These and other fundamental flaws in the basin interagency committee system spawned a variety of studies and actions that ultimately culminated in the termination of these committees and the establishment of the so-called Title II commissions overseen by the Water Resources Council (1965-1981). These commissions provided for a greater State role, but were generally not successful in responding to the environmental movement of the 1960s and 1970s. By the time the commissions were terminated by Executive order in 1981, the era of water development was over, and arrangements for resource management—not development—were needed.

A more lasting innovation of the depression and postwar eras occurred at the scale of the watershed. The U.S. Soil Conservation Service, established in 1935 in response to depression-era "dust bowl" conditions, has been an aggressive proponent of Federal-State-local partnerships at regional scales.

After successfully promoting the passage of similar authorizing legislation in all States from 1937 to 1946, the U.S. Soil Conservation Service has overseen the establishment of approximately 3,000 soil conservation districts covering virtually the entire nation. This effort, along with the agency's "small watersheds program" and its development of the "coordinated resource management" (CRM) framework, both begun in the 1950s, has allowed the agency to be an effective proponent of regional intergovernmental cooperation in issues of erosion and flood control. The U.S. Soil Conservation Service generally has been unable to effectively broaden this focus due to bureaucratic competition with more powerful natural resource agencies and a general decline in national spending for conservation. Nonetheless, the agency, which changed its name to the Natural Resources Conservation Service (NRCS) in 1994, remains a potent force in watershed management, largely due to the existence of the conservation districts. Conservation districts provide a highly practical organizational model for Federal-State-local cooperation in resource development and conservation. This model not only survived the turbulent era of environmentalism, but has become an increasingly appreciated framework upon which many current watershed initiatives have grown.

At the river basin scale, a similar model does not exist; however, at least one interstate innovation has received widespread praise: the Northwest Power Planning Council, established in 1980. The council features a management orientation; it is charged with balancing hydropower production with salmon restoration in the Columbia River Basin. It also features State representatives exercising some decisionmaking authority over Federal agencies. This innovation illustrates the States' rights philosophy of New Federalism which emerged in the 1980s to supplant the Federal-State partnership philosophy of Cooperative Federalism that had arrived in the previous decade to challenge two centuries of growing Federal primacy. The emerging momentum in favor of "Federal devolution" might suggest that a further reduction in Federal control—and governmental control in general—may be forthcoming.

### **Selected Case Studies of Western Watershed Initiatives**

The following pages feature an updated review of 12 case studies found in *The Watershed Source Book*, which provides an inventory of 76 watershed management initiatives in the Western United States (Natural Resources Law Center, 1996). Two studies from each of the following six basins are featured in this review: Colorado, Columbia, Platte, Sacramento-San

Joaquin, Truckee-Carson, and Upper Rio Grande.<sup>4</sup> These 12 case studies were selected based on several criteria. The most important criterion was to ensure that the 12 studies captured the diversity of approaches seen throughout the West. Several types of diversity were considered important:

- *Diversity of Federal Participation.* The case studies selected highlight the diversity of Federal involvement in terms of the agencies represented, the manner in which they participate, and the way that Federal programs, authorities, and funding sources are utilized in the watershed initiatives.
- *Geographic Diversity.* Within each of the six basins, efforts were made to select case studies that were geographically diverse. Typically, an upper basin and lower basin case study were selected.
- *Diversity of Origins.* The watershed initiatives reviewed in this study have originated through a variety of processes.
- *Substantive Diversity.* The case studies selected are concerned with a wide variety of water resource issues.
- *Functional Diversity.* The case studies selected capture the diversity in roles, activities, and goals of western watershed management initiatives.
- *Structural Diversity.* The case studies selected illustrate a diversity of structural qualities in terms of membership, decisionmaking processes, funding arrangements, leadership provisions, and other similar qualities.

In some basins, the relatively low number of active watershed initiatives made it impossible to satisfy all these criteria.

Each case study includes a brief description of the study area and resource problem; the origins, structures, and functions of the watershed initiative; and a general assessment of the effort's level of success. While "success" in watershed initiatives should ultimately be defined in terms of environmental indicators, this report uses a definition of success that also includes those

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<sup>4</sup> Each of these basins is the subject of river basin studies being conducted for the Western Water Policy Review Advisory Commission.

initiatives that have resulted in a noticeable improvement in either the process or focus of management efforts. This definition is used to recognize that many highly encouraging efforts are relatively young and have not had a chance to significantly correct resource problems that often took decades to develop. A watershed initiative that has brought concerned parties together in a seemingly viable process directed at improved resource management and restoration is therefore classified as a success, even if tangible on-the-ground results are not immediately forthcoming.

The 12 watershed initiatives (table 1) are presented according to the larger river basin in which they are located.<sup>5</sup>

Table 1

Colorado Basin	Verde River, Arizona—Verde Watershed Association
	Upper Animas River, Colorado—Animas River Stakeholder Group
Columbia	Lehmi, Pahsimeroi, and East Fork of Salmon Rivers, Idaho—Model Watershed Project
	McKenzie River, Oregon—McKenzie Watershed Council
Platte Basin	South Platte River, Colorado—South Platte River Forum
	Clear Creek, Colorado—Clear Creek Watershed Forum
Sacramento-San Joaquin	Feather River, California—Feather River Coordinated Resource Management Group
	South Fork of the American River, California—South Fork Dialogue Group
Truckee-Carson	Lower Truckee River, Nevada—Lower Truckee River Restoration Steering Committee
	Upper Carson River, Nevada and California—Upper Carson River Watershed Management Plan
Upper Rio Grande	Rio Puerco, New Mexico—Rio Puerco Management Committee
	Upper Rio Puerco, near Cuba, New Mexico—Rio Puerco Watershed Committee

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<sup>5</sup> The case study materials are primarily based upon phone interviews with watershed initiative participants conducted by Natural Resources Law Center researchers. These interviews are listed in the Bibliography section, but no effort is made in the text to attribute specific ideas and information to specific interviewees. This approach has been used at the request of a few interviewed parties who did not wish to be associated with particularly controversial comments. This approach also reflects the fact that many of the ideas listed were raised by several different individuals and, occasionally, were found to be relevant in cases other than the one under investigation during the interview.

## **Case Study 1: Verde River**

*Major River Basin:* Colorado River

*Watershed of Interest:* Verde River, Arizona

*Collaborative Group/Initiative:* Verde Watershed Association

### **Description of the Area and Problem**

The Verde River originates at the Del Rio Springs, approximately midway between Flagstaff and Prescott in central Arizona. The river flows southeast across the valleys and canyons of central Arizona until it joins with the Salt River east of Phoenix. The majority of the 6,600 square mile drainage basin is Federal land, primarily national forests. Grazing, forestry, and some irrigated agriculture are the major land uses. Upstream of Horseshoe Dam the river is perennial, while flows downstream are largely dependent upon reservoir operating regimes at Horseshoe and Bartlett Dams. The waters of the Verde River are an important component of the Salt River Project, a major water supply source for the Phoenix metropolitan area. Approximately 100,000 residents in the basin and an additional 110,000 individuals outside the basin utilize groundwater that is probably tributary to the Verde.

Compared to most of Arizona's rivers, the Verde is a healthy and unspoiled resource. The Verde (Spanish for "green") is one of the few perennial rivers remaining in Arizona and is highly valued for its recreational opportunities and wildlife habitat. The river corridor is critical habitat for several endangered and threatened species, including the Southwestern Willow Flycatcher, and contains Arizona's only federally designated Wild and Scenic River. Maintaining the nonmarket values of the Verde while supporting continued economic growth in the region will require protecting both the quantity and quality of the Verde's flow. The magnitude of flows are potentially threatened by increased groundwater pumping upstream, while water quality is vulnerable to existing sand and gravel operations, agricultural and urban development, recreation and tourism, and continued growth.

### **Origins of the Watershed Effort**

The Verde River watershed is a highly studied resource. One of the more extensive and salient recent investigations was conducted by the Verde River

Corridor Project, initiated in 1989 by the Arizona State Parks Board. The Corridor Project was a broadly focused investigation of resource management issues of concern to basin residents and resource managers. One of the conclusions of the Final Report and Plan of Action was that a permanent group should be established to investigate and address Verde River issues. This idea was explored in a 1992 Verde River Watershed Conference, sponsored by the Cocopai Resource Conservation and Development District, organized to address a variety of resource management issues—including growing concerns about the effect of upper basin groundwater pumping on downstream flows. Approximately 160 people attended that conference, which resulted in a "bridging committee" that recommended formation of the Verde Watershed Association (Association). The Association was officially established in 1993 at the second Verde River Watershed Conference, based on the bylaws and organizational objectives prepared by the bridging committee.

#### **Structure and Function of the Watershed Group/Initiative**

The Association is primarily a vehicle for organizing and conveying the concerns of local citizens to public and private resource managers. The rules of participation in the Association are clearly specified in the articles of association. The Association is headed by a 30-member board of directors featuring 1 member each from the following jurisdictions: 12 local communities, 4 counties, 4 Indian communities, and 10 at-large representatives from major sectors and interest groups active in the region. General membership in the Association is available to all agencies, organizations, and persons that choose to participate and pay annual dues. It is the responsibility of the board of directors to ensure that members have the opportunity to participate openly in the sharing of issues and concerns. The Association does not, however, explicitly function as a decisionmaking body and does not adopt positions on substantive issues.

The Association was established to "ensure sufficient flows in the Verde River to maintain a healthy river ecosystem and ensure sufficient water supplies to provide for and accommodate realistic levels of growth and uses within the Verde River Basin for the future." As described in the Verde Watershed Management Plan, the goals of the Association are being implemented in three general phases: the development of a good, common database; the definition and evaluation of alternative scenarios; and the selection of short-term and long-term management strategies. Several

parties have played an active role in efforts to compile and synthesize water-related data in the region, in part through an effort known as the Verde River Cooperative River Basin Study. Participants have included the Arizona Department of Environmental Quality, Arizona Department of Water Resources, Arizona Game and Fish Department, Arizona State Land Department, Salt River Project, Reclamation, U.S. Environmental Protection Agency (EPA), U.S. Forest Service, USGS, local Natural Resource Conservation Districts, and the Verde Watershed Association. The National Center for Atmospheric Research in Boulder, Colorado, has recently proposed a modeling project to begin the development and evaluation of alternative scenarios. The Association continues to play an important role in coordinating these efforts and in conveying information to interested parties through the Association's newsletter (*The Confluence*), conferences and meetings, and the Internet.<sup>6</sup>

**Federal Role.**—Although the Association is primarily a tool for educating the public about Verde River issues, Federal agencies are involved in several ways. Federal agencies have found the Association to be an excellent vehicle for communicating with the interested public and, consequently, have not been hesitant to participate in conferences, meetings, and studies sponsored by the Association. Federal involvement in the Verde River Cooperative River Basin Study is illustrative. Several agencies are dues-paying members in the Association. Since the Association does not undertake the implementation of projects itself, funding has not been a major issue for the group. A variety of in-kind services are provided by Federal agencies, including the U.S. Forest Service, Bureau of Land Management (BLM), Reclamation, EPA, and the Verde Natural Resource Conservation District—which provides office space.

#### **Success, Failure, and the Federal Role**

The Verde Watershed Association has defined for itself a specific and relatively uncontroversial role and has excelled. The flow of information in the region has improved dramatically. Resource managers receive a wealth of thoughtful public input, while concerned citizens have been exposed to an abundance of technical information about the status and qualities of the Verde resource. It is a productive symbiotic relationship, and does not appear to be noticeably constrained by any Federal statutes or programs. To

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<sup>6</sup> The Association has an excellent web site located at <http://www.verde.org/>

the contrary, Federal agencies, in conjunction with the local resource conservation districts, have been a tremendous asset to this watershed initiative.

As databases are completed and public education continues, the Association has begun to struggle with the more difficult task of trying to develop resource management strategies. That could require significant changes in organizational structure, something anticipated in the articles of association: "This organization, in order to remain effective, must evolve as conditions change and as new needs are perceived and understood." It could also require an added stimulus to encourage aggressive action. The Association has not had a clear crisis around which to rally local support. That crisis might come in the form of a controversy associated with the basin's most fundamental institutional deficiency: the failure of Arizona water law to effectively recognize and reconcile the relationship of surface water and groundwater. That broader issue has been a major source of controversy in Arizona for many decades, a situation that will undoubtedly continue in many basins, including the Verde.

## **Case Study 2: Upper Animas River**

*Major River Basin:* Colorado River

*Watershed of Interest:* Upper Animas River, Colorado

*Collaborative Group/Initiative:* Animas River Stakeholder Group

### **Description of the Area and Problem**

The Animas River originates in the mountains of southwestern Colorado, flowing south into New Mexico where it joins with the San Juan River, a major Colorado River tributary. In the upper stretches of the basin, three primary tributaries drain from the San Juan mountains and combine at the town of Silverton, flowing south through the town of Durango and continuing into the lands of the Southern Ute Indian Reservation and New Mexico. The upper basin is sparsely populated, featuring economies primarily based on agriculture, tourism, and, until recently, mining. Within this mountainous region are approximately 2,000 inactive mines located within a volcanic caldera (i.e., a large circular depression on the landscape formed by the collapse of lands that once featured volcanic activity).



Like many rivers of the West, the quality of the Animas has been significantly degraded by mining. Concentrations of cadmium, lead, iron, aluminum, and several other metals are particularly high just downstream of Silverton, where the waters are devoid of trout.<sup>7</sup> These metals leach from the abandoned mines in the region as well as from natural geologic processes.

### **Origins of the Watershed Effort**

The water quality problems of the Animas River are currently being addressed by the Animas River Stakeholder Group (Stakeholder Group). The origins of the Stakeholder Group can be traced to a series of water quality studies conducted between 1991 and 1993 by the Colorado Department of Health. While local residents were supportive of efforts to improve the quality of the Animas River water, many parties were concerned that these studies could lead to harsh new water quality regulations imposed by the Colorado Water Quality Control Commission or, worse, to a superfund action by EPA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Inclusion in the Superfund program would bring a negative stigma to the region, would increase the Federal presence in the basin, and could potentially bring economic harm to parties with ties to historic mining operations or owning lands upon which these sites are located.

In an effort to avoid controversy and promote a coordinated remediation effort, the Colorado Department of Health called upon the Colorado Center for Environmental Management (Center) to organize all parties in the basin concerned about the metal contamination problem. The Center is a nonprofit group created by the Governor of Colorado to find solutions to environmental management problems. Using a grant from the U.S. Department of Energy, the Center established the Stakeholder Group in January 1994 and served as the group's facilitator for its first three years of existence. With the blessing of both the Colorado Water Quality Control Commission and EPA, the Stakeholder Group has emerged as the primary vehicle for development of a water quality improvement strategy.

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<sup>7</sup> The town of Silverton takes its drinking water from a tributary without abandoned mines, so there is no public health issue. By the time the river reaches the town of Durango, the contaminated waters have been sufficiently diluted to support a variety of fish and to avoid any public health concerns.

### **Structure and Function of the Watershed Group/Initiative**

The Stakeholder Group attracts members from over 30 organizations, including representatives of the towns of Silverton and Durango, the Southwest Water Conservancy District, San Juan County, the Colorado Department of Health, the Colorado Division of Minerals and Geology, and the Colorado Division of Wildlife. Active Federal participants include EPA, USGS, BLM, the Forest Service, and Reclamation. Prior to being terminated, the U.S. Bureau of Mines was also an active participant. The Corps, the U.S. Department of Energy, and the Southern Ute Tribe have also participated on a limited basis. Nongovernmental participants represent local industrial groups, environmental activists, landowners, and other concerned citizens.

The primary goal of the Stakeholder Group is to restore a viable brown trout fishery as far upstream as Silverton by reducing metal leachings from old mines.<sup>8</sup> Of equal importance to many parties, however, is to accomplish this goal without increasing the regulatory presence of Federal or State agencies in the basin. These goals are being pursued through the development of a remedial action plan, which is expected to be complete by 1998. Thus far, the Stakeholder Group has undertaken monitoring operations, identified hot spots, and ranked the most serious sources of contamination. The plan will present a watershed-based solution for efficiently dealing with the most serious causes of the metal contamination problem by focusing on the most problematic contributors. In selecting plan elements, the Stakeholder Group operates by consensus, as overseen by a group facilitator. Formal voting does not occur, however, largely due to a desire to avoid any Federal Advisory Committee Act (FACA) complications. Implementation of the plan will be the joint responsibility of the Stakeholder Group participants.

**Federal Role.**—Federal agencies have played a major role in the Stakeholder Group. As active participants, Federal agencies have brought considerable technical and financial resources to the effort and have expressed a commitment to honor and implement the findings of the Stakeholder Group. The Stakeholder Group currently receives the majority of its funding from the EPA in the form of Section 319 grants under the Clean Water Act and from the Rocky Mountain Headwaters Mine Waste

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<sup>8</sup> Note that some parties believe that brown trout have never lived in this area due to the natural background levels of metals, and the fishery consequently cannot be restored by cleaning up abandoned mines. This is a minority opinion.

Initiative, which is part of the Reasonable Initiatives Program located within the Office of the EPA Administrator. Many other Federal agencies and departments have also contributed resources such as in-kind services to this effort. The high level of Federal involvement in this effort has been of concern to some local interests; however, Federal participation is more generally seen as necessary from the standpoint of resources and legal authority.

### **Success, Failure, and the Federal Role**

The work of the Stakeholder Group has been watched closely by several parties nationally, including EPA and the Departments of Interior and Agriculture, as a potential model for efforts elsewhere. In general, this effort is viewed favorably as a pragmatic mechanism for integrating national regulatory goals within a grass roots watershed management framework. The approach has potential application to many other sites throughout the West, particularly those burdened by abandoned mines.

To this point, the Stakeholder Group has been successful in generating and organizing broad support for a watershed-based approach to the metals contamination problem. A diverse group of participants has gained a better understanding of each other's concerns, and the level of trust has increased. Several potential problems loom on the horizon as the project begins to enter the implementation phase. In particular, some parties are concerned that the watershed-based remediation plan may not be consistent with the site-oriented Federal water quality regulatory framework under the Clean Water Act and CERCLA. This is a real concern since the primary strategy of the emerging remediation plan is to address the five major contributing mines, while taking little or no action at the other facilities. The Clean Water Act and CERCLA may also pose liability problems for any party that agrees to initiate remediation efforts at an abandoned site.<sup>9</sup> Securing long-term funding for the planning process, including the watershed coordinator, has become a critical concern, as the Rocky Mountain Headwaters Initiative is proving to be difficult to justify and defend in the annual budgeting

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<sup>9</sup> The liability issue is closely tied to the issue of ownership, which can be a complex problem given that most mines are abandoned and predate regulatory programs.

process—in part, since it lacks a statutory basis. Funding the implementation of the plan could also be a major problem, especially if Superfund is not utilized as a funding source. The fact that the most troublesome mines are located on private land further complicates the funding issue.

### **Case Study 3: Lemhi, Pahsimeroi, and East Fork of the Salmon Rivers**

*Major River Basin:* Columbia River

*Watershed of Interest:* Lemhi, Pahsimeroi, and East Fork of the Salmon Rivers, Idaho

*Collaborative Group/Initiative:* Model Watershed Project

#### **Description of the Area and Problem**

The lands just west of the continental divide and the Idaho-Montana border in north-central Idaho are primarily drained by the Lemhi, Pahsimeroi, and Salmon (East Fork) Rivers. Over 90 percent of this drainage area is comprised of national forests and other Federal lands; however, the privately-held lands contain the majority of the river bottoms and salmon habitat. These rivers eventually join with the Salmon River mainstem, which leads to the Snake River (near the Idaho-Washington-Oregon border) and, ultimately, the Columbia River. Most water consumption in this region is for irrigated agriculture, primarily to produce cattle feed. Other major industries include the timber and wood products industry and recreation.

Declines in salmon populations are a serious problem in most parts of the Columbia River watershed. Endangered salmon that successfully utilize fish ladders and other migration aids to reach the upper stretches of the basin often are faced with habitat degradation and depleted flows, primarily due to agricultural and timber activities. The degradation of riparian habitat also negatively impacts a variety of nonendangered species and is largely responsible for water quality violations in the region.

#### **Origins of the Watershed Effort**

Many water users throughout the Pacific Northwest have had to modify water use practices in recent years as part of salmon recovery efforts designed and implemented by a host of agencies in accordance with the

Endangered Species Act and other Federal environmental legislation. These recovery efforts not only pose a potential threat to established water use practices, but threaten to move water management decisions away from private, local, and State decisionmakers to Federal agencies and courts. In the Lemhi River basin, the fear of outside intervention prompted a coalition of water users and residents to begin meetings in 1990 to examine ways in which the needs of the fishery and water users could both be more adequately accommodated. Among the first products of these meetings was the development of an Irrigator's Plan to Improve Fish Passage, which was subsequently integrated into salmon recovery planning conducted by the Lemhi Soil and Water Conservation District. By February 1992, this research had led to a watershed recovery plan that was adopted in a memorandum of understanding signed by Reclamation, the two local water districts, and individual irrigators. In November 1992, Governor Andrus recognized the Lemhi effort as a Model Watershed Project, a designation that entitled the project to receive funding through the Bonneville Power Administration as part of the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program.<sup>10</sup>

### **Structure and Function of the Watershed Group/Initiative**

A wide variety of agencies and private interests are involved in the Model Watershed Project (Project). Participants include the U.S. Natural Resources Conservation Service (i.e., the former U.S. Soil Conservation Service), BLM, U.S. Forest Service, U.S. Fish and Wildlife Service, EPA, Bonneville Power Administration, Shoshone-Bannock Tribes, Idaho Department of Fish and Game, local soil conservation districts and water districts, and groups representing agricultural and environmental interests. The Project is overseen by the Idaho Soil Conservation Commission and is guided by an advisory committee of land managers, tribal governments, interest groups, and local residents, and by a technical committee of resource managers from State and Federal agencies. The stated objective of the Project is to "protect, enhance, and restore anadromous and resident fish habitat and achieve and maintain a balance between resource protection and resource use on a holistic watershed basis." This goal has been pursued through the

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<sup>10</sup> The Model Watershed Program was an outcome of the Strategy for Salmon (1991) produced by the Northwest Power Planning Council. The watershed has been defined to include the Lemhi River, the East Fork of the Salmon River, and the Pahsimeroi River. In addition to this watershed effort in Idaho, model watershed projects have also been designated in Oregon (Grande Ronde) and Washington (Asotin Creek).

completion of a habitat inventory, the identification of possible restoration projects/efforts, the prioritization and selection of alternative actions, and the on-the-ground implementation of several projects. Existing irrigation facilities have been made more fish friendly by a number of operational and structural changes, including periodic fish flushes, the installation of fish screens on water diversion facilities, the stabilization of streambanks, and the use of "hatch boxes" (i.e., structures containing fish eggs placed in the stream channel to promote successful propagation).

In the past year, the salmon recovery focus of the Project has been broadened to include the more general issue of riparian habitat degradation and the failure of local streams to meet water quality standards. Development and implementation of additional strategies to improve riparian habitat are now being pursued under the Lemhi County Riparian Habitat Conservation Agreement signed by local, State, and Federal partners in May 1996. This agreement was designed, in part, to involve local government more directly in watershed restoration efforts. EPA has also pushed the Idaho Division of Environmental Quality to utilize the Project as a tool for addressing water quality violations in the region associated with nonpoint source pollution. Integrating programs for salmon recovery, riparian habitat degradation, and water quality management is the primary administrative challenge facing the Project. The activities of the Project are documented in a quarterly newsletter (*Model Watershed News*) and in symposiums sponsored by the Project.

**Federal Role.**—Although the Model Watershed Project is primarily a bottom-up effort, the Federal Government has played, and continues to play, a major role in this watershed initiative. Ironically, it was fear of unilateral Federal intervention that prompted local water users to initiate habitat restoration efforts. These discussions quickly blossomed into a highly intergovernmental effort, due in large part to the availability of Federal funding and technical expertise available through the Northwest Power Planning Council's River Basin Fish and Wildlife Program.<sup>11</sup> The U.S. Farm Service Agency (formerly the U.S. Agricultural Stabilization and Conservation Service), U.S. Fish and Wildlife Service, BLM, and U.S. Forest Service have also provided some funding, as have some State, local, and

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<sup>11</sup> The Bonneville Power Administration provides the Project with approximately \$400,000 annually for administrative support and projects.

private parties. The Project has even tapped the AmeriCorps program (established in 1993 through the National and Community Service Trust Act) and the local Youth Employment Program for labor.<sup>12</sup>

### **Success, Failure, and the Federal Role**

The Model Watershed Project is generally considered a success on several levels. Perhaps most significantly, the Project is notable for integrating local control and knowledge with Federal support and participation in a highly pragmatic manner. The Project has effectively overcome the complications associated with fragmented land ownership and agency responsibilities and has resulted in dozens of on-the-ground habitat improvements. In part, this is due to the central role played by the soil and water conservation districts (also known as natural resource conservation districts) and by the Idaho Soil Conservation Commission. As is seen in dozens of watershed initiatives throughout the West, the conservation districts' program continues to be the premier tool for coordinating intergovernmental and public-private regional resource protection efforts in many western communities—especially on private lands. The Project has also benefited from a willingness of Federal agencies to participate actively and cooperatively with local interests in projects that are beyond the scope or responsibility of any one party.

The Project is also notable as an example of a local watershed initiative that is closely linked to a larger river basin program—in this case, the restoration of the Columbia River Basin's anadromous fishery. The Federal endangered species program has provided a powerful, albeit largely inefficient, stimulus for the formation of many watershed initiatives throughout the Pacific Northwest. Given the upper basin location of the Lemhi and the surrounding watershed and the "train-wreck" orientation of the endangered species program, it is unclear if the goal of salmon recovery can be achieved in this and other watersheds in the Columbia River Basin. Even if this goal cannot be achieved, however, resource management has clearly been improved by the watershed-level institutional innovations that have been sparked by the salmon decline.

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<sup>12</sup> The AmeriCorps group is comprised of members from the Shoshone-Bannock Tribes.

## Case Study 4: McKenzie River

*Major River Basin:* Columbia River

*Watershed of Interest:* McKenzie River, Oregon

*Collaborative Group/Initiative:* McKenzie Watershed Council

### Description of the Area and Problem

The McKenzie River is a Columbia River tributary flowing through the southern Willamette Valley of western Oregon. The river originates in three wilderness areas in the Cascade Mountains of central Oregon and traverses approximately 90 miles west before joining with the Willamette River just north of Eugene, Oregon. The purity of the river makes it popular as both a water supply source and a recreational resource. The sparsely populated watershed supports many natural resource industries, including timber production, agriculture, fishing, manufacturing (primarily of wood products), food processing, recreation, and tourism. Over two-thirds of the watershed is Federal land, mostly located in the Willamette National Forest. Most of the private land is held by timber companies. Although several dams along the river store water and produce hydropower, the watershed is known for its excellent trout fishing. Some species, however, have experienced significant declines.

The McKenzie River is often touted as the cleanest river in Oregon. Nonetheless, habitat and water quality degradation is a concern to many interests in the basin, including the Eugene Water and Electric Board (EWEB), which uses the McKenzie to provide drinking water to approximately 200,000 customers. Primary threats to water quality include municipal sewage, industrial wastes, poor land management, and flood-induced erosion. The combined impact of decades of poor timber harvesting practices, the construction of dams, and the more recent home building activity have had a negative impact on the hydrology of the watershed, increasing erosion, magnifying flood events, and reducing fish populations. Preventing further degradation to water quality and fish habitat will likely require better management of the riparian corridor.

### Origins of the Watershed Effort

The growing interest in protecting the health of the watershed was first crystallized by the Lane County and EWEB commissioners during hydroelectric facility relicensings in 1991, when they authorized funds to



investigate the potential for developing an integrated watershed program in the basin. One product of this investigation was the decision to establish a McKenzie Watershed Council, a goal that was achieved in 1993 when the Oregon congressional delegation was able to secure Federal startup funds to initiate an integrated watershed management program in the McKenzie watershed. The formation of watershed groups is strongly encouraged by the State of Oregon; however, it is the Federal Government, not the State Government, that has provided the financial support for this ambitious effort.

### **Structure and Function of the Watershed Group/Initiative**

The Council is comprised of 20 members drawn from Federal, State, and local governments and from the private sector. Eight members represent private interests, including environmental, agricultural, and timber groups; seven members represent local governments; three members represent Federal agencies; and two members represent State agencies. The structure and function of the Council is specified in a charter and ground rules adopted by the 20-member body.

The official mission of the Council is to "foster better stewardship of the McKenzie River Watershed resources, deal with issues in advance of resource degradation and ensure sustainable watershed health, functions, and uses." This goal is being pursued primarily through the Integrated McKenzie Watershed Management Program. The effort has several components and phases, including information collection and dissemination, preparation of a resource management plan, and the coordination, implementation, and monitoring of field-level activities. In pursuing these activities, the Council works to ensure adequate community involvement and education and serves as the forum for interagency communication, coordination, and consensus-based decisionmaking. Currently, the Council is making the transition from planning efforts to implementation and monitoring activities. Among the Council's most notable achievements are the establishment of water quality monitoring programs; the implementation of several restoration projects on the Mohawk tributary; the construction of a Geographic Information System database that links Federal, State, and local databases; and the development of action plans for water quality improvement and fish and wildlife habitat restoration. Action plans dealing with recreation and human habitat will be completed soon.

**Federal Role.**—Although the Council and watershed planning initiative originated at the grass roots, the Federal Government has played a major role in this watershed initiative. The U.S. Forest Service, BLM, and the Corps all participate on the Council. The Council has enjoyed considerable startup financial support from Federal agencies. The initial formation and work of the Council was supported by a \$600,000 congressional appropriation channeled through EPA and was soon followed by an additional appropriation of \$500,000 through NRCS. The Council has also received a \$100,000 focus watershed grant from the Northwest Power Planning Council. Federal funds have been successfully utilized to attract additional funding and in-kind services.<sup>13</sup>

### **Success, Failure, and the Federal Role**

In contrast to most watershed initiatives, the McKenzie Watershed Council is primarily an effort to prevent degradation of a relatively pristine resource, rather than an effort to rehabilitate a heavily damaged resource. Several efforts have been taken to improve the knowledge base and institutional arrangements necessary to effectively pursue this goal. It is somewhat surprising that the lack of a local crisis did not hinder the formation or early work of the Council, which has generally been blessed with abundant funding and the active participation of essential parties. This situation could potentially change in coming years, however, as large Federal grants appear to be evaporating. The Council would then need to explore a more diversified package of funding from Federal, State, local, and private sources. Other areas where the Council has excelled include public education, planning, interagency coordination, and public-private cooperation. These strengths are derived primarily from the strong leadership and sophisticated organizational structure of the Council.

Even though the origins and administration of the Council are predominantly local, Federal agencies have certainly played a key role in the Council's success. Continued Federal support will be needed to maintain the initiative in its current form. The Council has identified several actions that the Federal Government could take to improve the effectiveness of this and other watershed initiatives. Major recommendations include maintaining Federal funding for project implementation and for advising new watershed groups,

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<sup>13</sup> Like the Model Watershed Project in the Lehmi watershed, the McKenzie Watershed Council has also taken advantage of labor provided through the AmeriCorps program.

and addressing Federal bureaucratic procedures which limit the agencies' flexibility to spend money for collaborative efforts.

## **Case Study 5: South Platte**

*Major River Basin:* Platte River

*Watershed of Interest:* South Platte, Colorado

*Collaborative Group/Initiative:* South Platte River Forum

### **Description of the Area and Problem**

The South Platte River originates in the mountains of central Colorado and flows northeast along the Front Range into Nebraska, where it joins with the North Platte River. Approximately 96 percent of the basin's more than two million residents reside in the Denver metropolitan area, which is bisected by the river. Approximately 21 percent of the lower basin is located in the States of Wyoming and Nebraska. The waters of the Platte River are utilized for a variety of purposes, including recreation and tourism, municipal and industrial water supply, irrigated agriculture, and habitat for many riverine species—including the endangered whooping crane.

The South Platte Basin features a variety of water management problems, involving both water quantity and quality issues. Some of the more publicized water quantity issues include preservation and restoration of endangered whooping crane habitat in the central basin, proposed new water developments for the Denver metropolitan area (e.g., the Two Forks dam) and elsewhere, interstate water allocation, and Federal water rights on national forests. Water quality is threatened by a variety of discharges, the nature of which varies by location. Generally, industrial discharges (often from abandoned mines) are the major water quality concern in the upper reaches; municipal and industrial discharges are of concern along the urbanized Front Range; and agricultural runoff is the primary water quality concern along the remainder of the South Platte.

### **Origins of the Watershed Effort**

The South Platte River is the site of many notable intergovernmental and interdisciplinary resource management studies and programs, from a National Water Quality Assessment Program study overseen by the USGS, to adoption of a tri-state cooperative agreement regarding water

management in endangered whooping crane habitat, to the city of Denver's South Platte River Project designed to create an attractive riparian corridor in the urban region. Given the breadth of resource problems and the diversity of management entities and programs with an interest in South Platte issues, a strong need exists to improve the flow of information and ideas among interested parties. The South Platte Forum (Forum) was initiated in 1989 to fill this void, with the first conference being held in 1990. The Forum is an annual event, rather than an organization, convened to encourage greater understanding and coordination among parties interested in the management and welfare of the shared resource. Seven sponsoring organizations and a staff coordinator collectively organize the events.

### **Structure and Function of the Watershed Group/Initiative**

The Forum is an intergovernmental effort established by an interagency agreement among seven major entities: EPA, the Service, USGS, the Colorado Division of Wildlife, the Colorado Water Resources Research Institute, the Northern Colorado Water Conservancy District, and the Denver Water Department. The ultimate goal of the Forum is to contribute to the effective management of natural resources in the South Platte River Basin by promoting coordination among local, State, and Federal resource managers and private entities and to facilitate the exchange of ideas across disciplinary boundaries and among parties with divergent value structures. Common themes of Forum presentations include the theory and practice of integrated watershed management, general issues of water quality management, and the relationship between water supply development and endangered species management. Conferences typically draw about 150 attendees. Presenters and attendees represent a broad diversity of local, regional, State, and Federal agencies; academic groups; private enterprises; and other concerned parties. Proceedings of the Forums are published and distributed by the Colorado Water Resources Research Institute, a component of Colorado State University.

**Federal Role.**—Federal agencies participate in the Forum on three different levels. First, EPA, the U.S. Fish and Wildlife Service, and USGS are three of the seven members of the organizing committee responsible for planning the Forums. These agencies provide expertise, time, direct funding,

and in-kind services.<sup>14</sup> Contributions from the other four major participating entities and registration fees are also used to offset administrative costs. Second, Federal agency personnel occasionally act as presenters or panelists at the Forums. Third, Federal agency personnel participate as attendees and then utilize the information learned to seek improved resource management programs.

### **Success, Failure, and the Federal Role**

The Forum is generally considered to be successful in accomplishing its primary goal of information dissemination and interagency coordination. In that way, it makes a valuable contribution to addressing the resource management issues of the South Platte in an integrated fashion. Federal statutes and agency practices generally do not create significant barriers to this type of watershed management activity, although securing long-term funding for cooperative interagency programs can be a difficult challenge. Many Forum participants have suggested that the organizing committee and Forum could yield greater on-the-ground benefits if this initiative were encouraged to evolve into a more active and formal group with a clear problem-solving orientation. That would be a major transformation for the Forum and would require the group to take a more active role in challenging some of the Federal statutes that have discouraged the implementation of watershed-based management programs. Of particular concern in the South Platte is the functioning of the Federal endangered species program, with its emphasis on species rather than ecosystems, and its reactive, rather than proactive, orientation. Further upstream, abandoned mine issues would require some focus on the liability components of the Clean Water Act (as discussed in the Clear Creek Watershed Forum case study). Funding issues would also need to be addressed.<sup>15</sup> Many of these issues would require legislative attention. The organizing committee has been understandably hesitant to dramatically increase its role in this manner, especially since the Forum, in its current form, is generally considered to be a needed and valuable component of the existing institutional framework in the South Platte Basin, and there is no pressing or easily defined issue around which to mobilize decisive action.

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<sup>14</sup> The Forum is not a major expense for the agencies. The organizing committee members normally contribute \$500 to \$1,000 per agency each year to cover the costs of organizing the event.

<sup>15</sup> EPA has indicated that some financial support may be available to the Forum should an expanded role be pursued.

## Case Study 6: Clear Creek

*Major River Basin:* Platte Basin

*Watershed of Interest:* Clear Creek, Colorado

*Collaborative Group/Initiative:* Clear Creek Watershed Forum

### Description of the Area and Problem

Clear Creek originates near the Continental Divide in central Colorado (near Loveland Pass) and flows generally east along the I-70 corridor through mountain communities before joining with the South Platte River near the Denver metropolitan area. The resource offers significant recreational and ecological values and serves as a water supply for over 165,000 people in the downstream metro area.<sup>16</sup> In recent years, the mountain towns of Central City and Blackhawk have become well known as sites for tourism and legalized gambling, but, historically, the region had a heavy reliance on the hardrock mining industry.

The waters of Clear Creek face a wide variety of threats, including metal loadings from past mining activities, discharges into the river from highway accidents, runoff of sediment and toxics from the interstate corridor, sewage discharges from municipal sources and septic systems, industrial discharges and leaks, and a variety of related discharges associated with municipal and industrial development.

### Origins of the Watershed Effort

Clear Creek has been less than pristine for many decades, largely due to metal contamination from over 1,000 abandoned mines. In 1983, the Clear Creek/Central City site was included on the Superfund National Priorities List, and many ambitious projects have since been implemented under the CERCLA framework. Notable projects include the construction of new water treatment facilities (including some using wetlands), capping of mine tailings and mine waste piles, and the development of new recreational facilities on restored lands. A wide variety of intergovernmental and public-private partnerships has been utilized to address the region's water quality problems.

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<sup>16</sup> Approximately 85 percent of the flow is used as a drinking water supply.

After EPA selected Clear Creek as a pilot program under its Watershed Protection Approach in 1991, the agency initiated efforts to establish a Clear Creek Coordinating Council to bring governmental and nongovernmental parties together to coordinate the restoration of the river resource, establish common databases, and attract local funding to support the watershed-based initiative. The establishment of the council, however, was not warmly received by local residents or the Denver Regional Council of Governments who were fearful and resentful of the growing influence of "outside" governmental bodies in the basin's land and water management activities. For that reason, the group decided to form instead a highly informal Clear Creek Watershed Forum (Clear Creek Forum) focusing solely on organizing public conferences on Clear Creek watershed issues.

#### **Structure and Function of the Watershed Group/Initiative**

The Clear Creek Forum is both an informal group and a periodic event managed by a watershed coordinator in consort with the most active participants. Over 100 agencies, groups, and individuals who have expressed interest in Clear Creek issues receive periodic mailings and attend an annual conference (i.e., the Clear Creek Forum) at which a variety of resource management issues are discussed. The forum attracts an extremely wide variety of governmental and nongovernmental participants, including representatives of several municipal and county governments, State agencies, Federal agencies, landowners, professional organizations, business interests, and environmental groups. Among the more active members have been EPA, Coors,<sup>17</sup> and a Clear Creek County Commissioner.

The conferences have been very effective in promoting issue-specific discussions among subgroups of participants and have led to several on-the-ground projects. The Clear Creek Forum prides itself on being an effective catalyst for promoting field-level actions. It performs this catalyst role by promoting information exchange and communication, but does not rank or identify projects, adopt positions, or oversee field-level actions. Such actions are done on an ad hoc basis by the subgroups that spontaneously emerge to address collective problems. Some of the more notable outcomes from these efforts include a tailings capping project at the McClelland Mine site, the establishment of an emergency response system to inform downstream parties of upstream spills, and the formation of an Adopting Orphan Sites for

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<sup>17</sup> The well known brewery is located on the banks of Clear Creek in Golden, Colorado.

Credit Program.<sup>18</sup> The Clear Creek Forum is currently considering strategies for giving the rules and procedures of the group more structure and focus, with the aim of taking a larger and more direct role in identifying collective goals and implementing solutions. Some parties have historically resisted this evolutionary course due to the potential for magnifying a host of potentially divisive upstream-downstream, rural-urban, and public-private issues.

**Federal Role.**—As a driving force behind the formation of the watershed initiative and the manager of the region’s massive Superfund project, EPA has been a major player in the Clear Creek Forum and has been a primary source of funding.<sup>19</sup> Several other Federal agencies, including the Forest Service, USGS, and NRCS, have also played an active role, while the activity of the Corps and BLM has been more limited.

#### **Success, Failure, and the Federal Role**

The Clear Creek Watershed Forum and similar initiatives in the basin have played an important role in improving levels of communication and coordination between governmental agencies, between agencies and nongovernmental bodies, and between upstream and downstream interests. Despite gravitating to the narrow and relatively uncontroversial role of sponsoring conferences, the forum has emerged as a particularly effective catalyst in promoting a wide variety of watershed restoration projects, many involving abandoned hardrock mines.

Many parties believe that efforts to improve the water quality of Clear Creek in an efficient watershed-based approach have been hindered by the rigid

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<sup>18</sup> The Adopting Orphan Sites for Credit Program is an effort to try to utilize market incentives to encourage private sector cleanups of orphan sites. The program has been recognized by the National Forum on Nonpoint Pollution (cosponsored by the National Geographic Society and the Conservation Fund), which has helped to secure funding from Coors, EPA, Martin Marietta, General Service Foundation, and other parties. In theory, companies that finance cleanups in one location would be given credits to offset less easily controlled discharges in other areas. The Clear Creek watershed is a test area for the program.

<sup>19</sup> Two sources of funding have been utilized by EPA: Superfund money channeled through the Colorado Department of Health to support the coordinator and some discretionary funds from the Rocky Mountain Headwaters Mine Waste Initiative. Other Federal and State agencies, as well as private corporations, have also made financial contributions.



regulatory framework of the Clean Water Act, with its emphasis on uniform standards and point sources and its lack of flexibility in the areas of emissions trading and assessing liability. This framework can discourage the implementation of cost-effective solutions, provide strong disincentives for parties to adopt and clean-up orphan sites, and relegate EPA to "cite and fine" behavior which discourages the development of positive Federal-local relationships. A closely related issue is the lack of funding mechanisms, other than CERCLA, for funding the restoration of mines.<sup>20</sup> These problems appear to be common in basins dealing with abandoned hardrock mines. The Adopting Orphan Sites for Credit Program is a potential solution to many of these issues. Funding of the Clear Creek Forum itself is also an issue. The forum has not been able to attract sufficient State, local, or private sector funding to wean itself from EPA support; yet, continued EPA financial support is hindered by the lack of discretionary funds and by Federal regulations dealing with acquisitions. Finally, FACA is seen as an impediment to the participation of agency personnel in the activities of the Clear Creek Forum. Despite these obstacles, the forum continues to function as an effective problem-solving catalyst. However, it seems likely that national regulatory reforms could make the forum a more productive vehicle for addressing watershed-level issues.

### **Case Study 7: Feather River (North and Middle Forks)**

*Major River Basin:* Sacramento-San Joaquin River Basin

*Watershed of Interest:* Feather River, California

*Collaborative Group/Initiative:* Feather River Coordinated Resource Management Group

#### **Description of the Area and Problem**

The North, Middle, and South Forks of the Feather River drain the western slope of the northern Sierra Nevada in northeastern California, primarily in Plumas County. The Middle Fork is a National Wild and Scenic River. More than two-thirds of the region is under the jurisdiction of the U.S. Forest Service (primarily the Plumas National Forest). Lake Oroville, a key element of the State Water Project, is located on the river, as are several levees and

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<sup>20</sup> Note that CERCLA is generally well regarded in the basin, a situation that is in direct contrast to the public opinion found in the Arimas River basin.

other water developments. The Feather River is a tributary of the Sacramento River.

The Feather River watershed has been significantly modified by decades of timber harvesting, ranching, mining, and water development. Wildfires and flooding also influence the hydrologic characteristics of the watershed. Among the negative impacts of the natural resource industries have been soil erosion, loss of riparian habitat, stream channelization, water quality degradation (due primarily to increased sedimentation and temperature increases), lowering of the water table, loss of fish and wildlife, and flooding. Much of the recent flooding in the Central Valley was attributable to extremely high discharges from the Feather River system.

### **Origins of the Watershed Effort**

Over the past 20 years, the negative impacts of historic land use practices in the watershed have become more appreciated, while the timber industry has declined. This has provided the stimulus for improved watershed management practices. In 1984, Pacific Gas & Electric (PG&E) became alarmed by excessive levels of sedimentation along the river's North Fork that were reducing reservoir storage capacity and damaging turbines at the Rock Creek and Cresta Dams. The U.S. Forest Service and the U.S. Soil Conservation Service were also alarmed by the rapid loss of soil in the upper reaches of the watershed, while the California Department of Fish and Game was alarmed by declines in the trout fishery. Although their motivations were slightly different, all parties saw a need to reduce erosion in the watershed. In 1985, PG&E joined with these and other agencies and the Plumas Corporation—the county's nonprofit economic development agency—to implement a pilot project involving the construction of structures along Red Clover Creek. These structures created small ponds, raised water levels, and slowed the flow of the river, thereby resulting in reduced levels of sedimentation downstream. Encouraged by the success of this effort, a group of 13 participants quickly prepared and signed a memorandum of

understanding establishing the Feather River Coordinated Resource Management Group (Feather CRM) to pursue additional improvements throughout this part of the basin.<sup>21</sup>

### **Structure and Function of the Watershed Group/Initiative**

The structure and function of the Feather CRM has evolved over time, and the group now features 21 members representing local governments, State agencies, Federal agencies, and educational institutions. The Feather CRM program is coordinated by the Plumas Corporation, with most of the administrative funding coming from PG&E and the U.S. Forest Service. Project support has been provided by numerous other agencies and landowners. Over \$4 million has been raised to finance watershed restoration efforts. The Feather CRM meets quarterly to select projects and create restoration plans, acting upon the recommendations of the management and technical committees.

The geographic scope of the Feather CRM has expanded over time to include both the North Fork (the initial focus) and the Middle and South Forks. The Feather CRM has also broadened its substantive focus over time to include a variety of issues relating to water quality, ecosystem health, land use practices, and sustainable economic development. Among the specific goals of the Feather CRM is to reduce sedimentation in the reservoirs, decrease the erosion of streambanks, and restore the trout fishery, and improve the economic health of the county. The group has implemented more than 40 studies and restoration projects aimed at improving water quality and habitat. Most projects involve creating structures or planting vegetation. The most recent effort has been the Big Flat Project, designed to restore the hydrologic character of a meadow environment to achieve multiple benefits—including habitat, water quality, waterflows, and flood control. The flood control properties of a healthy ecosystem were aptly demonstrated by this project during recent severe flooding, an observation that the Feather CRM may be able to turn into new funding.

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<sup>21</sup> The coordinated resource management (CRM) framework was a development of U.S. Soil Conservation Service employees in Oregon and Nevada in the 1950s. It is primarily a voluntary, intergovernmental planning approach for addressing regional land use issues. These efforts are usually locally driven, but include participation of Federal and State agencies—typically participating under terms specified in interagency memorandums of understanding.

**Federal Role.**—Federal participants on the Feather CRM include the U.S. Forest Service, EPA, the Corps, the U.S. Fish and Wildlife Service, NRCS, and the Farm Service Agency. These agencies provide a variety of essential resources, including funds, expertise, labor, and permitting authority. The involvement of the U.S. Forest Service is especially critical, given that the agency is the watershed's primary land manager.

### **Success, Failure, and the Federal Role**

This watershed initiative is generally considered to be successful, because previously antagonistic groups have come together to seek innovative solutions to problems beyond the scope or control of a single party. The central role of the Plumas Corporation, a nonprofit corporation, has been a real asset, since the corporation is not as constrained by the red tape and antagonism that an agency, especially a Federal agency, would normally face. While the Feather CRM has not been immune to the sole source contracting and local cost-sharing requirements that hinder many watershed initiatives, it has generally avoided being seriously constrained by such Federal regulations. The participation and provision of resources by Federal agencies have been essential. The use of a relatively simple pilot project was also instrumental in building early momentum.

The primary challenge facing this watershed initiative is finding new sources to replace direct project funds provided by PG&E, which is becoming less interested in underwriting on-the-ground watershed restoration projects—in part, because they are exploring other methods for dealing with their sedimentation problems. One potential source of future funding is the Southern Water Contractors served by the State Water Project, which gets most of its water from the Feather River basin. A unit tax on exported water would perhaps be the most logical type of arrangement. The politics of such arrangements, however, often make them prohibitive. Future funding may also be available from the recent passage of California Proposition 204 (which should generate well over \$500 million in State funds for Bay-Delta restoration efforts) and from downstream flood control programs.

## **Case Study 8: South Fork of the American River**

*River Basin:* Sacramento-San Joaquin

*Watershed of Interest:* South Fork of the American River, California

*Collaborative Group/Initiative:* South Fork Dialogue Group

### **Description of the Area and Problem**

The American River originates along the western edge of the Sierra Nevada in California near Lake Tahoe in the Eldorado National Forest and flows approximately 55 miles west before draining into Folsom Lake near the city of Sacramento. Over this relatively short course, the South Fork drops approximately 10,000 feet in elevation, revealing landscapes that have historically supported a variety of natural resource industries, including mining, logging, and grazing. Approximately one-third of the basin is Federal lands (mostly national forests), with the remainder being held privately and utilized for homes, ranches, orchards, and commercial forestry. The river is heavily regulated, primarily by an elaborate system of dams known as the Upper South Fork American River Hydro Project operated by the Sacramento Municipal Utility District.

The natural resource industries of the watershed have significantly modified the character of the watershed and the stream channel. Of particular historical note is the discovery of gold in the basin in 1848 at Sutter's Mill, an event that brought thousands of miners into the Sierra Nevada region. In recent decades, the greatest threat to the watershed has come from rapid suburban development. The watershed faces a variety of interrelated challenges associated with water quality management, resource preservation, land use planning, and growth management.

### **Origins of the Watershed Effort**

In the early 1990s, following a series of Sacramento newspaper articles that focused attention on the growing threats to the Sierra Nevada watersheds, the Resources Agency of California, in conjunction with local resource conservation districts, established a multifaceted program of restoration efforts known as the Sierra Project. One element of this program was the creation of several watershed pilot programs. In the South Fork watershed,

the South Fork American River Partnership (Partnership) was created to investigate and coordinate watershed restoration efforts and to oversee the on-the-ground efforts of subwatershed groups also established by the Sierra Project. The Partnership brought together a diverse group of Federal, State, regional, and local agencies and interest groups from the timber, power, irrigation, water supply, and environmental sectors. After a couple years of activity, however, the Partnership has now faded into obsolescence, due to elimination of its funding and an inability to sustain a high level of participation given the absence of a clear crisis and the lack of tangible on-the-ground accomplishments. Recently, much of this core group has reformed as the South Fork Dialogue Group (Dialogue Group), focusing on the relicensing of hydropower facilities in the watershed.

#### **Structure and Function of the Watershed Group/Initiative**

The Dialogue Group is a relatively informal body, with about 40 to 50 participants and a core group of about 20 members. As seen in the Partnership, the Dialogue Group features representatives from a variety of interest groups and agencies from all levels of government. The U.S. Forest Service and NRCS are currently the most active Federal members, although it is expected that many other Federal agencies—including Reclamation and the Federal Energy Regulatory Commission—will eventually become highly involved.

The primary objective of the Dialogue Group is to take advantage of the opportunity presented by facility relicensing to improve the health of the South Fork watershed, while avoiding many of the delays and divisive controversies that characterize many relicensings. Several projects in the watershed are due for relicensing in the next decade. It is the short-term goal of the Dialogue Group to prepare a position paper that will help shape and direct the relicensing efforts. Over the long term, the Dialogue Group can potentially evolve into a group capable of implementing the comprehensive watershed restoration mandate originally given to the Partnership, including the oversight and coordination of subwatershed groups. Many of these groups, including the New York Creek Stewardship Committee and the Hangtown Creek Stewardship Committee, remain quite active, although they suffer from the same financial constraints that plagued the Partnership and now the Dialogue Group. The Dialogue Group has no significant funding

base, but is supported by in-kind services primarily provided by local parties such as the El Dorado County Water Agency and the El Dorado County Resource Conservation District. It is expected that these funding deficiencies will be addressed in coming years due to the recent passage of California Proposition 204 and related Federal funding that could channel over a billion dollars into restoration efforts for the Bay Delta ecosystem and the upper watersheds.

**Federal Role.**—Compared to most watershed initiatives reviewed in this study (and in *The Watershed Source Book*), the Federal role in the South Fork watershed restoration efforts has been relatively minor. While Federal agencies have participated in the Partnership and Dialogue Group, significant Federal funding has generally not been widely available, and the leadership of the overall watershed initiative has primarily come from the local and State level. The most significant Federal contribution has been the establishment of the "resource conservation district" system, which has provided the organizational framework and in-kind services around which the Sierra Project and the Dialogue Group have been focused.

#### **Success, Failure, and the Federal Role**

Efforts to promote coordinated watershed restoration in the South Fork basin have featured a series of organizational changes in the past several years and have clearly been hindered by a lack of funding and easily defined issues around which to mobilize interest and action. Despite this relatively turbulent history, a variety of groups and efforts currently exists that are attempting to address various water and land use issues in the watershed. The Dialogue Group has chosen to participate in this effort by focusing on the specific issue of Federal Energy Regulatory Commission relicensing. Other groups have chosen to focus on other, often more divisive, issues such as land use and water supply planning and the field-level implementation of restoration projects.

There is no evidence of any Federal legislation or practices inhibiting these efforts; however, significant Federal support of the watershed initiative has not been developed. Additional funding for watershed coordinators, field-level projects, and public education would be beneficial to existing efforts and is essential if the Dialogue Group is to eventually assume the more ambitious watershed restoration mandate first given to the Partnership. The best hope

for achieving this lies in California Proposition 204, which calls for approximately \$15 million in watershed restoration funds to be spent in the Sierra watersheds. Matching Federal monies may also become available. Until that time, the initiative is almost completely dependent upon the limited resources of local groups such as the El Dorado County Resource Conservation District.

### **Case Study 9: Lower Truckee**

*Major River Basin:* Truckee-Carson River Basin

*Watershed of Interest:* Lower Truckee, Nevada

*Collaborative Group/Initiative:* Lower Truckee River Restoration Steering Committee

#### **Description of the Area and Problem**

The closely integrated Truckee and Carson Rivers are located along the western edge of the Great Basin region, primarily in western Nevada but with the headwaters of each system extending into California. The Truckee River originates in and around Lake Tahoe, along the Nevada-California border, then flows through the Reno-Sparks metropolitan area in Washoe County to its terminus at Pyramid Lake, the central feature of the Pyramid Lake Indian Reservation created in 1859. Paiute Indians have traditionally relied on the lake's unique fishery of Lahontan cutthroat trout and the cui-ui. The reservation and fishery at Pyramid Lake are the central features of the political and geographic landscape of the Lower Truckee River.

The lower stretches of the Truckee and Carson systems have historically supported vast areas of wetlands, a rare and valuable feature in this highly arid region. However, these areas have been significantly depleted by water development and consumption, as evidenced by the threatened Lahontan cutthroat trout and endangered cui-ui fisheries of Pyramid Lake. In addition to depleted water supplies and the modification of stream channels and riparian habitat, the Lower Truckee River is also plagued by a variety of water quality problems due, in part, to urbanization upstream in the Reno-Sparks area. Interest in restoring and preserving ecological resources and Indian cultures in the Lower Truckee River has intensified in recent decades.



## **Origins of the Watershed Effort**

The Newlands Project, one of the first Reclamation irrigation projects built in the early 1900s, integrated the Truckee and Carson Rivers into a single plumbing system, allowing water from both systems to serve the Truckee Carson Irrigation District. This early Federal project—actually, the completion of an unsuccessful private venture—was based on water rights established in the Orr Ditch Decree of 1944, which also established tribal rights to irrigation water on the Pyramid Lake Indian Reservation. The decree did not, however, address the water needs of the fishery, which quickly became an issue because operation of the Newlands Project resulted in a precipitous decline in lake levels, resulting in the threatened and endangered designation for the Lahontan cutthroat trout and for the cui-ui. The Stampede Dam, built in the late 1960s in the upper tributaries in California, provided some relief to the fishery by providing more favorable flows, but only at the expense of aggravating a host of power, water supply, and water quality controversies in the Reno-Sparks region. The complex regional web of water allocation, water quality, hydropower, and fishery issues prompted a series of legal challenges to the Orr Ditch Decree and related arrangements, including an unratified interstate water allocation compact between California and Nevada. It soon became clear, however, that the complexity of the issues involved called for a comprehensive negotiated settlement. Given the involvement of two States and a wide variety of Federal interests associated with environmental protection, Federal lands and projects, and Indian affairs, the Department of the Interior became involved in negotiations, leading to a comprehensive, multiparty settlement enacted in the Truckee-Carson-Pyramid Lake Water Rights Settlement Act of 1990 (Title II of Public Law 101-618).

An important component of the legislation was to require the Corps to develop a program to restore the ecological health of the Lower Truckee River. This is a formidable challenge, given the wide variety of resource users, the maze of legal constraints and ambiguities, the generally poor quality of the natural environment, and the sparsity of dependable and clean water supplies. In 1993, at the urging of The Nature Conservancy, a Lower Truckee River Restoration Steering Committee (Steering Committee) was formed to develop recommendations to guide the Corps' efforts along the Truckee from Wadsworth, Nevada, to Pyramid Lake. Unlike numerous previous study efforts, the Steering Committee was formed primarily to pursue on-the-ground action.

### **Structure and Function of the Watershed Group/Initiative**

Most participants in the Steering Committee represent Federal and tribal agencies, although some State, local, and nongovernmental representation is provided by the Nevada Division of Environmental Protection, local resource conservation districts, and The Nature Conservancy, respectively. The Pyramid Lake Fisheries Office and the Pyramid Lake Tribe represent tribal interests, while Federal participants include the U.S. Fish and Wildlife Service, NRCS, the Corps, Reclamation, and EPA. The U.S. Bureau of Indian Affairs has obvious ties to both the Indian and Federal interests. Other interests are represented by unofficial members, including Washoe County, the USGS, and environmental groups. It is the challenge of the restoration coordinator to organize and implement this collaboration and to maintain informal ties to the Truckee-Carson Coordination Office within the U.S. Department of the Interior.

The overall goal of the Steering Committee is to restore the aquatic and riparian ecosystems of the Lower Truckee River, which requires modifying the physical condition of the channel and the riparian forest communities and improving water quality and flows. The Steering Committee has chosen to focus on two specific elements of this larger problem: the decline of riparian cottonwood stands and barriers to migrating cui-ui created by existing dams. The cottonwood restoration program, developed and implemented by the Steering Committee, calls for releases from flood control storage (in wet years only) to mimic natural flood regimes, thereby promoting new cottonwood germination. A first test of this unofficial program produced a healthy new stand of seedlings, although it is unclear if this new growth will survive the recent flooding. Fencing projects have also been completed to aid the cottonwoods. Improving fish passage will require modifying Federal structures. Federal water managers are currently developing strategies for facilitating fish passage based, in part, upon an experimental fish channel project developed by the Steering Committee. The goals of the Steering Committee have been aided by a recent water quality agreement mediated by the Truckee-Carson Coordination Office that promises increased flows and improved water quality.

**Federal Role.**—The Federal Government has played a central role in the region through statutes, programs, and court decisions in the areas of water development, Indian affairs, and environmental protection. The Water Rights Settlement Act was instrumental in moving the dispute out of the

courts and onto the ground, where several Federal agencies serve on the Steering Committee and participate in restoration projects. Federal funding, channeled through several of the participating agencies, is an essential component of the restoration effort. Funding and in-kind services have primarily come from EPA, the U.S. Fish and Wildlife Service, NRCS, the Pyramid Lake Tribe, and a variety of other sources at the Federal, State, local, and nongovernmental level. The 1990 legislation authorized \$400,000 in expenditures by the Corps on restoration projects.

### **Success, Failure, and the Federal Role**

While the past century of the Lower Truckee is still most notable for its resource degradation and polarizing litigious conflicts, the past decade has seen a dramatic reversal in trends as the actions of Congress and the Steering Committee have focused attention and resources (both in terms of authority and funding) on ecological restoration through intergovernmental cooperation. On these grounds alone, this watershed initiative must be considered a success. Eventually, success must be measured on the basis of actual resource improvements. This standard, however, is probably inappropriate at this time, given that a century of abuse cannot realistically be rectified in a few years of effort. Additionally, the recent flood damage has exacerbated the problem of achieving on-the-ground improvements. The cottonwood experiment overseen by the Steering Committee and the recent water quality agreement suggest that considerable progress is being made to augment flows, improve water quality, and restore riparian habitats, although the modest pace at which restoration efforts are being implemented is of concern to some parties.

The role of the Federal Government in the basin has clearly changed over time. While Federal actions are at the heart of many resource problems, it is equally true that the Federal Government has played a significant role in the current restoration effort. The Federal Endangered Species Act has been an invaluable tool for the Pyramid Lake Tribe and conservationists in efforts to halt resource degradation which, in turn, prompted congressional action. Additionally, Federal agencies have, sometimes reluctantly, played a central role in the work of the Steering Committee. Continued Federal involvement will likely be essential to maintain the recent progress.

## Case Study 10: Upper Carson River Basin

*Major River Basin:* Truckee-Carson River Basin

*Watershed of Interest:* Upper Carson River Basin, California-Nevada

*Collaborative Group/Initiative:* Upper Carson River Watershed  
Management Plan

### The Description of the Area and Problem

As described in the preceding case study of the Lower Truckee River Restoration Steering Committee, the watershed of the Carson River lies adjacent to the Truckee River system near Lake Tahoe on the Nevada-California border. The lower portion of the Carson watershed is hydrologically and politically connected to the Truckee system by the operation of the Newlands Project near the end of the Carson River. The upper portion of the watershed originates along the eastern slope of the Sierra Nevada Mountains in Douglas and Carson City Counties in Nevada, and Alpine County in California, traveling downstream through Carson City, Nevada. The upper portion of the watershed is the focus of this case study. Much of this area is Federal land under the control of the U.S. Forest Service and BLM.

Erosion and discharges associated with timber harvesting, ranching, mining, farming, and recent urban growth have created a host of water quality problems in the Upper Carson watershed. Surface waters do not meet water quality standards for suspended solids, nutrients, and temperature. Groundwater contamination is also a concern. Managing the impacts of new urban growth in this otherwise rural environment raises other water-related concerns and has complicated efforts to develop a coordinated flood control plan. Currently, during high flow conditions, such as the recent 100-year flood, irrigators are expected to voluntarily open headgates and allow their lands to flood to protect urban areas downstream.

### Origins of the Watershed Effort

The Upper Carson River Watershed Management Plan (UCRWMP) process was initiated in 1994 by the Nevada Division of Environmental Protection, NRCS, and EPA, with the aim of coordinating research and management

activities affecting surface water and groundwater. Many of the region's water issues are closely tied to land management practices, thereby encouraging a broad watershed perspective in resource management activities. Rather than being driven by a crisis situation or a regulatory action, this effort was initiated by a liaison between the Nevada Division of Environmental Protection and NRCS, which had experience with the watershed effort in the Feather River (discussed in an earlier case study). Similar watershed initiatives can be found in the Middle and Lower Carson River Basins.

### **Structure and Function of the Watershed Group/Initiative**

An extremely wide variety of governmental and private interests is involved in the planning effort. Major Federal participants on the planning committee include the Corps, NRCS, EPA, the Farm Service Agency, U.S. Forest Service, the U.S. Fish and Wildlife Service, BLM, Bureau of Indian Affairs, and USGS.<sup>22</sup> Among the State agencies participating from Nevada are the Divisions of Environmental Protection, Wildlife, Forestry, and Water Planning. California is represented by the California Regional Water Quality Control Board (Lahonton Region). Douglas, Alpine, and Carson City Counties are also well represented, as are water users, tribal interests (the Washoe Tribe of Nevada), and other groups.

The goal statement of this watershed initiative calls for the parties to "develop an openly accessible network of technical, financial and political support from private and public sectors, that will assist interested private landowners, tribal government and agencies in **voluntarily** planning and implementing ways to enhance the natural resource values of the Upper Carson River Watershed Area." It is hoped that this will produce a "productive, healthy, diverse, agricultural, urban, pasture, forest, range and river system." These goals have been pursued through the collection of data (including the completion of a geomorphology study), the design and implementation of demonstration projects, and the recent completion of a watershed management plan. Projects implemented thus far have primarily involved installing erosion and flood control structures, vegetation plantings, and fence building. Participants in the UCRWMP have developed streamlined procedures for obtaining the necessary permits for such actions.

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<sup>22</sup> The Carson River is part of USGS' National Water Quality Assessment study.

Additional projects will likely resume after current flood relief efforts are completed and after the watershed coordinator prioritizes items in the watershed plan. A variety of public outreach programs are also conducted.

**Federal Role.**—As participants in the UCRWMP process, Federal agencies bring authorities, technical skills, and financial resources to the watershed initiative. The watershed coordinator is funded through an EPA Section 319 grant under the Clean Water Act. The U.S. Fish and Wildlife Service and the NRCS also provide funding and in-kind services for implementing demonstration projects. It is expected that all members of the planning committee will play a role in implementing the plan. Most administrative matters are handled out of the Carson Valley Conservation District. Funds have also been contributed by county governments, private corporations and foundations, and landowners.

#### **Success, Failure, and the Federal Role**

A major success of this effort has been the way in which traditional adversarial relationships have evolved into cooperative relationships. The level of distrust between Federal agencies and the local governments and resource users has been significantly reduced. The watershed plan has been completed, and there is reason to believe that it will be implemented in the near future. Several demonstration projects already are operational. While most of the on-the-ground work has not begun, and funding these efforts will likely be a challenge, the planning committee has made considerable progress in a relatively short period.

In general, the effort has not been constrained by any Federal regulations or practices and has greatly benefited from the financial support and active participation of several Federal agencies. Recent severe flooding in the basin has temporarily delayed work on this initiative, but will undoubtedly serve to reinforce the importance of restoring the integrity of the stream channel and developing improved practices for balancing water supply and flood control practices on a watershed basis. These floods may also prove to be an asset in helping to mobilize the financial and human resources needed to fully implement the watershed plan.

## **Case Study 11: Rio Puerco Watershed**

*River Basin:* Upper Rio Grande

*Watershed of Interest:* Rio Puerco Watershed, New Mexico

*Collaborative Group/Initiative:* Rio Puerco Management Committee

### **Description of the Area and Problem**

The Rio Puerco is one of a half dozen major tributaries of the Upper Rio Grande River in northern New Mexico. The river originates along the eastern edge of the continental divide in the Nacimiento Mountains near the Jicarilla Apache Indian Reservation and the town of Cuba, and flows south until joining with the Rio Grande mainstem at the city of Bernardo, about 50 miles south of Albuquerque. The vast watershed of approximately 2.2 million acres is sparsely populated and primarily features natural resource economies such as grazing, irrigated agriculture, oil and gas development, recreation, and related activities. Approximately 15 percent of the watershed—and 80 percent of the headwaters—originate on lands managed by BLM.

Sedimentation and erosion are the primary resource issues in the Rio Puerco, although water availability is a chronic concern in this region. High levels of sedimentation are associated with natural conditions and several human activities, including grazing, oil and gas development, and recreation (especially off-road vehicles). In addition to reducing water quality in the region, sedimentation increases the risk of floods, causes increased maintenance costs for irrigation facilities, and reduces water storage capacity downstream in Elephant Butte Reservoir (on the Rio Grande mainstem).

### **Origins of the Watershed Effort**

Government agencies and private citizens have been working together since the 1950s to address the chronic sedimentation problems in the Rio Puerco watershed. In recent years, Clean Water Act amendments have called for the State to assume a larger role in addressing nonpoint source pollution. This mandate prompted BLM and the State of New Mexico to develop a memorandum of understanding in 1991 calling for the implementation of best management practices on BLM lands. In order to address these water quality problems in a more comprehensive fashion, in 1993, BLM expanded this

cooperative effort to include other agencies and public cooperators with a vested interest in the watershed. The resulting watershed initiative was known as the Rio Puerco Watershed Interagency Group. Many of these parties believed that a legislative mandate, such as that seen in the Zuni River Watershed Act of 1992, was needed to pursue their goals more effectively. Consequently, they successfully pushed for the congressional establishment of the Rio Puerco Management Committee (Management Committee) as part of section 401 of the Omnibus Parks and Public Lands Act of 1996. The Management Committee essentially replaces the Rio Puerco Watershed Interagency Group.

### **Structure and Function of the Watershed Group/Initiative**

The rules of membership in the Management Committee are specified in the legislation, which calls on BLM to convene the watershed group. Other Federal members include the U.S. Forest Service, the Corps, Reclamation, USGS, NRCS, the U.S. Fish and Wildlife Service, and the U.S. Bureau of Indian Affairs. State representation, from the New Mexico Environment Department of the State Engineer is also called for, as is the participation of affected tribes and pueblos. Other participants are to represent local soil and water conservation districts, the Elephant Butte Irrigation District, private landowners, interested citizens, and a representative of the Management Committee itself. Approximately 30 members are envisioned for the Management Committee, which held its first meeting in February 1997.

The Management Committee is mandated to perform several needed functions, including the establishment of an information clearinghouse on resource conditions and best management practices (BMPs). The Management Committee is to function as a forum where this information can be crafted into a management strategy for achieving the desired watershed restoration. The management strategy is to emphasize the voluntary implementation of BMPs on public and private lands. A variety of BMPs, including several fencing and reseeding projects, has already been implemented in recent years. The work of the Management Committee is to be documented in biennial reports to the Senate Committee on Energy and Natural Resources.



**Federal Role.**—The Federal role in this effort is unusually significant, due to the existence of a Federal legislative mandate, the active participation of several Federal agencies, and the promise of Federal funding. Congress has authorized the expenditure of approximately \$7 million over the next ten years, at which time the Management Committee is expected to disband. The Management Committee has yet to request funds and has not yet determined how these funds should be utilized. Use of funds is one of the most fundamental issues the Management Committee will address in upcoming meetings. Despite this significant Federal role, BLM and other Federal participants are being careful to maintain an equal partnership among all Management Committee members.

#### **Success, Failure, and the Federal Role**

Parties in the Rio Puerco watershed have been successful in establishing a new institutional framework for watershed restoration, loosely patterned after an arrangement already in use in the Zuni watershed. These two efforts are relatively rare in that they have achieved formal congressional authorization. Despite the relative formality of these arrangements, both rely on voluntary cooperation; and only the Zuni legislation calls for the production of an actual watershed plan. By relying on voluntary cooperation and the collaborative development of management strategies, the Rio Puerco effort is similar to most other watershed initiatives in the West. Legislation was pursued primarily to increase the level and breadth of participation in watershed management activities, encourage additional interagency and public-private cooperation, eliminate the perception that the watershed initiative was an "agency owned" effort, and attract Federal funds that can be used with matching local contributions. Deficient funding was a major impediment to the research and interagency cooperation goals of the interagency group. The promise of \$7 million over ten years has the potential to make the Management Committee a potent force in watershed restoration. However, the effectiveness of this arrangement has yet to be demonstrated.

## Case Study 12: Upper Rio Puerco Watershed

*River Basin:* Upper Rio Grande

*Watershed of Interest:* The Upper Rio Puerco Watershed (near Cuba, New Mexico)

*Collaborative Group/Initiative:* Rio Puerco Watershed Committee

### Description of the Area and Problem

As discussed in the preceding case study of the Rio Puerco Management Committee, the Rio Puerco watershed covers a large area of northern New Mexico in the Upper Rio Grande Basin. In the upper reaches of this watershed lies the small town of Cuba, New Mexico. It is this portion of the watershed that contains the highest percentage of BLM lands. As seen throughout the Rio Puerco watershed, erosion and sedimentation are the major resource management concerns in this area. The watershed initiative described in this case study focuses on that component of the Rio Puerco watershed approximately 30 miles in radius from the town of Cuba.

### Origins of the Watershed Effort

The watershed management initiatives in the Rio Puerco watershed originated around 1991. As discussed in the previous case study, these efforts began when BLM, the State of New Mexico, and other Federal agencies established a group known as the Rio Puerco Watershed Interagency Group to share information and coordinate activities. That group has recently evolved into the Management Committee as a result of Federal legislation in 1996. About the same time the Rio Puerco Watershed Interagency Group was forming, it became clear that, actual implementation of on-the-ground projects within the watershed would require the active participation of local landowners. That concern was crystallized by a New Mexico State University seminar aimed at identifying economically beneficial projects around the community of Cuba. The result of that effort was the establishment of a group often referred to as the Cuba Committee, now more commonly known as the Rio Puerco Watershed Committee (Watershed Committee). At the present time, the Management Committee and the Watershed Committee are not formally linked, although a representative of the Watershed Committee is expected to participate in the activities of the larger Management Committee.

### **Structure and Function of the Watershed Group/Initiative**

The Watershed Committee is a largely informal group, primarily comprised of local landowners and representatives of BLM, U.S. Forest Service, and NRCS. These parties share a common belief that improving the economic and environmental health of the region requires addressing the erosion and sedimentation problems and repairing the associated damages to the acequia systems (i.e., irrigation canals).

The goals of the Watershed Committee are pursued by a variety of on-the-ground activities. Most completed projects have involved sagebrush removal, vegetation plantings, and the construction of check dams and other erosion-control structures. This focus complements, but is not explicitly tied to, the research and planning focus of the larger watershed initiative overseen first by the Rio Puerco Watershed Interagency Group and now by the Management Committee.

**Federal Role.**—Federal agencies have played a major role in the functioning of the Watershed Committee. The group was initially established by seed money provided by the U.S. Forest Service and has since obtained additional funding from the Farm Services Agency and from local conservation districts of NRCS. BLM and local landowners have also been an important source of funding on a project-by-project basis. Given that most projects have been conducted on BLM lands, the active and enthusiastic involvement of that agency has been a key element in the functioning of the Watershed Committee.

### **Success, Failure, and the Federal Role**

The Watershed Committee has accomplished exactly what it was established to do: the on-the-ground implementation of erosion control projects and best management practices in the Upper Rio Puerco watershed near the town of Cuba. In pursuing this objective, the Watershed Committee has faced two primary obstacles. The first and most chronic challenge faced by the group has been securing funding for desired projects. The Watershed Committee does not have sufficient funds to employ a coordinator and, perhaps, consequently, has not been able to effectively locate or pursue a variety of potential funding sources. Recent Federal legislation establishing the

Management Committee and authorizing approximately \$7 million in funds over ten years holds the promise of increased funding; however, it is unclear how these funds will be distributed.

The other major obstacle faced by the Watershed Committee has been more successfully addressed. The many regulatory and permitting requirements associated with the implementation of projects—often on Federal lands with Federal funds—can create a formidable administrative hurdle for a largely informal and unstaffed watershed group. In recent years, this obstacle appears to have been successfully overcome by changes in local BLM leadership that have brought the Watershed Committee and BLM closer together. In recent years, BLM has established itself as an essential and valuable ally in local watershed restoration efforts. This dramatic improvement in Federal-local relations does not appear to be the result of any specific legislative or executive reform, but is more attributable to changing attitudes and improved leadership at the BLM district office. BLM still has several critics in northern New Mexico, and the condition of the range in much of the Rio Puerco is quite poor. However, it appears as if the region has made a serious commitment to improving the resource through the use of watershed initiatives. While it will likely take many years to notice significant improvements in the condition of the physical landscape, it appears as if the institutional landscape has already benefited.

## **Findings and Conclusions**

Through the review of case studies and the related literature of regional resource management, it is possible to place current watershed-based experiments in regional water management into context. This context not only facilitates an assessment of the current situation, but provides the necessary foundation from which to look forward and to craft recommendations. The following discussion reviews the eight major findings and conclusions of this study, grouped into two categories: general findings and findings related to the Federal role in watershed initiatives.

### **General Findings**

The information presented in this study supports at least six general findings. These findings are:

1. Managing water (and related resources) at a regional scale is an idea with a long history and sound theoretical basis, but it has never been so widely implemented as at the present time.
2. The watershed initiatives of the West show tremendous variety in structures and functions, although the successful initiatives tend to exhibit several common qualities.
3. A lack of formal authority for a watershed initiative usually does not hinder the functioning of the initiative; to the contrary, a reliance on "moral authority" is generally seen as a key asset.
4. Most watershed initiatives are not closely linked to management programs at the larger river basin scale.
5. The watershed movement has some serious critics who raise legitimate issues about the goals, focus, decisionmaking procedures, representativeness, and effectiveness of certain watershed initiatives or watershed initiatives in general.
6. The performance of most watershed initiatives is sufficiently positive to merit guarded optimism and to justify greater support from all levels of government and the private sector.

***Finding No. 1: Managing water (and related resources) at a regional scale is an idea with a long history and sound theoretical basis, but it has never been so widely implemented as at the present time.***

As mentioned earlier (and discussed in detail in appendix A), a variety of scholars and study commissions at various times in U.S. history have proposed managing water resources within regionally defined scales, leading to a diversity of intergovernmental experiments. Efforts at the river basin scale have been long on rhetoric and have featured many ambitious Federal initiatives, but have been woefully short on positive results. In contrast, past efforts at the small watershed scale have generally operated outside of the limelight, but have produced some notable successes—although only in the relatively limited areas of soil conservation and flood control. Managing water resources at hydrologically-defined regions is again emerging as a fashionable idea at both the river basin and small watershed scales. At the river basin scale, this "rebirth of regionalism" is still primarily confined to rhetoric; but at the smaller watershed scale, this concept is being

aggressively expressed like never before through the rapid proliferation of watershed initiatives throughout the West. The case studies presented in this report cover only a small sampling of the dozens of watershed initiatives evolving to address the chronic and seemingly ubiquitous problems deriving from interagency and intra-agency competition and intergovernmental fragmentation.

The vast majority of these cases are less than a decade old, although many have close organizational ties to local conservation districts (a program that began in the 1930s) and philosophical ties to the democratic planning principles of coordinated resource management (a 1950s era innovation). While important differences exist among the various watershed efforts, the initiatives as a whole illustrate that this current trend involves more than just a fine tuning of administrative arrangements. The changes being undertaken have a significant political and social component, as more and more interests and perspectives are being welcomed and accommodated in decisionmaking environments that are becoming increasingly reliant on voluntary cooperation.

A review of the ongoing institutional experimentation suggests that the "watershed movement" is simply the most visible expression of an evolving new western philosophy, originating largely from the grass roots and stressing three primary elements. The first fundamental element of this emerging philosophy is the notion that western natural resource institutions must respect the needs of both ecological and community sustainability. The idea that the West can have either healthy environments or robust economies, but not both, is increasingly seen as a false and counterproductive notion that has slowed progress on the development of modern institutional arrangements.

The second element is an emphasis on democratic processes, stressing decentralization, collaboration, inclusion, limited privatization, and, most of all, participatory government. There is a strong belief that the problems faced by western communities should be solved by western communities rather than by distant governments; through endless intergovernmental competition among executive, legislative, and judicial decisionmakers; or by markets that do not adequately consider local needs. Providing the linkage between the concepts of sustainability (of both natural and human systems) and democracy is the simple notion of pragmatism. Most watershed initiatives are designed to function as practical, problem-solving tools, cutting bureaucratic red tape and redundant planning, and promoting on-the-ground

action. The triad of sustainability, democracy, and pragmatism provides the philosophical context within which issues of regionalism, interagency and intra-agency competition, and intergovernmental fragmentation are now being addressed.

***Finding No. 2:*** *The watershed initiatives of the West show tremendous variety in structures and functions, although the successful initiatives tend to exhibit several common qualities.*

Watershed initiatives originate in a variety of ways to address a variety of problems. Frequently, studies and conferences play a major role in providing a stimulus for watershed initiative formation. For example, the origins of the Verde Watershed Association can be traced to the Verde River Corridor Project study (initiated by the Arizona State Parks Board) and the first Verde River Watershed Conference (sponsored by the Cocopai Resource Conservation and Development Area). Specific problems and problem-solving efforts are also likely to stimulate the formation of watershed initiatives, although a few efforts—such as the McKenzie initiative—have emerged in the absence of any obvious crisis. One of the more powerful stimuli appears to be the threat of governmental (usually Federal) intervention to address a natural resource issue, especially an endangered species or water quality concern. This phenomenon is illustrated by the watershed initiatives in the Animas, Lehmi, and Clear Creek watersheds. The fear of Federal intervention is likely a much more viable and useful stimulus for watershed initiative formation than actual intervention, although the restoration efforts in the Columbia, Truckee-Carson, and Sacramento-San Joaquin basins provide evidence that Federal efforts at dispute resolution can produce a fertile environment for watershed groups.

It is usually difficult to attribute the formation of a group to the action of any one party, jurisdiction or sector, since watershed initiatives are inherently collaborative efforts. Nonetheless, general trends have been established. Of those cases reviewed in *The Watershed Source Book*, approximately two-fifths could be classified as originating through a State initiative, while the remaining three-fifths were established in relatively equal numbers by local government initiatives, Federal Government initiatives, and nongovernmental bodies. Most initiatives do not have a legislative basis and autonomously establish their own mandates and organizational structures.

The watershed initiatives reviewed in this report focus on a wide variety of resource issues. The most common focus is also the broadest focus: the

preservation and restoration of watershed health, especially the condition of the riparian corridor. Groups such as the Feather CRM and the Verde Watershed Association fall into this category, while groups such as the Animas River Stakeholder Group and the Rio Puerco Watershed Committee exhibit narrower focuses (i.e., cleaning up abandoned mines and minimizing erosion, respectively). Water quality issues are a concern to almost all watershed groups, which is a major reason why most efforts include parties associated with both water and land management. The broad focus and participation of these watershed groups are a direct and predictable response to the problems associated with traditional institutional arrangements featuring highly specialized and independent agencies and programs. The regional nature of the salmon crisis in the Pacific Northwest is at least partially responsible for the high number of watershed initiatives in that region, while sparsely populated ranching communities typically feature fewer initiatives. A large number of collaborative groups have also evolved in recent decades to address land management issues, especially forest planning. While beyond the scope of this research, these groups provide a further illustration of the growing trend to involve communities in regional resource management.

Most of the efforts reviewed in this report and in *The Watershed Source Book* are genuinely intergovernmental in nature. While it is true that a few efforts, such as the Verde Watershed Association, are primarily local, while others, such as the Lower Truckee River Restoration Steering Committee, are primarily Federal, a major unifying element of most successful watershed initiatives is broad participation of governmental and nongovernmental parties. A majority of the 12 watershed initiatives reviewed in this report feature the active involvement of the U.S. Forest Service, NRCS (often working through conservation districts),<sup>23</sup> and EPA. BLM, the U.S. Fish and Wildlife Service, the Corps, and USGS are also common participants in this sample of cases, while Reclamation, the U.S. Bureau of Indian Affairs, and the U.S. Farm Service Agency are found at a slightly lesser frequency. Efforts in the Verde, Animas, Lehmi, Truckee, and Rio Puerco watersheds also feature a significant role for tribal governments.

Participating Federal agencies normally provide financial support and in-kind services. While a few specific grant programs—such as section 319, nonpoint source pollution grants administered by EPA—are common funding

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<sup>23</sup> At least 4 of these 12 initiatives are closely affiliated with or supported by local conservation districts, which typically function as a local government while retaining close ties to their Federal parent: NRCS.



sources, watershed initiatives generally draw funds from a variety of programs. This is not surprising, given that participating agencies often find these efforts to be efficient mechanisms for implementing a variety of pre-existing programs and mandates. Most watershed initiatives are highly, if not completely, reliant on Federal funds, and even the most successful efforts typically do not wean themselves from Federal support. This creates an arguably healthy "codependency" situation that is crucial to the success of these efforts: The watershed initiatives need Federal resources to survive, while Federal agencies find the initiatives essential to the efficient implementation of their mandates.

A variety of researchers and resource managers have identified qualities that are typically associated with successful watershed efforts, although academically rigorous analyses are generally lacking. Most observers identify essential qualities in five general areas: leadership, participation, focus, resources, and process. The most frequently mentioned quality of successful groups is effective leadership, which is often provided by a watershed coordinator. Efforts that lack a coordinator—such as the Rio Puerco Watershed Committee—must rely on volunteers to raise funds, schedule meetings, produce documents, and "keep the ball moving." This is a significant burden, since coordination and scheduling are notoriously time-consuming activities. The presence of an independent coordinator is also helpful in alleviating fears that one party will dominate the process. Building trust is an essential prerequisite to successful collaboration in many basins. A lack of trust can discourage some necessary parties from participating, which can be a fatal flaw in watershed restoration. In general, participation from all levels of government and the private sector is necessary for efforts that feature a relatively broad scope, as is seen in many watershed initiatives.

It can be a real challenge to identify a focus that is sufficiently broad (substantively and geographically) to effectively address watershed restoration issues, while still being manageable. Many groups find that a focus on field-level projects, rather than planning activities, is useful in retaining interest and participation and in attracting needed resources. Essential resources include funding for coordination and projects, information and technical expertise, and the authority to implement selected actions. These resources are typically most effectively secured and utilized when channeled through decisionmaking processes that stress voluntary cooperation, consensus decisionmaking, and flexibility in organizational structure and problem-solving approaches.

***Finding No. 3:*** *A lack of formal authority for a watershed initiative usually does not hinder the functioning of the initiative; to the contrary, a reliance on "moral authority" is generally seen as a key asset.*

The majority of watershed initiatives are based solely on the concept of voluntary cooperation. Some efforts, such as the Feather CRM, establish a degree of formality through the use of interagency agreements; however, these types of agreements do not significantly modify the allocation of decisionmaking power. Even watershed initiatives originating from Federal legislation, such as the Rio Puerco Management Committee, typically stress voluntary cooperation and a reliance on the coordinated, but still independently held, exercise of authorities by the participating agencies. In this respect, modern watershed initiatives are similar to many of the interagency river basin committees of earlier decades. Many of these efforts, including the postwar "firebrick" committees, were widely assumed to have failed due to a lack of formal authority.<sup>24</sup> The relative success of voluntary watershed groups means that the popular notion that river basin management in the United States has failed because regional organizations tend to lack formal authority must be questioned, if not rejected outright. Clearly, most participants in watershed initiatives have rejected this notion, as almost every individual interviewed in this research indicated that formal authorities were neither needed nor desired by their watershed initiatives. Instead, these groups utilize "moral authority"—i.e., the idea that when all parties associated with a given resource are made aware of their role in causing and solving the observed problems, then each party feels a compelling need to support collective efforts to improve resource management. Within this framework, agencies, landowners, and other parties possessing formal authorities do not relinquish these powers, but feel obligated to voluntarily exercise these authorities in a coordinated manner.

Two important considerations must be factored into any analysis of the role of formal authorities in watershed initiatives. First, management efforts organized at the scale of small watersheds are potentially more likely to achieve "moral authority" than those at the larger river basin scale simply because face-to-face interactions are more common. Upstream-downstream conflicts, for example, take on a decidedly different nature when the parties are only 20 miles apart and members of the same civic and social organizations, than when hundreds of miles (and numerous political

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<sup>24</sup> Consult appendix A for a detailed review of the river basin initiatives of the postwar era and the literature summarizing the generally poor track record of these efforts.

jurisdictions) separate parties that never meet and that have little appreciation of the others' situation. Secondly, many years have passed since the interagency river basin committees of earlier decades were active. Those committees existed in an era when most Federal agencies retained a high level of discretionary authority (as defined in law), political clout, and respect as impartial scientific resource managers. Most natural resource agencies no longer possess those qualities in the same magnitude, due, in large part, to changes in laws and attitudes brought about by the environmental movement. Consequently, it has become increasingly difficult for agencies to unilaterally exercise authority in an area where they have been unable to build supportive constituencies. Exercising authorities in the context of collaborative decisionmaking efforts helps agencies avoid gridlock. While this is generally a positive development, it can be troublesome when watershed groups pursue goals that do not adequately correspond with the objectives and standards agencies are mandated to pursue. In those situations, agencies may be pressured to allow watershed groups to have inappropriate influence on how an agency exercises its statutory authorities.<sup>25</sup> In general, concerns of this nature are most significant in watershed initiatives that lack participants adequately representing the full range of resource values and interests.

***Finding No. 4: Watershed initiatives are not closely linked to management programs at the larger river basin scale.***

Water resources are geographically "nested." Major river basins feature a host of sub-basins, which, in turn, contain smaller watersheds. Ideally, institutional arrangements should recognize this relationship, since the outlet of one basin is typically an input of another. In practice, however, these institutional linkages are usually poorly developed, due, in large part, to the increasingly complex maze of jurisdictions and agencies that become involved in a resource as the geographic scope broadens. Building and maintaining institutional links between "nested" watersheds can be extremely difficult, especially if this is to be done across the functional specialties that are typically used to establish agencies and programs. Agencies generally do not have the incentives or the resources to attempt this effort, which most likely cannot occur without a concentrated effort by a governmental jurisdiction that fully encompasses the river basin. Since most American river basins are interstate, this implies a need for Federal

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<sup>25</sup> There is some concern that this might be occurring in Oregon's Coastal Salmon Restoration Initiative, discussed under finding number 5.

intervention in most cases—the Sacramento-San Joaquin Basin being one of the few potential exceptions. As shown in appendix A, this has been attempted in many ways, usually with very limited success. Given the current lack of a Federal water policy or coordinating agency (on the Water Resources Council model), the traditional disdain for regional planning in the United States, the limited Federal role in western water allocation, and many other inherent constraints, establishing these linkages has been difficult to accomplish. Recent efforts to reauthorize and modify the Clean Water Act and the Endangered Species Act have prompted renewed thinking in this area, but the problem remains largely unaddressed in most basins. Fortunately, many watershed initiatives in the West have not been significantly harmed by not being part of a linked river basin effort, primarily since many efforts are located in headwaters and are not significantly impacted by activities downstream.

Perhaps the primary barrier to establishing these linkages is the absence of significant river basin organizations and management programs in most American river basins. Of the six basins covered in this study, only the Columbia River Basin features a significant organization with a mandate to pursue regional resource management objectives: the Northwest Power Planning Council. The McKenzie Watershed Council and the Model Water Project in the Lehmi region maintain pseudoformal linkages (mostly financial) with the Northwest Power Planning Council due to the needs of salmon recovery. Salmon, being an anadromous fish, is the perfect coordinator, graphically illustrating the physical connections among the watersheds of the Pacific Northwest.

Arrangements in the Colorado, South Platte, and Rio Grande Basins are not so well developed. Federal legislation, including interstate water allocation compacts, in each of these basins helps to establish only primitive and substantively limited river basin arrangements and does not provide any significant linkage to the watershed initiatives in those basins focusing on broader water quality issues. As shown by the watershed case studies presented for the South Platte and Upper Rio Grande Basins, some nesting of watershed initiatives does exist in those basins, but strong connections with a river basin effort are unlikely to develop until more significant arrangements evolve at these larger scales. This probably will not happen until a compelling reason—such as a regional "train wreck" like the salmon crisis—arises to force action. This is unfortunate, as improved coordination between watershed and river basin initiatives promises to strengthen the management efforts at both scales.

The other two basins covered in this study, the Truckee-Carson and Sacramento-San Joaquin, are primarily substate and could theoretically pursue the development of river basin management programs without Federal leadership. Ironically, those basins have been the site of recent Federal interventions which promise to bring new Federal resources to the restoration of those resources. The CALFED Bay-Delta Program and the recent passage of California Proposition 204 indicate that California is moving closer to developing a coordinated regional strategy for the Sacramento-San Joaquin Basin. It would be beneficial to develop linkages with the Feather CRM, the South Fork Dialogue Group, and other watershed initiatives in the region.

***Finding No. 5:*** *The watershed movement has some serious critics who raise legitimate issues about the goals, focus, decisionmaking procedures representativeness, and effectiveness of certain watershed initiatives or watershed initiatives in general.*

The watershed movement enjoys the support of a wide variety of parties that see watershed initiatives as a valuable tool for promoting more creative, locally responsive, and efficient regional resource management. However, as these collaborative efforts come to be relied upon more and more as preferred tools for resource management, critics have emerged who ask important and difficult questions about whose interests these groups represent, and how they modify the responsibilities and accountability of resource managers. The most forceful critics of watershed initiatives come from within the environmental community, although many of the movement's strongest proponents also represent environmental interests. This division within the environmental community is not easily explained, although some commentators have chosen to distinguish between grassroots activists who are committed to locally driven efforts and the national environmental groups who are most comfortable (and effective) acting through congressional lobbying and litigation rather than at the local level. This concern is clearly articulated by Michael McCloskey (1996:7), chairman of the Sierra Club, in remarks concerning the potential lack of environmental activists in some local initiatives:

*Few of the proposals for stakeholder collaboration provide any way for distant stakeholders to be effectively represented. While we may have activists in some nearby communities, we don't have them in all of the small towns involved. It is curious that these ideas would have the effect of transferring influence to the very communities where we are*

*least organized and potent. They would maximize the influence of those who are least attracted to the environmental cause and most alienated from it.*

The underlying assumption in such statements is that local participants in some watershed initiatives are less likely to champion environmentally responsible policies than “outsiders” such as federal bureaucrats or national environmental group representatives. In some situations, this is undoubtedly true;<sup>26</sup> although, broad economic and demographic trends in the West suggest that these situations are increasingly less common.

The reliance on consensus decisionmaking is also of concern to some parties, since this requirement may prompt watershed initiatives to selectively exclude dissenting voices from the collaborative effort (for fear of creating groups that are unable to make decisions) and can encourage “lowest common denominator” decisionmaking. These criticisms raise important questions about the democracy and effectiveness of some watershed initiatives, suggesting that they may work to subordinate the opinions of both national and local majorities to the whims of local minorities concerned with perpetuating existing patterns of resource use and abuse. Skeptics of watershed initiatives correctly observe that consensus decisionmaking is a useful tool for making significant deviations from the status quo if innovations are available that promise to provide benefits to all participating parties.<sup>27</sup> A reliance on consensus-based processes also can serve to discredit or “de-legitimate” public conflict and litigation, strategies upon which many environmental groups have become highly dependent.

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<sup>26</sup> The observations of Reed Benson, reclamation issues director of WaterWatch of Oregon, support McCloskey’s apprehensions: “The membership composition of some Oregon watershed councils strongly indicates that their primary goal is the protection of existing economic activities. For example, the Umatilla Basin Watershed Council was originally formed with thirteen members, of which eight to ten were closely associated with irrigated agriculture. Moreover, the original representative of “fisheries” interests on the Council was president of the Eastern Oregon Irrigation Association. For some watershed council members, restoring ecological health seems to be a secondary goal” (Benson, 1996:196).

<sup>27</sup> Benson (1996) argues that a reliance on consensus means that most watershed initiatives are unable to address issues of water quantity. Consequently, he observes that “It is easier for all concerned to focus on somewhat less controversial matters, such as installing fish screens, planting trees among riverbanks, and keeping cattle away from riparian areas. While land use changes may improve flows at certain times by helping to restore the natural hydrograph, such measures offer limited benefits on overappropriated rivers with inadequate streamflow protection” (pages 203-204).

Recent events in Oregon have added to the ongoing debate about the motives and the effectiveness of watershed initiatives. Critics who fear that some watershed initiatives are being used to avoid compliance with federal environmental laws point to a recent action taken by the U.S. National Marine Fisheries Service regarding wild coastal coho salmon in the Pacific Northwest. In response to the demands of the State of Oregon and Governor Kitzhaber, the agency has decided to list some populations under the Endangered Species Act, but not those populations in central and northern Oregon. Instead, the responsibility for restoring those salmon runs will primarily reside with watershed initiatives and private landowners identified in the state's Coastal Salmon Restoration Initiative. Critics believe that the state approach will not be as rigorous or effective as a federally driven effort, and that the state effort was motivated solely by the desire to avoid federal intervention under the Endangered Species Act. While proponents of the state plan (including many environmental groups) concede this to be a primary motivation, they counter that the program is a responsible and effective strategy for efficiently achieving the goals of the federal endangered species program through locally controlled processes (Larmer, 1997; National Association of State Foresters, 1997).

A recent case raising questions about the motives and effectiveness of collaborative groups is provided by the highly acclaimed Quincy Library Group, a community organization primarily concerned with forest management issues in northern California. The group has sought congressional action to translate its proposed fire management and timber harvesting program into federal law. The bill (HR 858), however, has become a lightning rod of controversy, not only due to the level of timber harvests called for in the plan, but due to the attempted use of collaborative groups as an alternative to existing forest planning processes and other national environmental statutes that provide clear procedural and substantive decisionmaking guidelines (Little, 1997; *Public Land News*, 1997). As organizations such as the Quincy Library Group and watershed-based efforts like Oregon's salmon restoration program begin to emerge as important vehicles for locally driven decisionmaking, issues of representation, focus, decisionmaking procedures, and effectiveness will increasingly be directed at collaborative efforts. These inquiries are useful and legitimate.

***Finding No. 6.*** *The performance of most watershed initiatives is sufficiently positive to merit guarded optimism and to justify greater support from all levels of government and the private sector.*

The watershed initiatives described in this study are only a small subset of the cases being tracked by the Natural Resources Law Center and other research organizations. The majority of the well documented cases being tracked are normally characterized as successful, and only rarely exhibit those potential deficiencies identified by the critics. The popular characterization of watershed initiatives as generally successful, however, deserves two qualifications. First, efforts which are not successful are typically not well documented, so the literature has an inherent bias in favor of the successful efforts. Although difficult to document, failures exist. Second, most researchers and resource managers have chosen to classify efforts as successful if they increase the level and quality of communication among and between resource managers and stakeholders, a convention followed in this study. It is certainly true that most watershed initiatives can make an immediate, and often highly valuable, improvement in intergovernmental and public-private sector relations; however, over the long term, these efforts must be evaluated in terms of resource conditions. Most of the initiatives reviewed in this report have implemented projects that have made a contribution to watershed restoration, but none has completed the formidable tasks that prompted its formation, and many have been forced to target only a subset of the issues of concern. However, successful watershed initiatives take time; and until these efforts are given more time, it is impossible to conclude they are truly successful management tools.

In the meantime, it is fair to conclude that most watershed initiatives are a move in the right direction. Increasing the diversity of participants and the breadth of focus in water resources planning and management is a welcome and long overdue innovation, as is the focus on regional management units. These innovations are especially notable when contrasted against the backdrop of gridlock that characterizes many facets of resource policy and administration. For these reasons, all levels of government and the private sector should continue to step forward to promote carefully monitored experimentation in this area. This is probably best accomplished by providing additional and more reliable funding for the successful efforts and providing startup technical and financial assistance to new efforts. This is already happening. An increasingly broad range of Federal agencies are finding ways to support watershed initiatives, and a few States—most notably Oregon—have established programs providing legitimacy and financial support for many efforts. The resources of local governments and nongovernmental sources have also been tapped by many initiatives, although the continued heavy reliance of most groups on governmental, especially Federal, funds is disconcerting. About half of the initiatives



reviewed in this study have indicated that funding deficiencies threaten to slow progress in the coming years. While that is a real concern, there is also evidence to show that many successful efforts are not expensive, and several of the initiatives enjoying the largest budgets have not been terribly successful or innovative. The challenge in the coming years will be to identify those efforts most worthy of support and to direct the appropriate mix of resources to those initiatives. If current trends continue, this will prove to be a worthwhile investment.

### Findings Related to the Federal Role

A major focus of this research has been to examine the manner in which the Federal Government supports, constrains, and participates in the current watershed movement. The information presented in this study supports two additional findings that relate to the Federal role.

7. The Federal Government plays a significant and essential role in the effective functioning of most watershed initiatives.
8. Most watershed initiatives are more likely to suffer from a lack of adequate Federal support than from specific Federal barriers; nonetheless, some barriers do exist.

***Finding No. 7: The Federal Government plays a significant and essential role in the effective functioning of most watershed initiatives.***

Perhaps the most inaccurate generalization associated with watershed initiatives is that they are locally initiated and driven efforts. In the overwhelming majority of cases, that is only half of the story. While these efforts generally have a strong "bottom-up" character, Federal agencies (and occasionally Congress) often play a major role in the origination of watershed initiatives. Federal agencies usually are among the most active participants; they typically provide the majority of financial, technical, and "authority" resources; and they often play a role in implementing selected resource management strategies. This should not come as a surprise given that the Federal Government is the West's largest landowner and water developer. Federal agency personnel have generally learned, however, that too large a Federal role can doom an effort. As shown by the experience in Clear Creek (Colorado) and elsewhere, viable groups are difficult to form and maintain if they are perceived as being controlled by outside agencies. Partly due to this

reason, many Federal agencies have found it useful to channel efforts through local conservation districts, which often have well-established (often formalized) working relationships with Federal and State agencies and local stakeholders. Achieving a balance of Federal and local participation is often key to achieving the "codependency" situation described earlier. Meaningful collaboration takes place only when Federal agencies and stakeholders are at the table, as well as relevant State and local governments, tribal governments, and other interested parties. Fortunately, this is frequently the case.

The role played by Federal agencies and Federal laws is often essential to the functioning of watershed initiatives. Since watershed initiatives are normally voluntary efforts, Federal assistance to watershed initiatives is best viewed from the standpoint of providing incentives to participate. Both negative and positive incentives are useful. The primary negative incentive utilized is the threat of regulatory intervention, usually under the terms of the Endangered Species Act or the Clean Water Act. The threat of intervention can often be more useful than actual intervention in mobilizing interest in an issue, and promoting frank dialogue for addressing resource conditions that are often attributable to decades of incremental decline. The threat of intervention is often viewed by local stakeholders as the institutional equivalent to a flood; it is a crisis, and crisis situations promote innovation. Once interest is aroused, Federal agencies are often eager to join and support fledgling watershed initiatives and can play a key role in steering new concerns through the effort. For example, the origins of the Lehmi Model Watershed Project can be traced to a fear of Federal intervention under the Endangered Species Act; more recently, EPA has encouraged the Idaho Division of Environmental Quality to address Clean Water Act violations through the initiative. While some agencies have been repeatedly criticized by environmental groups for deferring to ineffective watershed initiatives when a more appropriate response might be to exercise the "Federal hammer," there is little doubt that regulatory action—real or threatened—will remain a powerful driving force behind many useful efforts.

The positive incentives utilized by Federal agencies generally fall under the heading of providing resources. Certainly, the least controversial and most "local friendly" type of assistance is Federal funding and in-kind services. Each of the 12 watershed initiatives described in this study has received Federal funding and/or in-kind services such as office space, technical assistance, or labor. Formal authorities and legitimacy are other potential

resources that Federal agencies can provide by virtue of their participation. As mentioned earlier, most watershed initiatives are highly dependent upon these resources.

An additional type of positive incentive is provided by the conservation districts (set up by the NRCS). The great success of these districts in serving as a framework or seed from which watershed initiatives are born and sustained is partially due to the fact that these districts have historically not been used as a vehicle for unwanted regulatory action but, rather, have operated on a system of positive incentives (i.e., Federal funding and technical assistance being provided to landowners who voluntarily agree to implement conservation measures). That framework has put NRCS in a unique position to participate in the current watershed movement. Many agencies with regulatory roles, however, have also proven themselves as effective advocates of watershed initiatives. No agency has more forcefully promoted watershed initiatives than EPA. The agency provides a variety of resources to many initiatives, while continuing to pursue language in proposed Clean Water Act reauthorization bills outlining watershed management as the dominant organizing principle. Even the U.S. Forest Service, which has had the reputation of being a reluctant player in watershed initiatives, has been singled out in many watersheds as being a proponent of these efforts. The Administration and all Federal natural resource agencies have articulated a commitment to collaborative watershed-based management, although the degree to which an agency actively participates seems to be driven more by the personal philosophies of the local agency representative than by the formal policy of the agency. When an agency does exhibit a commitment to the process, it can be a powerful collaborator with local interests.

***Finding No. 8:*** *Most watershed initiatives are more likely to suffer from a lack of adequate Federal support than from specific Federal barriers; nonetheless, some barriers do exist.*

The majority of watershed initiatives tracked by the Natural Resources Law Center do not report being constrained by significant Federal barriers associated with specific Federal laws or agency practices. Bureaucratic red tape is almost universally cited as a nuisance, but only a small minority of watershed initiatives report that their success is significantly limited by Federal regulations. Most of the problems identified are associated with the use of Federal funds in watershed initiatives. Five issues are commonly raised. First, identifying sources of Federal grants and submitting

applications can be a difficult and time-consuming process for many watershed initiatives, given the great variety of agencies and potential funding sources. Many watershed coordinators spend the majority of their time on this exercise. Watershed initiatives without a paid coordinator, such as the Rio Puerco Watershed Committee, can find this task too overwhelming for part-time volunteers. Second, agencies can find interagency collaboration across jurisdictional boundaries difficult, due to the challenge of sharing costs equitably. Some agencies in some districts report that transferring funds to other governmental partners in collaborative efforts can be difficult, although it is generally acknowledged that it can be done. Some personnel even report that it is simple and routine. Third, agencies can find it difficult to finance projects in areas with fragmented public-private land ownership due to restrictions on spending Federal monies on private lands. Fourth, many programs require local cost-sharing before Federal funds can be used to implement projects. In some cases, identifying a local sponsor can be difficult. The fifth issue pertains to sole-source contracting rules that can make it difficult for Federal funding to be used to hire a coordinator selected by the group without going through a competitive review process.

It is unusual for one or more of these problems to present an insurmountable hurdle, although their resolution can siphon time and resources away from more productive activities. Rules on spending money on lands outside an agency's jurisdiction or through another agency are often flexible enough to account for situations in which these outside entities play a role in contributing to issues within an agency's scope.<sup>28</sup> Additionally, many Federal agencies have found it useful to channel money through a third party—such as a State agency, conservation district, or nonprofit organization—and let that organization allocate the funds in an unconstrained manner to projects or specific coordinators. Some watershed initiatives are clearly more skilled than others in overcoming these complications, which suggests that some agency personnel are more skilled than others in navigating Federal accounting regulations. To many parties, however, it also suggests that some agency personnel are more dedicated to support of watershed initiatives than others. A lack of trust between Federal and local interests can be a significant hurdle in some collaborative efforts, and agencies are occasionally accused of inventing constraints as an excuse for not participating. In addition to funding issues, the Federal Advisory Committee Act is sometimes utilized in this manner. It is normally impossible to ascertain which cases

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<sup>28</sup> The issue of expending Federal funds on private lands is addressed in part by Section 124 of the Omnibus Consolidated Appropriations Act of 1997 (Public Law 104-208).

involve a real concern over potential violations of a statute or administrative rule and which involve the exploitation of a contrived excuse. It is fair to conclude, however, that serious participants in watershed initiatives are normally able to find ways around these potential constraints and that addressing awkward regulations will do nothing to increase the participation of reluctant parties.

One of the few areas where specific Federal laws present a real constraint to the work of watershed initiatives is illustrated by the efforts of the Animas River Stakeholder Group. The restoration of waters contaminated by abandoned hardrock mines exposes some real deficiencies in the Federal clean water program. Anytime a party attempts to reduce contamination from an abandoned mine, there is a concern that this party may be assuming liability for the site. This is a well-founded concern, given that most remediation measures that might be attempted by a watershed initiative would only reduce the problem, not eliminate it entirely. This issue is partially addressed in CERCLA by a good Samaritan clause that exempts parties from assuming liability for cleaning up abandoned sites as long as they do not make the problem worse. Still, parties fear that once remediation efforts are initiated, CERCLA and the Clean Water Act will require that these sites obtain discharge permits and that they are made part of efforts to meet discharge and water quality standards. In this way, the Clean Water Act may force the good Samaritans to maintain a long-term involvement in, and potential liability for, cleanup efforts that can take decades and involve hundreds of millions of dollars. A related and much broader issue faced by the Stakeholder Group is the fact that the Clean Water Act is primarily based on the philosophy of requiring all point sources to meet uniform discharge standards, rather than on evaluating pollution control strategies from a watershed perspective. The most efficient strategy in the Upper Animas River and in similar basins would be to concentrate heavily on the most serious contributors, while ignoring the other sites. This would be an efficient way to improve regional water quality, but would bring only some sites in compliance with discharge standards.

While relatively few specific Federal barriers can be identified that significantly impede the progress of watershed initiatives, it is important to remember that fundamental deficiencies in natural resource institutions have provided the overall stimuli for the watershed movement and that Federal laws and agencies are major components of these institutional arrangements. As discussed earlier (and in more detail in appendix A), the fragmentation of natural resource management responsibilities among

programs and agencies representing different geographic areas, substantive issues, and management philosophies is a major impediment to integrated resource management. While many of these problems can never be fully resolved given the widely different interests and values of involved stakeholders and the resilience of institutions to change, the Federal Government has historically done a poor job of integrating the Federal presence in most western river basins and watersheds. This is the primary way in which the Federal Government is a barrier to the goal of integrated watershed management. Federal involvement in watershed initiatives demonstrates that in the realm of western water management, the Federal Government is clearly part of both the problem and the solution.

## Recommendations

The information presented in this report paints a relatively optimistic picture of the current watershed movement. Hundreds of agencies and thousands of individuals across the West have chosen to endorse this evolving new model of resource management stressing collaboration, participation, and consensus, all within a broader philosophical framework promoting sustainable use of resources in a manner that is responsive to local, as well as national, concerns. Of course, not all efforts achieve or even remotely approach this ideal, and collaborative efforts are not immune from bitter controversies, coercive behavior, and the intolerable boredom sometimes associated with collective decisionmaking. Claims of inadequate representation, an over-reliance on consensus, and ineffectiveness also plague some watershed initiatives. Most efforts, however, appear to be headed in the right direction. The Federal Government is generally not seen as being an impediment to this movement—although it is clearly a major contributor to the fundamental deficiencies in western resource management institutions that serve as the primary stimulus for these recent innovations. Federal agencies contribute to watershed initiatives in many essential ways. The opportunity does exist, however, for Federal policymakers to make additional contributions to the watershed movement. Some recommendations are offered below to help guide Federal policymakers in this effort.

***Recommendation No. 1: Systematically address fundamental flaws in the governmental system to the extent practical.***

In large part, the current watershed movement is a direct response to problems of intergovernmental fragmentation and interagency and intra-

agency competition. To the extent that these problems are solvable, they should be addressed. Conflicting mandates need to be reconciled, the management of resources at physically relevant scales should be promoted, and an integrated and substantively holistic viewpoint should be fostered. This is not something that can realistically be done in one massive legislative action, nor will this task ever be done to perfection. Major differences in values and goals among stakeholders will likely always exist and will discourage integrated thinking. Nonetheless, the daunting nature of this task should not serve as a deterrent to periodic, incremental reforms designed and pursued with an appreciation of the significant political obstacles to change and the desirability of minimizing bureaucratic disruptions.

***Recommendation No. 2: Allow watershed initiatives to retain flexibility and informality.***

One of the reasons why watershed initiatives are often an effective way for dealing with resource management issues is that they are not constrained in how they define problems and solutions and are not burdened by rigid organizational structures and processes. This flexibility allows these efforts to be creative, entrepreneurial, and evolutionary—qualities that are typically lacking in existing bureaucracies. Many parties in watershed initiatives are justifiably fearful of legislative attempts to standardize and replicate these efforts. This does not mean, however, that the Federal Government should not play a role in defining clear criteria that watershed initiatives must meet in order to qualify for Federal grants or for Federal agencies to participate. Establishing such criteria is a legitimate Federal role and is an activity that should be done to address the concerns of the critics. Any such criteria, however, should be sufficiently general to retain room for creativity and flexibility, should clearly reinforce the necessity of compliance with the objectives of Federal law, and should primarily call for the evaluation and support of efforts based on their ability to achieve desired resource conditions and standards.

***Recommendation No. 3: Retain and faithfully exercise necessary Federal regulatory authorities.***

Watershed initiatives should not be viewed as a surrogate for sound environmental regulation, but as an additional and complementary tool to be used in a coordinated program of resource management. The exercise of Federal regulatory powers is an essential component of sound watershed

management in the West. In particular, enforcement of the Clean Water Act and Endangered Species Act has been instrumental to the establishment of many efforts and continues to provide the essential incentives necessary to stimulate needed actions. Arrangements such as Oregon's Coastal Salmon Restoration Initiative, which was designed largely to avoid the regulatory requirements of the Endangered Species Act, should be approached very cautiously. The appropriate role of watershed initiatives within federal and state regulatory programs is to help identify and implement creative, efficient, and equitable strategies for achieving legally defined resource standards. To most effectively accomplish their primary roles, watershed initiatives do not need to be vested with formal authorities, but should continue to rely on the exercise of those authorities held by participating agencies. Participating agencies, in turn, need to be provided with sufficient discretion to creatively exercise existing powers in the pursuit of legislatively defined resource management objectives.

***Recommendation No. 4: Maintain a Federal role in regional conflict resolution.***

While watershed initiatives are often an excellent tool for designing and implementing strategies to achieve common goals, they cannot be expected to function effectively in the presence of fundamental conflicts associated with differing value structures or incompatible resource management interests. This is a predictable consequence of a complete reliance on voluntary participation, consensus decisionmaking, and an absence of formal authority. Governmental intervention is often necessary to bring closure to fundamental disputes and to initiate efforts at identifying and implementing strategies for achieving mandated goals—an environment within which watershed initiatives can then excel.

***Recommendation No. 5: Maintain the knowledge base necessary for effective resource management.***

The Federal Government has traditionally played a critical role in the collection, analysis, and dissemination of water-related data and the development of technical knowledge and management tools. This role must be maintained in order to support scientifically sound resource management at the watershed level. The continued decline in Federal support for resource monitoring is particularly troublesome, as is the declining availability of highly trained Federal agency personnel at the local level. Watershed management will not be an improvement over past strategies of resource



management if the collection and analysis of technical data is insufficient to support science-based decisionmaking.

***Recommendation No. 6: Promote flexibility in the allocation and use of Federal funds in watershed initiatives.***

To effectively function, watershed initiatives need the ability to efficiently allocate and utilize funds for coordination (i.e., administrative tasks) and projects. While Federal participants are usually invaluable as a source of this funding, this Federal involvement can come at the expense of regulations that can potentially limit the flexibility of the initiative. Federal regulations pertaining to the allocation and expenditure of funds in collaborative efforts should be reviewed and, where possible, modified to better serve the needs of all participating parties. The following actions, in particular, should be rigorously evaluated:

- Simplifying and standardizing (to the extent possible) those procedures and paperwork requirements associated with applying for Federal support of watershed initiatives
- Promoting Federal collaborations across substantive and geographic boundaries by simplifying the interagency transfer of funds
- Modifying rules that can discourage or inhibit agencies from allocating resources to projects on private lands
- Providing some flexibility in cost-sharing requirements so that basins without significant local sponsors are not overly constrained by the requirement of securing local matching funds
- Addressing sole-source contracting rules to make it easier for watershed initiatives to hire and retain watershed coordinators.

***Recommendation No. 7: Promptly address those specific Federal barriers that impede the formation or functioning of effective watershed initiatives.***

While most watershed initiatives are more likely to suffer from a lack of adequate Federal support than from specific barriers originating in Federal laws or administrative rules, some statutes do pose barriers for some efforts. When such situations are identified, they should be promptly addressed. Some specific examples identified in this research are:

- *Liability Issues at Abandoned Mines.* The restoration of abandoned mines raises a host of liability issues and can pose an unacceptable risk to parties that are otherwise willing to attempt mitigation measures. A good Samaritan clause, such as that found in CERCLA, should be considered in a revised Clean Water Act.
- *Federal Advisory Committee Act.* This legislation establishes specific conditions under which Federal agencies can establish or participate in collaborative efforts. In some cases, agencies have interpreted the legislation in a way that precludes their involvement in certain watershed initiatives. Recent judicial interpretations of the Federal Advisory Committee Act suggest that these fears are unfounded.<sup>29</sup> This information needs to be conveyed to agency personnel, or the legislation and rules should be modified to preclude any possibility of violating the statute. Agency personnel should be encouraged to participate in those watershed initiatives that are pursuing goals consistent with those of the agency.

***Recommendation No. 8:*** *Reauthorize the Clean Water Act and the Endangered Species Act, drawing upon the lessons learned in the watershed movement.*

Two of the most influential and essential statutes in promoting western watershed initiatives need to be reauthorized. This is proving to be a time-consuming process, due to the controversial nature of these statutes and due to magnitude of reforms that are being considered based on the lessons learned in recent years of implementation. Of particular note is the effort of EPA to instill a watershed management framework in the Clean Water Act. These efforts are highly worthwhile and should be a top legislative priority.

***Recommendation No. 9:*** *Maintain or increase Federal financial support of existing watershed initiatives.*

Even successful watershed initiatives tend to be unable to wean themselves from Federal funding. Consequently, it is important to maintain existing funding sources (such as nonpoint source pollution control grants under Section 319 of the Clean Water Act) and potentially establish new sources. Effective watershed initiatives that serve community and national interests

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<sup>29</sup> These court cases are examined in a report entitled "The Federal Advisory Committee Act, Rules and Executive Orders: Judicial Interpretations and Suggested Revisions" (May 1997) produced by the Natural Resources Law Center.

while respecting statutory requirements, democratic norms, and other criteria established by policy-makers should not be allowed to perish due to federal budgetary constraints. Additionally, the Federal Government must play a role in ensuring that the costs and benefits of resource management are equitably allocated across jurisdictions, since the benefits of resource restoration and the costs of resource degradation often extend beyond State lines. In appropriate cases, the Federal Government should play a role in promoting the establishment of automatic funding systems that spread the costs of resource management equitably among beneficiaries. Stable funding mechanisms should be promoted.

***Recommendation No. 10:*** *Train agency personnel in the theory and practice of collaborative watershed management.*

While Federal agencies and the Administration have generally articulated an eagerness to explore collaborative mechanisms of resource management, the watershed management philosophy has not reached all levels and branches of the Federal bureaucracy. All Federal resource managers need to become more aware of the role that watershed initiatives (and similar tools) can and cannot play in resource management and need to be trained to carry out the unique role that Federal agencies play in these efforts. These individuals, in turn, should transfer these skills to those parties interested in exploring such relationships. While these skills are most essential to field-level managers, higher level employees should also be made familiar with the unique challenges, opportunities, and pitfalls of these arrangements.

## **Appendix A**

Regional Water Resources Management in the  
Western United States: A Historical Review  
of Institutional Issues and Experimentation

## Introduction

Among the most difficult and long-standing challenges in the field of natural resources is the management of transboundary resources. No resource raises more boundary issues than the so-called "fugitive resource": water. Unlike most natural resources, water is innately mobile and elusive, traversing physical boundaries with a seemingly premeditated disregard for the consequences on human institutions. The most obvious type of boundary crossed is geographic, with most water laws, agencies, and management programs being adopted and implemented by political entities empowered to act at physical scales other than those defined by hydrology. This is most easily seen by noting the orientation of the Nation's river basins. The continental United States is a Nation of transboundary rivers; all rivers are either international, interstate, substate, or a combination of these regions.<sup>1</sup> Nested within the major river basins are a host of smaller tributary rivers and local (i.e., substate) watersheds. The institutional landscape features a similar nesting of politically defined regions, with the rules of nations, States, counties, and various special districts layered upon each other. Rarely do the politically defined geographic units used as the lattice for human institutions conform to hydrologic units such as river basins or watersheds.

The lack of congruence between political and hydrologic regions is only a small part of water's transboundary nature. Institutional arrangements for the governance, administration, and management of water resources are fragmented by a variety of forces that hinder a regionally integrated management orientation.<sup>2</sup> The perspectives of agencies, congressional committees, interest groups, professional disciplines, political processes, management programs, budgeting practices, judicial inquiries, the media, and so on, are often highly reductionist, providing a formidable and entrenched barrier to integrated regional resource management. When chronic issues of competing values and ideologies are also considered, it is quickly evident why two centuries of research and experimentation have failed to produce a universally accepted institutional model for the control of the Nation's regional water resources. Designing an ideal institutional framework cannot be done without addressing some of the most fundamental and contentious issues in resource management, such as the allocation of decisionmaking

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<sup>1</sup> For purposes of classification, the U.S. Geological Survey (USGS) organizes the Nation (and its territories) into 21 regions and 222 subregions, with regions generally defined with respect to major river basins (e.g., the Missouri region), while subregions contain the smaller tributary rivers (e.g., the South Platte subregion). With the exception of the Alaska, Hawaii, and Caribbean regions, which do not border other United States territories, all "regions" are interstate. Approximately two-thirds of the subregions cross (or comprise) one or more State lines (USGS, 1986).

<sup>2</sup> In this report, the terms "institution" and "institutional arrangements" are used to describe those agreements, regulations, laws, customs, practices, and other formal and informal arrangements that determine how, and by whom, water resources are governed, administered, and managed.

rights and responsibilities, the manner in which costs and benefits are distributed, and the ethical responsibilities that define the relationship between man and nature.

Designing and modifying institutional arrangements to achieve the goals of regional resource management are the common objectives of both river basin and watershed management initiatives. Throughout most of American history, interstate rivers have been an active laboratory for intergovernmental experimentation, constitutional clarification, and scholarly thought. In recent years, however, experimentation with "river basin administration" has waned as the watershed, rather than the river basin, has become the hydrologic region receiving the greatest attention.<sup>3</sup> Despite the similar conceptual nature of river basin administration and the modern "watershed initiatives," these efforts are often viewed (and implemented) as unrelated activities. In part, this is because water management efforts at these two regional scales have typically featured different objectives—something that is at least partially explained by the timing of the efforts. Efforts at the river basin scale have traditionally focused on the development and allocation of water for regional economic development purposes, while the more recent watershed initiatives frequently deal with more "environmentally friendly" goals associated with ecosystem restoration and comprehensive resource management. These differences hide the fact that both types of regional water management efforts share many common features and raise similar institutional issues. Both practical and philosophical considerations suggest that these two efforts should be more closely coordinated.

The following report draws upon highly diverse literature to provide an overview of the barriers and challenges associated with transboundary resource management and, more specifically, regional water management in the Western United States. A review of the American history of regional water management is provided to illustrate the progress made in this area and to identify the major components of the unfinished agenda.

## **The Phenomenon of Institutional Fragmentation**

It is widely acknowledged that the effective management of transboundary resources requires a holistic viewpoint and coordinated action (Cairns and

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<sup>3</sup> In this report, river basins are generally assumed to be interstate, while watersheds are considered to be substate.

Crawford, 1991; Mitchell, 1990). Yet, as mentioned above, a variety of factors promotes institutional fragmentation. In this context, the term "fragmentation" is utilized to describe the imprecise delineation of authorities and responsibilities for various facets of resource management among different governmental jurisdictions, or among agencies from the same jurisdiction, and the resulting lack of a holistic administrative perspective that inevitably results from arrangements that feature agencies and programs with narrow perspectives and mandates. As discussed later in this report, throughout the first half of the 20th century, the negative consequences of fragmentation were frequently utilized to support proposals calling for powerful and centralized regional water organizations such as the Tennessee Valley Authority, created in 1933. In recent decades, however, it has become more widely appreciated that institutional fragmentation is not something that can be resolved simply by the consolidation of bureaucracies into superagencies. Not only does that approach have the practical deficiency of simply transposing areas of conflict from the interagency scale to the intra-agency scale, but it fails to consider that we live in a democratic federation that embraces the tenets of decentralization and value-pluralism. This is not to imply that institutional fragmentation is not important or is an academic fiction—to the contrary, it is a very real and important concept, but is simply an acknowledgment that the concept loses much of its utility when it is given a normative value. In this report, institutional fragmentation is viewed as an important phenomenon to be managed, rather than an error to be corrected.

The most obvious source of institutional fragmentation in regional water institutions has already been identified: the lack of congruence between management areas with those regions defined by relevant natural processes and landscape features. In the context of water management, hydrologic regions defined by topography will continue to be important regional constructs as long as natural physical and biological processes play a significant role in determining the flow characteristics of water resources. As Teclaff (1967:11-12) explains, this observation is the fundamental contribution of the natural sciences to the concept of regional water management:

*Climate, topography, soils, and vegetation combine to maintain the river in a State of delicate equilibrium. If there is a change in any of these factors the entire river system, from the mainstream to the smallest tributary, reacts at once to restore that equilibrium, through adjustments in volume, rate of flow, discharge, sediment load, and quality of waters.*

With the passage of time, however, regions defined by topography have become increasingly less useful as management units as water projects and diversion facilities have breached and interconnected most major river basins in the West and elsewhere, and the supreme influence of gravity in directing waterflows has been moderated by the marriage of economics and engineering.<sup>4</sup> This phenomenon has led many scholars to advocate management units defined in terms of hydraulics, rather than hydrology. Weatherford (1990) uses the term "hydrocommons" to suggest that it is the service area of a resource, rather than the "natural" drainage area, that best defines the appropriate geographic scale of management efforts. A related idea is to establish institutional arrangements for regional water management in accordance with a geographic region that encompasses a particular problem or functional responsibility of chief concern. This philosophy was clearly articulated by the National Resources Committee (NRC) in its seminal report entitled *Regional Factors in National Planning and Development* (1935:vii), which called for administrative regions encompassing the "general coincidence of major planning problems." This construct has since been termed the "problemshed" by Lord (1982:60) and others:

*It is true that water flows downhill, and it is also true that much of our water use technology relies heavily upon this evident tendency. As I have acknowledged, it is these simple and basic facts which have given rise to the fruitful idea of unified river basin management. But they have also diverted attention from the basic reality that all problems are human problems, even those which we choose to call water problems. It is the human problem-shed we should seek to manage, not the watershed.*

Further complicating this issue is the fact that all potential management units—whether defined by hydrology, hydraulics, problemsheds, or simply political units—are nested together and rarely feature boundaries that are

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<sup>4</sup> This has been a fact of life in the West for many years, as evidenced by the following Bureau of Reclamation (1963:1, appendix) assessment of the Colorado River Basin: "In the Colorado River Basin, drainage boundaries have not been recognized as a restricting barrier to water resource development and use for many years. Waters of the Colorado River drainage area either are being, or will shortly be, diverted from the Colorado Basin to be mingled with the waters of the Bonneville Basin and the Platte, Arkansas, Rio Grande, Los Angeles, Owens, Santa Ana, San Diego, Sacramento, and San Joaquin Rivers. As water needs become critical in the West, river basin boundaries will become even less rigid in water and land resource development."



both stable and impenetrable.<sup>5</sup> Proposals to manage natural resources in accordance with physical regions defined by ecosystems, bioregions, or biomes feature the same complication. Yet, almost any attempt to focus administrative efforts at regions defined, at least in part, on pertinent natural factors is preferable to frameworks where the reach of decisionmaking bodies is defined in rectangular political units following major lines of latitude and longitude, or worse, are defined using the centerline of river courses. Both approaches are used extensively in the Western United States.

Improving the quality of regional water management in the West, however, will require more than revising maps to feature new regional administrative units, but will also require addressing two broad categories of additional factors that fragment water institutions. The first category can be termed the "fundamental intergovernmental considerations" and can be disaggregated into three components: (1) the existence of various levels of government (e.g., Federal, State, local), each operating at different geographic scales; (2) the division of the American system of government into three branches (the legislative, executive, and judicial); and (3) the division of water resources responsibilities between the public and private sectors. The second major category is comprised of "interagency (and intra-agency) considerations." This category contains two major components: (1) the division of responsibilities and authorities for water resources along functional and administrative criteria; and (2) the existence of differing mandates and objectives among water agencies, derivative of ideological conflicts and organizational histories. Each of these factors is described below.

## **Fundamental Intergovernmental Considerations**

The United States features three major levels of government: Federal, State, and local. Over time, the Nation has evolved from a republic of relatively autonomous and equal political States to a hierarchical federation with a strong central government. Regional water resources have been at the center of this movement.<sup>6</sup> The legal justification for Federal primacy in water issues can primarily be traced to pro-Federal interpretations of the commerce

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<sup>5</sup> This line of reasoning is central to the "spaceship earth" concept.

<sup>6</sup> For example, the calling of the Constitutional Convention was largely prompted by a dispute over navigation policies affecting interstate commerce (Fox, 1964; President's Water Resources Policy Commission, 1950).

and property clauses. Beginning with *Gibbons v. Ogden* (1824), the Court has argued that the congressional authority to regulate interstate commerce gives the Federal Government control over all rivers that are navigable or are tributary to navigable rivers.<sup>7</sup> In doing so, the court not only has interpreted navigability quite broadly, but has also utilized a broad definition of commerce, thereby ensuring expansive and continued Federal legal control over most water resources.<sup>8</sup>

Of equal or even greater significance in the Western United States has been judicial interpretations of the property clause, which gives the Federal Government extensive powers over the manner in which Federal public lands and resources—including water—are used and managed and a primary role in specifying the terms under which these resources can be (and have been) transferred to State and private hands. The property clause is also the legal foundation of the western reclamation program, which is responsible, in part, for the transfer of billions of dollars of Federal funds, and Federal influence, into western water institutions. When combined with powers originating in Congress' treaty-making, general welfare, compact, and war powers, the property clause ensures a strong—and often controversial—Federal legal presence in western water resources management, especially in regard to issues of Federal reserved rights (including Indian rights), treaty responsibilities, interstate water allocation,<sup>9</sup> and environmental protection.<sup>10</sup>

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<sup>7</sup> This is known as the "navigation servitude." Even rivers that, due to flow or temperament, do not support a navigation industry have been subjected to the "navigation servitude," as articulated by the Supreme Court in *Arizona v. California* (1936): "The Colorado River is a navigable stream of the United States. The privilege of the States through which it flows and their inhabitants to appropriate and use the water is subject to the paramount power of the United States to control it for the purposes of navigation" (298 U.S. 558, 569).

<sup>8</sup> "It cannot properly be said that the constitutional power of the United States over its waters is limited to control for navigation. . . . In truth the authority of the United States is the regulation of commerce on its waters. Navigability . . . is but a part of this whole. Flood protection, watershed development, recovery of the costs of improvements through utilization of power are likewise parts of commerce control. . . . [The] authority is as broad as the needs of commerce. . . . The point is that navigable waters are subject to national planning and control in the broad regulation of *commerce granted the Federal Government.*" *United States v. Appalachian Electric Power Company*, 311 U.S. 377, at 426-427 (1940).

<sup>9</sup> The compact clause has been an important constitutional feature in the development of western water institutions. Approximately two dozen water allocation compacts can be found in the West. Compacts are discussed later in the text.

<sup>10</sup> As articulated by Findley and Farber (1992:71), ". . . congressional power in the environmental area is virtually unlimited. The commerce clause reaches essentially any private activity that has significant environmental consequences. That power, broad as it is, is augmented by the other broad powers to protect public property, to deal with matters of international concern, and to spend money in the public interest."

In addition to apportioning power among the Federal, State and local levels, the American political system also allocates decisionmaking authority within each of these levels among the three branches of government: the legislative, the judicial, and the executive.<sup>11</sup> Each branch has the ability to influence water management decisionmaking, and, consequently, each is strategically targeted and exploited by interests looking for the most favorable forum of decisionmaking (Goldfarb, 1993a; Light and Wodraska, 1990). The impact of this "forum shopping" behavior has been most significant in the context of Federal water development politics. Historically, water development agencies and key congressional committees joined with private development interests to form the "iron triangle" of water development politics; however, in recent decades, reform legislation, Executive orders, and increased bureaucratic oversight by the judiciary has rusted through these political subsystems, injecting needed economic, environmental, and process-related criteria into decisions that were previously made almost entirely on political grounds (Gottlieb, 1988; McCool, 1987). While these efforts appear to have significantly reduced the frequency of economically and environmentally bankrupt water development proposals, this redistribution of policymaking powers among (and within) the branches of government has had the undesirable side effect of making all but the most innocuous water management proposals politically tenuous, contributing to the modern "policy drought."<sup>12</sup>

Another important facet of the intergovernmental component is the delineation between public and private roles. While far from a new issue, the debate over private rights in natural resource management has recently attracted renewed scholarly inquiry. At the center of this modern debate are competing notions of economics and public administration. It has long been understood that resources which are transboundary or common are subject to "market failures" and exploitation if rights to their use are not properly allocated and regulated. The prevention of externalities, common pool resource problems, and public good situations is a major challenge facing natural resource institutions.<sup>13</sup>

Two primary and fundamentally different approaches have been offered to address these problems: governmental regulation and private rights. While

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<sup>11</sup> Many political scientists prefer to view the "bureaucracy" as a de facto fourth branch of government.

<sup>12</sup> The term "policy drought" is normally attributed to Anderson (1983).

<sup>13</sup> This subject is at the core of natural resource economics. For more information, see: Tietenberg (1988), Miller (1990), Baumol and Oates (1988), and Anderson (1983).

examples of both approaches can be found in American natural resource institutions, "new resource economists" and "private rights" proponents have become increasingly forceful recently in arguing that the most efficient mechanism for allocating resources (or the right to use resources) is through a system of private rights subject to legal protection and market exchanges, rather than by subjecting shared resources to bureaucratic control and oversight (Anderson, 1983). Market opponents argue that natural resources have broad, nonmarket, intergenerational, and systemic values that cannot be adequately appreciated or preserved through a system of private rights.<sup>14</sup> In practice, western water resources are currently subjected to both types of controls, as illustrated by a stream that is allocated in accordance with private (i.e., prior appropriation) rights, but subject to governmental regulation under the public trust doctrine (and public welfare provisions), environmental restrictions (including the Federal water quality program), and a host of other governmental requirements designed to protect the public interest in quasi-private resources. Issues of water marketing, governmental "takings," and Federal "devolution" highlight the complexity and significance of this source of institutional fragmentation which, in western water institutions, often pits Federal systems based on governmental regulation against State systems emphasizing private rights.<sup>15</sup>

## Interagency and Intra-agency Considerations

Many of the most important natural resource agencies and statutes are defined in functional terms, rather than in terms of geography—although each agency has a geographic limit on its scope of authority. Over time,

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<sup>14</sup> For example, the Western Governors' Association (1986:86-87) offers the following cautionary remarks about unregulated water markets: ". . . a reallocation of water effectuated through a transfer of a water right may appear efficient if the value of the water transferred is less to a transferor than a transferee. However, this does not tell the whole story. Water use carries with it values that are not reflected in private transactions. For example, what is the effect of the transfer on businesses whose livelihood depends on a water-based economy? Similarly, what is the effect on the economy of the area to receive the water? What, also, is the effect of the transfer on aesthetic and other environmental values associated with the use of the water? The issues raised by these questions must be addressed in developing policy represented to advance economic efficiency."

<sup>15</sup> The term "dual sovereignty" is used to refer to situations in which western water resources are allocated to specific users using a system of private rights under State law, while the Federal Government reserves the right to exercise "reserved rights" as needed for public purposes relating to land management objectives, satisfying treaty obligations, and for other purposes (Sax and Abrams, 1986). Thus, dual sovereignty not only illustrates the fragmentation between public and private rights, but between State and Federal legal systems.

certain agencies have become associated with specific functional areas, such as water supply (Bureau of Reclamation (Reclamation), U.S. Army Corps of Engineers [Corps]), water quality (U.S. Environmental Protection Agency [EPA]), wildlife management (U.S. Fish and Wildlife Service), water resource monitoring (USGS), and soil conservation (Natural Resources Conservation Service). Similarly, agencies established to manage particular lands typically favor some functions over others, as shown by the U.S. Forest Service's postwar emphasis on timber protection and the Bureau of Land Management's grazing orientation. This specialization reflects (and is partly derivative of) the narrow focus of many academic disciplines that contributes to resource management, and is also representative of the fact that specialized agencies often enjoy greater political success than those with a broader focus.<sup>16</sup> Functional specialization is also a common feature of State Government, although innovations such as Nebraska's system of Natural Resource Districts provides a notable experiment in holism.<sup>17</sup>

Functional specialization discourages the efficient development of regionally integrated policies. In the field of water resources, this is best evidenced by the historically poor job of integrating land and water management programs, water quantity and water quality programs, and policies for the joint control of surface water and groundwater. Modern efforts to address these deficiencies are based on the belated recognition that the various goals of water management can be classified as competitive, complementary, or neutral. Competitive activities, such as river development and habitat preservation, must be considered jointly if management efforts are to be effective; while goals that are complementary, such as erosion control and water quality management, should be considered jointly to achieve efficiency. In theory, goals that are neutral can be pursued independently without affecting other resource values; however, few management goals are sufficiently independent to be considered in isolation. This is a fundamental premise of watershed/ecosystem management.

Functional specialization is also seen by arrangements that allocate administrative roles to different agencies. In this context, the term "administrative roles" is used to describe activities such as regulation, system

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<sup>16</sup> As Clarke and McCool (1985) have observed, agencies tend to gravitate to those functions that feature the most supportive constituencies, which are frequently those associated with extractive industries. Only recently have powerful constituencies developed to champion the idea of "holism" in resource management.

<sup>17</sup> The system organizes the State into hydrologic regions primarily for the purposes of regional water quality management.

operations, and planning and policymaking. Each of these roles not only requires unique personnel skills, but places different agencies (and divisions within agencies) in significantly different political situations (Clarke and McCool, 1985). Agencies that provide services—such as providing water supplies—normally develop supportive relationships with the constituencies they serve, while agencies that regulate activities—such as water quality, endangered species, or environmental preservation agencies—often operate in a more adversarial environment with the regulated community. As a consequence, agencies that have both regulatory and service-providing roles for a given resource can have powerful internal incentives to subordinate their regulatory functions. This phenomenon can encourage the creation of regulatory agencies, such as EPA, to oversee and moderate the behavior of agencies preoccupied with service-providing functions.<sup>18</sup> While this can help to restore balance to the bureaucracy, it can further fragment decisionmaking authority.<sup>19</sup>

Perhaps the least appreciated source of institutional fragmentation involves the presence of incompatible ideologies about what constitutes good public policy and proper resource use. When divergent ideologies form the basis of different agency mandates, programs, and interest group positions, it is extremely difficult to expect any water institution to produce water management regimes which are internally consistent and integrated (Feldman, 1991). Given the wide variety of uses and values associated with water resources, it is likely that divergent ideologies will always be among the major sources of institutional fragmentation; nonetheless, processes which encourage the exchange of ideas and the consideration of multiple values offer the promise of increasing the level of holism in regional water management efforts. For this reason, many authors<sup>20</sup> strongly suggest that new institutional arrangements for water management should be designed from a "process orientation"—i.e., be designed to satisfy criteria such as public participation, value-pluralism, and democratic decisionmaking—rather than being constructed to pursue specific predetermined management

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<sup>18</sup> An excellent example of the significance of this phenomenon was seen in the Two Forks Dam controversy in Colorado, in which EPA used its regulatory powers to block a dam construction project approved by the Corps.

<sup>19</sup> An extreme version of this administrative strategy can be currently seen in New Zealand, where recent efforts have been made to completely restructure the Federal bureaucracy away from agencies concerned with specific resources into agencies organized to serve specific roles (e.g., policymaking, regulation, systems operations) across all resource areas (Erickson, 1990). Note that this type of bureaucratic restructuring is consistent with efforts to increase the level of privatization, in resource management, with service-providing functions being privatized, while regulatory responsibilities are retained by public bodies.

<sup>20</sup> For example, see Fox (1976), Harrison (1986), Lord (1984), and Kenney (1993).

outcomes. The establishment of several processes which are collaborative and inclusive has been the most exciting initial achievement of the ecosystem/watershed movement (Yaffee et al., 1996; Natural Resources Conservation Service, 1996).

## **Regional Water Resources in American History<sup>21</sup>**

The institutional fragmentation currently seen in western water institutions is the product of several decades of incremental, and often uncoordinated, "rulemaking," as the social, economic, legal, and political fabric of the region has been repeatedly modified in response to changing environmental conditions, resource use demands, and technological advances. Predictably, several efforts have been made over time to combat the forces that fragment regional water institutions in the United States. A variety of strategies has been employed to improve the integration of policies, programs, and legal doctrines, with mixed success. These efforts have occurred in a wide variety of river basins and watersheds across the Nation and have taken place in eras exhibiting salient differences in legal and sociopolitical trends. Despite these complicating factors, it is possible to organize this wealth of experimentation in a manner which allows major trends and lessons to be identified.

In the following pages, the American experience with regional water management is reviewed over six time periods: (1) early history; (2) the Progressive Conservation era (circa 1890 to 1920s); (3) the Depression era (1929 to 1942); (4) the era of the basin interagency committee (1943 to the early 1960s); (5) the emergence of cooperative Federalism (1960s to circa 1980); and (6) the modern era. Although the exact chronological divisions between these six eras are imprecise in many cases, each of these eras features important intergovernmental and bureaucratic trends that distinguish them from other periods in American history. These trends are responsible for shaping the current institutional environment in which modern resource management initiatives must operate. They also provide insight into the types of innovations that may or may not prove useful and viable in the future, since institutions change slowly, zealously retaining relicts from previous eras and crises. Reformers do not have the luxury of starting with a clean slate, but must instead adapt to and exploit the barriers and opportunities that have built up through decades of institutional inertia. This cannot be done without an understanding of the relevant history.

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<sup>21</sup> Much of this discussion is taken, with permission, from Kenney (1993).

## Early History

Even before the western frontier had opened to homesteading, important events were underway in the East that would have a lasting impact on regional water management throughout the entire United States. Navigation was among the first regional issue to test the intergovernmental limits of the new Republic (Shallat, 1992). As early as 1784, the Commonwealth of Virginia and the State of Maryland had created a Bi-State Commission, chaired by George Washington, to investigate the navigation potential of the Potomac River and the possibility of opening a road connecting the navigational networks of the Potomac and Ohio River basins (Schad, 1964). This effort was soon followed by the Nation's first major regional water resources report: the Gallatin Report of 1808. This report outlined an ambitious plan for the development of a national system of waterways, a vision that began to be fulfilled with a frenzy of canal building activity in the 1820s (Fox, 1964).

Most of the early navigation projects were financed by either private parties or the States, often with disastrous results (MacGill, 1917). In many cases, the scope of these projects proved to be beyond the financial resources of these entities, prompting many parties to advocate a greater Federal role in navigation improvements. In addition to its considerable financial resources, the Federal Government was also the Nation's chief repository of engineering expertise, as evidenced by the creation of the Corps in 1802 (2 Stat. 137).<sup>22</sup> The early 1800s featured a major public policy debate on the issue of Federal involvement in regional water development and management, with the Federalists, and later the American Whig party, calling for a strong Federal role (i.e., Federal financing and construction), while Jeffersonian Republicans urged a continued reliance on State and private parties (Shallat, 1992). This debate spilled over to the judicial arena as well, as the Supreme Court used interstate navigation issues to address the meaning of the commerce clause and, more generally, to ponder the role of the Federal Government in the growing Nation. In 1824, this debate culminated in the highly pro-Federal decision of the Supreme Court in *Gibbons v. Ogden*, and in congressional passage of the General Survey Act calling for intense Federal study of potential river developments.

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<sup>22</sup> The Corps has always had both a military and civilian focus. The agency was established within the Army because West Point (at that time) was the only engineering school in the Nation. The Corps is patterned after a similar French organization (Maass, 1951; Clarke and McCool, 1985).



Although the 1824 legislation initially limited the Federal role to research and planning, supportive constituencies quickly managed to secure large Federal water development appropriations. The first "iron triangles" were being formed (Maass, 1951). Before the end of the 1820s, the Corps was involved in many large-scale civilian projects, concentrating primarily on navigation improvements for the Ohio and Mississippi Rivers.<sup>23</sup> By the 1860s, the Corps was active in repairing the damages originating with floods and Civil War battles on the Mississippi and Missouri River systems. Efforts to repair these two river systems and integrate them with the Great Lakes network were not only technically and financially ambitious, but also included important (although fleeting) institutional innovations as well. Of particular note was the creation of some of the Nation's first major regional water organizations in the Mississippi River (in 1879) and the Missouri River (in 1884), an ironic historical footnote considering the eventual failure to logically integrate the development and administration of these two basins (Thorson, 1994).<sup>24</sup>

The American West did not play a significant role in the era of canal building and navigation improvements but, nonetheless, inherited the legal and political legacy of a strong Federal role in regional water issues. In the West, the railroad emerged as the primary transportation system.<sup>25</sup> The western reliance on railroads (and wagon trails) as major transportation corridors did not foster a sense of regional identity in western river basins and is at least partially responsible for the lack of emphasis given to river basins as the West began to evolve its own institutional qualities (Teclaff, 1967). The river basin did not become a focus of study in the Western United States until the Progressive Conservation movement, which largely originated from the seminal work of John Wesley Powell.

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<sup>23</sup> By the 1830s, the magnitude of the Federal investment in navigation improvements had reached alarming levels, partly due—according to the House Ways and Means Committee (1836)—to unethical arrangements between the Corps and private water development beneficiaries (Shallat, 1992). This prompted a temporary reduction in Federal spending for water development, and even resulted in the indictment of the Corps' chief engineer on charges of fraud. Nonetheless, the Corps continued to grow and prosper, with most general rivers and harbors work coming the agency's jurisdiction by 1852. The Corps' flood control emphasis evolved at a much slower pace, not reaching a coequal status with navigation until the Flood Control Act of 1936.

<sup>24</sup> As discussed later in this report, the enactment and implementation of the so-called Pick-Sloan Plan has prevented the maturation of effective institutional arrangements for regional water management in the Nation's interior.

<sup>25</sup> A proposal outlined in the Windom Report of 1874 called for the Federal Government to develop a western waterways network to compete with the transportation monopoly held by the railroads, but Congress chose instead to simply increase regulation of the railroads via the Interstate Commerce Commission (Fox, 1964).

## The Progressive Conservation Era (1890s to 1920s)

The study of western water resources and institutional arrangements is generally considered to originate with Powell's *Report on the Arid Region of the United States, with a More Detailed Account of the Lands of Utah* in 1878, in which he began to formulate ideas about appropriate institutional arrangements for the arid West. In crafting his "Grand Plan" for the West, Powell was highly influenced by the Hispanic "pueblo" communities and the Mormons, where social organization was largely fashioned around the needs of communities to jointly and cooperatively manage scarce water supplies. Sociopolitical organization on an areal scale defined by the needs of water management was an idea imported to the New World via Spain and had its origins in the ancient fluvial societies of Mesopotamia, Egypt, and China (Wittfogel, 1955; Teclaff, 1967). In the pueblo and Mormon communities, water and land resources were seen as important and integrated community resources. Writing in *The Century* in 1890, Powell articulated his belief that the institutions of the arid West should follow these examples and be organized along "hydrographic" districts:

*Such a district of the country is a commonwealth by itself. The people who live therein are interdependent in all their industries. Every man is interested in the conservation and management of the water supply, for all the waters are needed within the district. . . . Thus it is that there is a body of interdependent and unified interests and values, all collected in one hydrographic basin, and all segregated by well-defined boundary lines from the rest of the world. . . . This, then, is the proposition I make: that the entire arid region be organized into natural hydrographic districts, each one to be a commonwealth within itself for the purpose of controlling and using the great values which have been pointed out. . . . The plan is to establish self-government by hydrographic basins. (Powell, 1890:113-114).*

In addition to recognizing the value in regionally defined water institutions, Powell was among the few westerners to clearly articulate the limitations of the evolving prior appropriation system of water rights, arguing that "where there is more land than can be served by the water, values inhere in water, not in land; the land without the water is without value" (Powell, 1890:112). Powell's ideas for linking land and water institutions were revolutionary. The Federal land disposal practices—embodied in legislation such as the

Preemption Act of 1841, the Homestead Act of 1862, the Desert Land Act of 1877, the Timber and Stone Act of 1878, and the General Allotment Act (or Dawes Act) of 1887--and the growing western acceptance of the prior appropriation doctrine, which many States placed in their constitutions even after being counseled by Powell to the contrary, were taking the West in a different direction (Stegner, 1953; Pisani, 1992).

Still another point of divergence between the ideas of Powell and those of Congress concerned the Federal role in western water development. Powell (1890:113) viewed governmental intervention in water development as only slightly less horrific than the control of water by monopolists and speculators:

*. . . in the name of the men who labor I demand that the laborers shall employ themselves; that the enterprise shall be controlled by the men who have the genius to organize, and whose homes are in the lands developed, and that the money shall be furnished by the people; and I say to the Government: Hands off! Furnish the people with institutions of justice, and let them do the work for themselves.*

The progressive administration of Teddy Roosevelt shared Powell's fear of monopolists and his admiration for the family farmer, but thought that government could (and should) play a role in promoting western water developments (Hays, 1959; Stegner, 1953). It was not widely believed that the States or private parties could raise enough capital to finance water development on a large scale, and the States and project beneficiaries were often not eager to try when the alternative approach was the Federal pork barrel.<sup>26</sup> The era of eastern canal building had set a precedent of Federal primacy that was difficult to ignore, especially as the progressives began to characterize the Federal expansion of irrigated agriculture in the West as an important national social objective, empowering the family farmer while reining in the monopolists and empire builders. A strong Federal role was also encouraged by Supreme Court discoveries and articulations of additional Federal powers over western water resources—this time emerging from the

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<sup>26</sup> In some locations throughout the West, successful private irrigation communities were well established prior to the 1900s. Some of the most notable developments could be found in California, Utah, and Colorado. Nonetheless, the National Reclamation Association, the successor of the National Irrigation Association, effectively lobbied Congress for a strong Federal role in western water development (President's Water Resources Policy Commission, 1950; Pisani, 1992).

property clause. The Reclamation Act of 1902, adopted in the year of Powell's death, established the basic framework of the Federal reclamation program and created the Reclamation Service (which became the Bureau of Reclamation in 1923) to implement the massive effort. The Federal reclamation program was initially designed to feature a greater level of executive branch oversight and rigorous financial scrutiny than was seen in eastern water projects under the domain of the Corps; however, the program quickly evolved into a campaign featuring heavy subsidies controlled by legislative log-rolling (Holmes, 1972; Wahl, 1989).

The remainder of the Progressive Conservation movement was kinder to the ideas of Powell, especially in regard to regionalism. Led by ardent conservationists such as Teddy Roosevelt, Gifford Pinchot, W.J. McGee, Frederick Newell, George Maxwell, Francis Newlands, and Marshall Leighton, the river basin was endorsed as the proper scale for the development and management of the Nation's water resources (Hays, 1959). In his letter appointing the Inland Waterways Commission in 1907, Roosevelt asserted that "Every river system, from its headwaters in the forest to its mouth on the coast, is a single unit and should be treated as such" (Inland Waterways Commission, 1908). With this charge, it is not surprising that the reports of the commission (1907-1912) all strongly endorsed the river basin as the proper unit of governance.<sup>27</sup> Water resources management at the watershed scale was also endorsed in theory, but it was the river basin that was the subject of most intense research and experimentation.

Another idea of the progressives that was consistently and forcefully articulated was the belief that water development should serve many uses, a goal that was best accomplished through the construction of multiple-use projects. The conservationists of this era, especially W.J. McGee, were instrumental in convincing the Reclamation Service to include hydroelectric turbines in several of its initial projects, including Pathfinder Dam (1909), Buffalo Bill Dam (1910), and Roosevelt Dam (1911) (Hays, 1959; Teclaff, 1967). The success of these ventures created a surge of interest in water development and basin management:

*The enormous possibilities of basin-wide river development captured the imagination of Newell, Pinchot, Garfield, and*

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<sup>27</sup> This conclusion was also echoed by the 1908 report of the National Conservation Commission, which was created following the Governors' Conference of 1907 (which itself was recommended by the Inland Waterways Commission) (Hays, 1959; Schad, 1964).

*other conservation leaders. . . . The multiple-purpose concept required attention to the entire basin as well as to the size and design of reservoirs. . . . The multiple-purpose approach, therefore, brought together Federal officials in both land and water agencies in a common venture. (Hays, 1959:100-101).*

Senator Newlands of Nevada, the primary force behind the passage of the Reclamation Act and a member of both the Inland Waterways Commission and the National Conservation Commission, was among the most ardent supporters of comprehensive and multiple-purpose river basin development (Hays, 1959). In 1917, after approximately 15 years of personal struggle, the so-called "Newlands Commission" was created to provide Congress with plans for the comprehensive development of river basins nationwide (Schad, 1964). However, the idea of an independent Federal commission directing multiple-purpose river development was highly offensive to the Corps, who desired a unifunctional focus (navigation) and wanted to retain its role in the water development iron triangles. Largely due to the Corps' opposition and to a national preoccupation with World War I, the Newlands Commission was stillborn and was officially deauthorized in the Federal Water Power Act of 1920, which created the Federal Power Commission and assured a strong Federal role in future hydropower development.

Despite the Corps' initial opposition to multiple-purpose planning and development, the Corps and the Federal Power Commission were soon put to work by Congress preparing comprehensive river basin plans. Largely due to the strong national interest in hydropower production, legislation was passed in 1925 and 1927 charging these two Federal agencies with developing a series of comprehensive river basin development plans integrating the purposes of navigation, flood control, irrigation, and power production (Schad, 1964; Teclaff, 1967). These studies became known as the "308 Reports," since the rivers to be studied were listed in House Document 308, 69th Congress, 1st Session. Over two hundred 308 Reports have since been completed.

Up to this time, there had been little experimentation with administrative arrangements for regional water management and development. At the substate (watershed) scale, the creation of the Miami (of Ohio) Conservancy District in 1914 to pursue a flood control mandate is a notable, but highly isolated, experiment. Similarly, the national impact of the Federal water organizations established in the Mississippi and Missouri basins (in the

1870s and 1880s) was marginal. The only significant institutional arrangement for river basin administration to have emerged by the 1920s was the interstate water compact—pioneered in the Colorado River Basin (Hundley, Jr., 1966; 1975). Resulting from a massive and characteristically western water war, the Colorado River Compact was drafted and signed by the seven Basin States in 1922, but was not officially ratified until passage of the Boulder Canyon Project Act of 1928, which also authorized the construction of Hoover (i.e., Boulder) Dam and the All-American Canal, facilitating massive water diversions to southern California.<sup>28</sup> The legislation was also noteworthy as a strong congressional endorsement of the multiple-purpose project concept (Martin et al., 1960).<sup>29</sup> The use of the interstate compact for apportioning rivers and the multiple-purpose project for serving diverse constituencies were both innovations that proved to be highly popular and were frequently copied nationwide. In the 50 years following the negotiation of the Colorado River Compact, 18 other western rivers were apportioned via the interstate compact process and at least 500 multiple-purpose projects were built (National Water Commission, 1973; Martin et al., 1960).

Interstate water allocation compacts can now be found in the following western basins: Arkansas, Bear, Belle Fourche, Big Blue, Canadian, Colorado, Costilla Creek, Klamath, La Plata, Pecos, Red, Republican, Rio Grande, Sabine, Snake, South Platte, Upper Colorado, Upper Niobrara, and Yellowstone Rivers (McCormick, 1994; Simms et al., 1988). The 1940s saw a peak in the use of interstate water allocation compacts, with the number of new compacts dropping each decade and with no new compacts having been enacted and ratified since 1978. These compacts typically provide a quantitative apportionment of water among signatory States using formulas based on flow standards, reservoir storage requirements, delivery requirements, or rights of consumption/diversion (Kenney, 1996). Most

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<sup>28</sup> Federal ratification was temporarily delayed by the refusal of the Arizona legislature to formally endorse the agreement, arguing that the compact should provide a true interstate apportionment (rather than an interbasin apportionment), that the allocation of hydropower (and hydropower revenues) should be addressed, that the allocation of shortages should be more explicitly considered, and, perhaps most importantly, that the State should be provided with some formal protection against the rapidly growing water and power demands in southern California—a concern that fueled decades of interstate litigation and even prompted a brief conflict between the Arizona National Guard and water developers (financed by California) along their shared border (Mann, 1963).

<sup>29</sup> The priorities of Hoover Dam were specified by Congress in Section 6 as being "First, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses and satisfaction of present perfected rights in pursuance of [the] . . . Colorado River compact; and third, for power."

compacts establish a commission to oversee implementation of the formula.<sup>30</sup> A well-drafted formula can help to minimize interstate conflicts, although it is debatable if apportionment has been useful in promoting a regional focus in subsequent water development and management actions. A few compacts have been notoriously troublesome, due to imprecise or inaccurate allocation formulas, frequently requiring Supreme Court intervention. These compacts include the landmark Colorado River agreement as well as later compacts in the Pecos, Canadian, and Arkansas (between Colorado and Kansas) Basins.

### The Depression Era (1929 to 1942)

On October 29th, 1929, the economic and social fabric of the United States was thrown into chaos as "Black Tuesday" signaled the start of the Great Depression. Trends in favor of Federal primacy and regionally oriented river basin development became firmly entrenched during the Depression, as regional water development became an integral part of Franklin Roosevelt's employment and economic development strategy under the auspices of the National Industrial Recovery Act of 1933. With Congress writing the checks, New Deal agencies such as the Public Works Administration, Works Progress Administration, Civilian Conservation Corps, and the pre-existing Federal development agencies provided the expertise and manpower for this period of intense national water development—an era aptly described by Reisner (1986) as the "Go-Go Years."

More impressive than the rate of development, however, was the magnitude of the projects. Despite the growing role of social scientists in regional water planning and development, the Depression was clearly the era of the engineer, as giant skyscrapers, bridges, highways, tunnels, and dams were erected on a scale challenging the pyramids of Egypt and China's Great Wall (Reuss, 1993). By the mid-1930s, the four largest concrete dams ever built were all under construction: Hoover, Shasta, Bonneville, and Grand Coulee. These multiple-purpose projects were not only constructed to store water and produce electricity, but were designed to glorify science and boost the morale of a Nation suddenly humbled by economic collapse:

*. . . massive engineering achievements like the Hoover and Grand Coulee dams symbolized the power of harnessed science*

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<sup>30</sup> One of the few compacts without a commission is the landmark agreement for the Colorado River.

*to satisfy a number of democratic aspirations, such as economic growth, regional development, and cheap energy. The great winged statues gracing Hoover Dam's entrance exemplified an optimistic attitude toward large-scale engineering projects, which today appears quaint. (Feldman, 1991:71).*

The national preoccupation with the showpiece water project waned in the late 1930s, as it became increasingly clear that the United States would be drawn into the coming world war. During the war, the symbolic value of these structures was supplanted by the more tangible and equally invaluable benefit of providing abundant and cheap electricity for manufacturing operations.

The impressive scale of Depression era water projects was matched by an equally fervent and ambitious movement to pioneer new institutional arrangements for regional economic development and water management. The most ambitious of the institutional reforms was the creation of the Tennessee Valley Authority (TVA) in 1933. The TVA is a highly autonomous and authoritative Federal regional water agency—the first organization of its type—governed by a three-person board of directors appointed by the President.<sup>31</sup> It epitomizes two of the virtues most forcefully articulated in the preceding eras: regionalism and multiple-purpose water development. The TVA is authorized to construct and operate facilities as needed to meet a broad multiple-purpose mandate, primarily using lump sum congressional appropriations and revenues from the sale of power.<sup>32</sup> The Tennessee Valley Authority Act of 1933 charged the agency with several functions:

*To improve the navigability and to provide for the flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; to provide for the agricultural and industrial development of said valley; to provide for the national defense by the creation of a corporation for the operation of government properties at and*

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<sup>31</sup> The TVA is possibly the most heavily studied water organization in the world. Insightful reviews are provided by Selznick, 1966; Teclaff, 1967; Donahue, 1987; Derthick, 1974; Martin et al., 1960; and Reisner, 1986.

<sup>32</sup> This mandate has been aggressively pursued by the agency, which constructed over 50 projects in its first 50 years, utilizing a multibillion-dollar annual budget financed primarily through power revenues (Freeman and Lesene, 1981).



*near Muscle Shoals in the State of Alabama, and for other purposes.*

The institutional arrangements embodied by the TVA were very popular in the administration of Franklin Roosevelt, who was instrumental in the passage of the authorizing legislation (Teclaff, 1967). In a message to Congress on June 3, 1937, Roosevelt proposed expanding the experiment with valley authorities to seven other river basins (81 Congressional Record, 528-581; Teclaff, 1967). The proposal drew mixed reviews:

*Advocates of the Federal valley authority believed it was the ultimate answer because the river basin was treated as a unit, the State boundary problem was hurdled, centralization of authority in Washington was avoided, and inter-agency rivalry was eliminated. The opponents were those who feared widespread extension of public power and encroachment upon State prerogatives, as well as the existing agencies and their clientele whose power and authority would be diminished through general applicability of the valley authority arrangement. (Fox, 1964:72).*

The Nation was in the midst of a valley authority movement. In the 74th Congress alone, more than a dozen bills were introduced calling for valley authorities in the upper Mississippi, Cumberland, Arkansas, Wabash, Columbia, Sacramento-San Joaquin, Missouri, Tombigbee, Connecticut, and Merrimack basins (National Resources Committee, 1935; Martin et al., 1960; Teclaff, 1967). The Ohio, Arkansas, Red, and Rio Grande basins were also soon targeted, along with the Atlantic seaboard, northern California, and the Great Lakes. All of these proposals failed, however, as the emerging economic recovery and the preoccupation with the ongoing world war lessened Congress' willingness to impose new forms of governance and to redistribute decisionmaking authority (Fox, 1964; Teclaff, 1967).

Proposals for additional valley authorities soon reappeared, however, amidst fears that the end of World War II would initiate an economic downturn. These proposals continued for almost 20 years and were pressed with particular vigor in the Columbia basin, but were no more successful than the earlier efforts. "On only three occasions (1937, 1945, 1949) was a bill granted a hearing; only once (1945) was such a bill reported out of committee and, on that occasion, received an unfavorable recommendation" (Donahue,

1987:153). The TVA remains the sole example of this institutional arrangement in the United States.

The creation of the TVA was not only the product of a crisis situation, but was the result of an active search for improved institutional arrangements for regional water development and management. The TVA is an endorsement of the idea that river basins should be managed as a unit and that land and water institutions should be integrated (Fox, 1964).<sup>33</sup> Although dwarfed by the attention given the TVA and the valley authority movement, regional land-water integration was being more effectively accomplished in this era by the proliferation of conservation districts established under State statutes (enacted between 1937 and 1946) in a national program administered by the U.S. Soil Conservation Service (Clarke and McCool, 1985). Intergovernmental and private-public partnerships at the watershed level for erosion control were highly popular depression-era innovations that have made a lasting and national impact on small scale regional water development and management, and they continue to play an important role in promoting the modern watershed movement.

Regionalism was a theme permeating many of the major studies of the day, prompting the Advisory Commission on Intergovernmental Relations (1972:6) to term the decade beginning with the TVA's creation as the "renaissance of regionalism." This theme was featured in the work of the President's Committee on Water Flow, the Mississippi Valley Committee of the Public Works Administration, the National Resources Board and its Water Planning Committee, NRC with its Water Resources Committee, the National Resources Planning Board, and numerous other investigations into water resources development and management (Schad, 1964; Teclaff, 1967; Reuss, 1993).

Among the most prominent reports produced were the President's Cabinet Committee on Water Flow (1934) and the National Resources Committee (1935), the successor to the National Resources Planning Board. Responding to a congressional appeal for guidance in directing national water development activities, the President's Committee on Water Flow recommended 10 basins for comprehensive development. In addition to the Tennessee, the Mississippi and Columbia basins were the subject of the most attention during this decade. Identifying appropriate institutional

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<sup>33</sup> Interstate water allocation compacts were generally not used during the depression era, in part because they were seen as too narrowly focused in comparison to valley authorities.

arrangements for river basin development was primarily the charge of the NRC. Although the Committee endorsed the TVA model as well as calling for additional interstate compacts, the group's primary recommendation was for the establishment of more informal and flexible arrangements, primarily interagency coordinating committees featuring both Federal and State representatives and a Federal chairman (National Resources Committee, 1935). Witnessing the strong bureaucratic opposition generated to defeat the valley authority movement, the NRC correctly anticipated that interagency coordinating committees were the more politically pragmatic institutional arrangement for the future—a future which began in earnest in 1943.

### **The Era of the Basin Interagency Committee (1943 to 1960)**

The inability to create additional valley authorities and other centralized regional organizations across the Nation was largely due to the opposition of Federal agencies who feared losing bureaucratic turf, autonomy, and decisionmaking authority to new organizations (Teclaff, 1967; Fox, 1964). The TVA, after all, effectively excluded the Federal development agencies from one of the Nation's major river basins. Even the small soil conservation districts which began to spring up in the late 1930s were shaped by intense turf battles among Federal agencies, with the Corps, the Agricultural Stabilization and Conservation Service, the U.S. Forest Service, and other bureaucracies working to ensure that the districts maintained a narrow focus and low profile. This bureaucratic opposition also was instrumental in the termination of the numerous Depression era study commissions and committees during the early years of World War II. An approach much more palatable to the existing bureaucracy was the use of basin interagency committees to coordinate activities.

The era of the basin interagency committee began in 1943 with the establishment of the Federal Interagency River Basins Committee (FIARBC), a group drawing members from the Departments of Interior, Agriculture, and Army; the Federal Power Commission; and later, the Department of Commerce and the Public Health Service (National Water Commission [NWC], 1973). Five so-called "firebrick" committees were formed by 1950, for the Missouri, Columbia, Pacific Southwest, Arkansas-White-Red, and New York-New England basins. The FIARBC vehicle was primarily intended to coordinate the activities of the Federal agencies within river basins—a function it inherited from the National Resources Planning Board—and to provide a modest degree of State participation in Federal

planning efforts by including State governors (or their representatives) on the committees. In general, these committees had difficulty in truly coordinating and integrating activities, and their relations "with State and local governments were informal and tenuous" (NWC, 1973:416). Only in the New York-New England basins did the level of State participation approach equality (Foster, 1984).

In contrast to the firebrick committees, which were intended to be permanent organizations, a wide variety of interagency "coordinating committees" were also active in this era, established to conduct river basin studies in specific regions (Hart, 1971). These temporary arrangements shared many structural similarities with the firebrick committees, with the exception that a few committees were established by congressional action (i.e., resolutions of the Senate Committee on Public Works). These study commissions were primarily limited to the Central and Eastern United States. Like the firebrick committees, the majority of these arrangements were quickly dissolved in the 1960s in favor of more formal arrangements. This era also featured the negotiation of several interstate water allocation compacts in the West, which were often seen as a necessary precursor to attracting Federal water development projects.

The literature on the firebrick committees is rich and diverse and is almost uniformly critical of this institutional arrangement.<sup>34</sup> These committees are generally considered to have been ineffective vehicles for integrated resource management, primarily because they provided no real incentive for coordination. It was Congress, and not the firebrick committees, who approved or rejected proposed development schemes; consequently, when disagreements arose among the committee's participating agencies, each would simply take their own plans to Congress—a forum where enforceable decisions could be made and implemented. This was most clearly seen in the activities of the Missouri Basin Interagency Committee (MBIAC), the first firebrick committee established (Martin et al., 1960; Maass, 1951; Baumhoff,

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<sup>34</sup> For example, see Maass (1951), the National Water Commission (1973), Baumhoff (1951), Hart (1971), and Martin et al. (1960), among others. Most of the criticisms directed toward the firebrick committees regarded the inability of these mechanisms to function effectively as conflict resolution and decisionmaking entities. While Dworsky (1974) and Dworsky et al., (1991) concede this point, they emphasize that the firebrick committees were considerably more successful in the performance of other functions, primarily the coordination and dissemination of technical research. These are tasks which do not require a great deal of formal authority, nor do they require extensive communication with State policymakers. In these areas, the firebrick committees represented an improvement over existing arrangements.

1951). The MBIAC was created in 1945 to implement the Pick-Sloan Plan, adopted in the 1944 Flood Control Act. The Pick-Sloan Plan was forwarded as the solution to the long-standing bureaucratic division of water resource activities by the Corps and Reclamation to the East and West, respectively, bisected by the Missouri. While the Corps developed ambitious plans for flood control and navigation improvements on the Missouri, designed primarily to benefit users along the mainstem of the Mississippi, Reclamation had independently produced a development plan featuring irrigation and power production in the Missouri basin. Congress could not logically integrate the two plans advocated by General Lewis A. Pick of the Corps and W.G. Sloan of Reclamation, so they essentially approved both. The MBIAC proved useful in coordinating the implementation of the Pick-Sloan Plan, but the opportunity for meaningful integration had already been lost (Thorson, 1994; Martin et al., 1960).<sup>35</sup>

The activities of the firebrick committee in the Columbia basin followed a similar course. The Columbia Basin Interagency Committee (CBIAC) was created in 1946, and quickly became the focus of national attention when a series of disastrous floods in 1948 sparked interest in additional development in the basin. Since the Corps and Reclamation were already working on separate comprehensive plans for the Columbia basin, the President suggested that the CBIAC be employed to integrate the field studies and recommendations of these agencies into a comprehensive plan for the basin. However, as was seen in the Missouri, the CBIAC did not make a meaningful contribution (Maass, 1951:119):

*The Corps of Engineers and the Bureau of Reclamation presented separate reports to the President. The Columbia Inter-Agency Committee was not used as a means for achieving real coordination. Instead, the Secretaries of Army and Interior entered into a bilateral agreement, reached after the uncoordinated reports of the two agencies had been submitted to Washington, and accomplishing little other than dividing up the construction job between the Corps and the Bureau.*

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<sup>35</sup> A decade earlier in California's Central Valley, Reclamation and the Corps had a similar turf battle when the ambitious private project (i.e., Central Valley Project) was taken over by the Federal Government during the depression. While both agencies have constructed facilities in the Central Valley Project, Reclamation was the winner of the turf battle.

While the spirit of unified basin planning was not embraced by the Federal construction agencies, they did quickly learn to utilize the rhetoric of basin planning to generate support for additional construction projects (Dworsky and Allee, 1981; Reisner, 1986; Martin et al., 1960). Reclamation proved to be especially skilled in using this political strategy for meeting the increasingly stringent economic feasibility requirements for new irrigation projects. By jointly considering noneconomically justifiable projects along with so-called "cash register" hydroelectric power projects within a single basin plan, Reclamation achieved authorization and appropriations for a long list of projects of dubious merit. This technique was first used in 1942 in the development of the Big Horn River in Wyoming and then applied on a larger scale in Reclamation's portion of the Pick-Sloan Plan in the Missouri basin (Robinson, 1979).<sup>36</sup>

Water development also emerged as the driving force behind Federal programs aimed at the watershed level, namely the "small watersheds program" of the U.S. Soil Conservation Service. Beginning in 1954, this program encouraged local organizations and State agencies to enter into voluntary arrangements offered by Federal extension agents to receive technical information and Federal financial assistance for the construction of projects serving a variety of purposes, including flood control, agricultural water development and management, fish and wildlife enhancement, and municipal and industrial water supply (Holmes, 1979).<sup>37</sup> The nature of the cost-sharing arrangements ensured that the majority of the projects were primarily for flood control, and then only in small upland watersheds—a specialization needed to avoid destructive turf battles with the more powerful Corps (Clarke and McCool, 1985).

The failure of Federal agencies to meaningfully coordinate activities and their continued reluctance to encourage coequal State participation in river basin planning, development and management were addressed by numerous postwar study commissions during this era, including the First Hoover

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<sup>36</sup> Among the most ambitious of these schemes was Reclamation's Pacific Southwest Water Plan for the Colorado River Basin (1963, 1964). The plan contained several economically unjustifiable projects, the Central Arizona Project being the centerpiece, all funded by "cash register" dams at Bridge and Marble Canyons in the Grand Canyon. While the proposals for Grand Canyon dams did not survive the opposition of environmental interests, the Central Arizona Project was eventually authorized and constructed along with a coal-fired electric plant near Page, Arizona (Reisner, 1986; Ingram, 1990).

<sup>37</sup> These are sometimes known as "566 projects," after the public law number of the authorizing legislation: Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566).

Commission (1949), the President's Water Resources Policy Commission (1950), the Second Hoover Commission (1955), and the President's Advisory Committee on Water Resources Policy (1956).<sup>38</sup> The Hoover Commissions were a broadly focused look at the need for reorganization of the executive branch of the government. In the arena of regional water policy, the commissions primarily focused on the roles of the Corps and Reclamation and the need to better coordinate all natural resource activities within a single department. The First Hoover Commission responded to the perverse bureaucratic logic of the Pick-Sloan Plan by proposing the consolidation of the Corps and Reclamation into a new "Water Development Service" in the Department of the Interior. The Corps vigorously and successfully fought transfer to the Department of the Interior and its consolidation into a Water Development Service and also defeated plans to establish a Drainage Area Advisory Committee for each major drainage basin to facilitate regional water planning, development, and management.

The recommendations of the Hoover Commissions were largely echoed by the President's Water Resources Policy Commission, also known as the Cooke Commission in reference to chairman Morris Cooke, an alumnus of the New Deal administration. The Cooke Commission (1950:10-11, vol. 1) produced a comprehensive examination of national water resources policy and made several recommendations promoting regional water management and criticizing basin interagency committees:

*Congress should set up a separate river basin commission for each of the major basins. These commissions, set upon a representative basis, should be authorized to coordinate the surveys, construction activities, and operations of the Federal agencies in the several basins, under the guidance of independent chairmen appointed by the President and with the participation of State agencies in the planning process.*

Like both Hoover Commissions, the Cooke Commission also recommended the creation of Federal review boards to evaluate water development proposals, an effort to disrupt the pork barrel politics practiced by water elites and empowering the Federal development agencies. However, none of the major recommendations of these commissions were enacted (Advisory Commission on Intergovernmental Relations, 1972).

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<sup>38</sup> The common names of these studies are used in the text. See the Bibliography section for official titles.

Also tackling the issue of ineffective agency coordination in regional water development was the President's Advisory Committee on Water Resources Policy (1956), comprised of the heads of the Departments of Agriculture, Defense, and Interior. This committee proposed the formation of new regional organizations to better coordinate river basin planning by Federal and State agencies, emphasizing the need for forums in which the two levels of government could interact as equals (Schad, 1964). These new organizations were to be overseen by the Interagency Committee on Water Resources, created by Presidential order in 1954 to take over the river basin planning role held by the phased-out FIARBC (NWC, 1973).<sup>39</sup>

Very few of the major recommendations from any of these reports were immediately or fully acted upon, although they did influence the sweeping reforms that awaited in the 1960s. One of the more significant, but frequently overlooked, products arising from the reports criticizing the performance of interagency committees was the establishment of U.S. Study Commissions in the Southeast River Basins and in Texas. These commissions—operational from 1959 to 1963—were more notable for their composition and organization than for their reports (Pealy, 1964). The commissions featured an independent staff, a Federal chairman, and direct Federal appropriations, and they were comprised of State governors and Federal agency representatives, all appointed by the President. These key structural elements were prominently featured in many of the regional water organizations that originated in the 1960s.

### **The Era of Cooperative Federalism (1960 to circa 1980)**

The 1960s were a highly turbulent era in the American history of river basin administration, as many of the dominant trends and assumptions developed in earlier eras were significantly modified in an effort to respond to new water resource concerns as well as to broader sociopolitical developments. The "era of Cooperative Federalism"<sup>40</sup> begins with the dismantling of the basin interagency committees and with efforts to develop arrangements featuring greater Federal-State cooperation, a reduced policymaking role for Federal water agencies, a greater respect for environmental values, and an attempt to limit the influence of the iron triangles that had become so

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<sup>39</sup> With this bureaucratic change, the firebrick committees became known as the "icewater" committees; however, their structure and function was not notably changed.

<sup>40</sup> "Cooperative Federalism" is occasionally referred to as "creative Federalism."



dominant in previous decades. As discussed earlier and documented in the many commission and committee reports of the 1950s, this movement was fueled by the consistent failure of Federal agencies to effectively integrate their activities. The National Water Commission (1973) attributed the disappointing record of the basin interagency committees on their need to achieve unanimity among the participating agencies, since implementation of committee agreements was voluntary. The committees had no independent authority, funding, or staffing, and were simply children of the participating agencies. Due to this need to achieve unanimity among the participating agencies, the committees were ineffective in reconciling separate agency plans and policies, choosing instead to simply layer divergent plans together as was done in the Pick-Sloan Plan.

A second criticism working against the basin interagency committees was their subordination of the States in regional water development planning and decisionmaking processes (NWC, 1973). The congressional recognition of States' rights in regional water resources planning and development was well established by the 1940s, as evidenced by the language of the 1944 Flood Control Act:

*. . . it is declared to be the policy of Congress to recognize interests and rights of the States in determining the development of watersheds within their borders and likewise their interests and rights in water utilization and control . . .*

In practice, however, the Federal water development bureaucracy offered few opportunities for meaningful State participation in river basin planning efforts, preferring instead to deal directly with prodevelopment constituency groups at the local level (Advisory Council on Intergovernmental Relations [ACIR], 1972). The inclusion of State representatives in the firebrick committees was a partial solution to this deficiency and established an important precedent for Federal-State cooperation in river basin planning.<sup>41</sup>

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<sup>41</sup> The movement to instill greater State recognition and involvement in river basin planning had picked up steam in the 1950s and was a theme permeating the major water resources reports of the basin interagency committee era. However, by 1958, only two major regional studies had been authorized which provided for meaningful State participation—the aforementioned Texas Basins Study Commission and the Southeast Basins Study Commissions—and no permanent and effective Federal-State institutional arrangement for river basin administration had emerged. Despite all the study and rhetoric, the actual level of State participation in regional water planning increased only minimally during the 1940s and 1950s (ACIR, 1972).

More substantial innovations, however, were widely considered to be necessary.

A highly different model of intergovernmental regional water planning could be found at the watershed scale in the 1950s as employees of the U.S. Soil Conservation Service in Oregon and Nevada began an effort that came to be known as coordinated resource management (CRM). In a CRM planning process, participants from Federal, State and local governments, as well as interested private stakeholders, voluntarily come together to address transboundary resource issues. The U.S. Soil Conservation Service and BLM have traditionally been among the Federal agencies most supportive of this approach, although the participation of several other Federal agencies is provided for in a series of interagency memoranda of understanding primarily enacted in the 1970s and 1980s. This model helped to pave the way for the modern watershed movement, but does not appear to have had any noticeable impact on river basin administration.

Three new and highly distinct forms of river basin organizations appeared in the 1960s as the basin interagency committees finally began to give way to more formal and regionally accountable organizations, although the distinctions, in some cases, have been negligible. The first of the new arrangements was the Delaware River Basin Commission, established in 1961 through the first use of a Federal-interstate compact.<sup>42</sup> Two years after the innovation in the Delaware Basin, a Supreme Court decision concerning the Colorado River Basin established an administrative framework known as the "single Federal administrator." As discussed below, this "innovation" was localized and seems to have occurred independently of most of the major trends of this era. A much more calculated and nationally significant innovation occurred in 1965, when several years of legislative action culminated in the Water Resources Planning Act, which provided for the establishment of several "interagency-interstate commissions."

The most anomalous and nationally insignificant of these arrangements is the "single Federal administrator" approach seen in the Colorado River Basin, generally considered to have originated with a landmark Supreme Court decision in 1963 (Kenney, 1993; Water Resources Council, 1967; Donahue, 1987). While most innovations in this era had the effect of increasing the role of the States in river basin administration, the Court's

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<sup>42</sup> This institutional arrangement was duplicated in the Susquehanna River basin in 1970 (Voight, 1972).

decision in *Arizona v. California* (1963) went in the opposite direction, expanding the already significant Federal role in the Colorado River Basin by increasing the discretion of the Secretary of the Interior to administer the apportionment of the river—especially among the Lower Basin States.<sup>43</sup> The expanded Federal role in Colorado River management not only reflected the high concentration of Federal lands in the American Southwest,<sup>44</sup> but also rulings in the *Arizona v. California* litigation that gave the Federal Government expanded powers regarding reserved rights and interstate water apportionments.<sup>45</sup>

The more nationally celebrated innovations in the 1960s were the new arrangements pioneered in the Delaware (and later copied in the Susquehanna) and those arising from Title II of the Water Resources Planning Act of 1965. Although the Nation's first Federal-interstate compact commission was established 4 years before the enactment of the Water Resources Planning Act, it is the Title II Commissions that best represent the next evolutionary step beyond the basin interagency committees of the firebrick model. The Water Resources Planning Act was the product of a decade of focused research and lengthy legislative action, primarily

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<sup>43</sup> As a result of the Supreme Court action and several decades of Federal legislation, the Secretary of the Interior's responsibilities in the Colorado River now include most facets of resource management, including the design and modification of reservoir operating regimes, the allocation of water shortages among the Lower Basin States and between basins (in accordance with compact provisions), the implementation (and interpretation) of compact and treaty obligations, the negotiation and implementation of water delivery contracts, the facilitation of Indian water rights settlements and the general oversight of the Indian lands, the exercise of Federal reserved water rights (primarily for environmental and Indian purposes), the development and implementation of strategies for endangered species protection, and the management of Federal grasslands, parks, and wildlife refuges.

<sup>44</sup> When Indian lands are included, over 72 percent of the Colorado River's watershed is Federal lands, administered primarily by the National Park Service, BLM, U.S. Forest Service, Bureau of Indian Affairs, Reclamation, the U.S. Fish and Wildlife Service, and the military (Weatherford and Brown, 1986).

<sup>45</sup> As part of one of the Nation's longest and costliest cases, the Supreme Court expanded upon the definition of Federal reserved rights, first articulated in the *Winters v. United States* (1908) decision, by expanding the scope of Indian water rights and by recognizing the existence of Federal water rights for lands withdrawn for a variety of purposes, such as forests, grasslands, national parks, military installations, and other purposes defined in the authorizing legislation or Executive order. The court also ruled that Congress has the independent authority to apportion interstate rivers, something that Congress did—in the opinion of the court—in the Boulder Canyon Project Act of 1928. Prior to this time, it was widely believed that only two mechanisms existed for making interstate apportionments: the interstate compact (which requires congressional ratification) and the Supreme Court's use of the equitable apportionment doctrine. While these two developments have the potential to alter the institutional arrangements in all American river basins, especially in the West, their impact has thus far primarily been confined to the Colorado Basin.

originating from the recommendations of the President's Advisory Committee on Water Resources Policy (1956) and the Senate Select Committee on National Water Resources—commonly known as the Kerr Committee in reference to chairman Robert Kerr of Oklahoma (ACIR, 1972; Hart, 1971; Holmes, 1979).<sup>46</sup>

In the context of regional water management, the act contained two important elements: Title I created the Water Resources Council (WRC), and Title II provided a framework for the establishment of interagency-interstate commission (i.e., Title II Commissions) in regions desiring them (NWC, 1973; ACIR, 1972). The Water Resources Council was originally comprised of the Chairman of the Federal Power Commission and the Secretaries of Agriculture; Army; Interior; and Health, Education, and Welfare. Participation by the Secretary of Transportation and the Administrator of the EPA was accomplished in later years. The WRC was faced with two primary challenges: coordinating the activities of Federal and, to a lesser extent, State agencies involved in water management activities; and overseeing the completion of the river basin plans—now known as Comprehensive Coordinated Joint Plans—initiated by a variety of actors, including many of the firebrick committees and several ad hoc coordinating committees.<sup>47</sup> In many cases, the Comprehensive Coordinated Joint Plans served as the basis for comprehensive water development plans known as "Level B" studies.

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<sup>46</sup> The Kerr Committee's 1961 report identified several deficiencies in national water policy, including a need for additional water development and research and the lack of adequate processes for including the participation of State and, to a lesser extent, local officials in regional planning, development, and management activities. Many parties felt that the solution to these problems could be found in the expanded use of regional water organizations, the rapid development of comprehensive river basin plans, and the establishment of a national water resources committee to study water issues. In response to these findings, the Kennedy administration supported legislation in 1961 calling for a national system of "river basin commissions" with both Federal and State representation (ACIR, 1972). That effort was unsuccessful, however, largely since it failed to provide a strong role for the States (e.g., the bill called for the President, not the governors, to appoint the State representatives to the commission). Modified bills in 1963 and 1965 that provided more power to the States generated greater congressional support, leading to passage of the Water Resources Planning Act of 1965.

<sup>47</sup> The Water Resources Planning Act gave the WRC five specific duties: (1) preparing national assessments of water supplies and demands; (2) developing principles, standards, and procedures for the formulation and evaluation of projects; (3) establishing and maintaining liaison with the "Title II" Commissions; (4) providing funding to States for water planning; and (5) encouraging and reviewing river basin plans (NWC, 1973).

The fundamental vehicle for achieving the goals of the 1965 legislation was the creation of the Title II Commissions.<sup>48</sup> Title II Commissions were initially established by Presidential order in the Pacific-Northwest, Souris-Red-Rainy, Great Lakes, Ohio, New England, and Missouri regions (ACIR, 1972). Later, an Upper Mississippi Title II Commission was created, incorporating the Souris-Red-Rainy Commission created 6 years earlier. Establishment of a Title II Commission by the President required the approval of a majority of the affected Basin States and a positive recommendation by either the WRC or an affected State governor. The commissions featured a mixture of Federal and State members, with one Federal member from each WRC participant and one member from each participating Basin State (ACIR, 1972).<sup>49</sup> Each commission was headed by a presidentially appointed chairman not affiliated with any of the participating agencies, a highly valuable innovation. Despite the similar structure of each commission, the activities of the Title II Commissions varied from region to region in response to unique resource demands and basin histories (ACIR, 1972; Gregg, 1992).<sup>50</sup>

While the Title II Commissions were the next evolutionary incarnation of the basin interagency committees, the emergence of the Federal-interstate compact commissions represented a new direction in the use of interstate compacts. Proponents of this new type of regional water organization

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<sup>48</sup> The use of regional organizations was a theme permeating congressional thinking in 1965, as Congress chose to address the challenge of regional economic development with several types of regional commissions. In addition to the Title II Commissions, so-called "Title V Commissions" were established pursuant to the Public Works and Economic Development Act, while the Appalachian Regional Commission was established in the Appalachian Regional Development Act (ACIR, 1972).

<sup>49</sup> In a few cases, representatives from other departments served on the commissions, including the Justice Department in the Great Lakes Basin Commission and the Atomic Energy Commission in the Ohio and New England Commissions. Not surprisingly, several of the commissions featured a Federal majority (e.g., the Souris-Red-Rainy Commission possessed 77-percent Federal membership). A few of the commissions—most notably the New England River Basins Commission—also featured representatives of interstate organizations, thereby facilitating a regional perspective in the commission (ACIR, 1972).

<sup>50</sup> For example, while the Ohio River Basin Commission oversaw a major development program, most of the other commissions primarily evolved into forums for communication, coordination, planning, and information gathering. Commissions such as the Upper Mississippi River Basin Commission pursued additional lock-and-dam developments, while others shunned additional Federal development. The New England River Basins Commission raised eyebrows and drew praise by actively working to derail the Corps' flood control agenda in the region (Gregg, 1992; Derthick, 1974). Other commissions were so constrained by existing physical and institutional factors that very little innovation was possible. The activities of the Missouri River Basin Commission were constrained by the specifics of the Pick-Sloan Plan, while the Pacific Northwest Commission was constrained by the reservoir operating regime of the Bonneville Power Administration (BPA).

believed that interstate compacts were generally not being utilized in a sufficiently creative manner to tackle most regional water issues. In particular, they felt that compacts should be more multiple-purpose in nature and should provide a Federal-State partnership in addressing problems.<sup>51</sup> These ideas were prominently featured in the conclusions of an influential Syracuse University study recommending the creation of the Delaware River Basin Commission (Martin et al., 1960).

The Delaware River Basin Commission (DRBC) and the highly similar Susquehanna River Basin Commission (SRBC) are innovative in many ways (Government Accounting Office, 1981; Derthick, 1974; ACIR, 1972; Martin et al., 1960). Among the most important features of these regional water organizations is their high level of independent authorities, a quality that is derivative of having the participation of the Federal Government as both a compact signatory and a full voting member of the commission. Unlike the Title II Commissions, the Federal-interstate compact commissions are empowered to make binding water management decisions which can normally be implemented without the need for additional congressional action or the total reliance on existing agencies for voluntary cooperation. This includes the ability to block proposed actions that are inconsistent with the regional plans developed by commissions. The DRBC and SRBC are also distinguished from most other regional water organizations by their comprehensive scopes, with both organizations having important roles in the areas of water supply management, pollution abatement, flood control, river regulation, recreation, environmental protection, and a variety of other water concerns. It is these features of the Federal-interstate compact commissions that draw the bulk of the scholarly praise;<sup>52</sup> however, the regional water organizations featured in the Delaware and Susquehanna Basin have several other notable features, including their possession of independent and technically competent staffs, their problemshd orientations, and their reliance on State political leaders (i.e., governors) rather than water bureaucrats for guiding policy decisions. The analysis of earlier national experiments with regional water organizations was instrumental in identifying these organizational features as desirable in administrative bodies charged with management and planning responsibilities. Despite widespread praise of the institutional form, the DRBC and the SRBC remain

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<sup>51</sup> For more information, see *The Interstate Compact Since 1925*, published by the Council of State Governments in 1951.

<sup>52</sup> Among the major reports praising the Federal-interstate compact commissions are those of the National Water Commission (1973), the Advisory Commission on Intergovernmental Relations (1972), and the General Accounting Office (1981).

the Nation's only two examples of regional water management via the Federal-interstate compact vehicle.

The Title II Commissions and the Federal-interstate compact commissions were among the subjects addressed by NWC, established by Congress in the National Water Commission Act of 1968.<sup>53</sup> In its analysis of regional water organizations, the NWC describes the Title II Commissions as improvements over the basin interagency committees of earlier decades, primarily due to their improved treatment of the States. However, the commissions were not highly praised. The reports of the Water Resources Council (1967) and the Advisory Commission on Intergovernmental Relations (1972) contain only modest praise for the Title II Commissions, a sentiment reflected in much of the scholarly literature (e.g., Derthick, 1974; Ingram, 1973).<sup>54</sup> A sentiment more commonly expressed was that the Federal-interstate compact commission format, pioneered in the Delaware River basin and copied in the Susquehanna River basin, was a highly promising institutional arrangement for the emerging era of water management and State primacy (ACIR, 1972; NWC, 1973). The report of the National Water Commission (1973:422) judged the Federal-interstate compact commission to be the preferred organizational structure when compared to the Title II Commissions, concluding that Federal-interstate compacts "have great potential for solving major water and related land resource problems on a regional basis." The General Accounting Office (1981) concurred, calling Federal-interstate compact commissions "useful mechanisms for planning and managing river basin operations." In the turbulent and largely disappointing history of regional water organizations, these comments rate as exceptional praise.

During the 1970s, while these new organizational forms were evolving and adjusting to their institutional settings, the environmental movement born in the 1960s began to yield the fruit of Federal legislation in a variety of subject areas, including land management, pollution abatement, species protection,

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<sup>53</sup> In order to avoid conflicts of interest and political distortions, the NWC was entirely comprised of scholars and water policy experts from outside of the Federal service. The NWC investigated all aspects of national water policy, including future water demands, environmental impacts of reservoir development, pollution control, conservation, interbasin transfers, supply augmentation, Indian water rights, water development financing, and a host of other topics directly and indirectly related to the governance of regional water resources.

<sup>54</sup> Only the New England River Basins Commission was widely praised as an innovative and effective body, largely due to the strong conservation ethic of Chairman Gregg, the relatively modest influence of the Federal development agencies in the region, and the strong regional orientation and identity borne from a long history of interstate cooperation (ACIR, 1972; Derthick, 1974; Foster, 1984).

and resource preservation. Two of the most important acts in the context of regional water management were the National Environmental Policy Act and the Federal Water Pollution Control Act Amendments. The National Environmental Policy Act of 1969 called for increased public participation and social science investigation into the selection of water development and management actions. These goals were to primarily be accomplished by the environment impact statement requirement. The environmental impact statement requirement has been particularly important as a vehicle for expanding the role of the courts and activists (granted standing to sue) in regional water decisionmaking.

The Federal Water Pollution Control Act Amendments of 1972 are significant for focusing attention on issues of regional water management, rather than development—even though the program had a strong emphasis on the construction of wastewater facilities. In contrast to the majority of the act, which emphasized controlling specific point sources, a regional strategy to water quality management was advocated in some sections. For example, section 208 of the act primarily called for "areawide water quality management" investigations following political, not hydrologic, boundaries, although those areas identified in the 208 process as having significant water quality deficiencies were subject to inclusion in basinwide studies under section 209 of the act (Kerr, 1982; Ertel, 1982). These investigations were to be (and occasionally were) coordinated with the regional "Level B" studies conducted by the WRC; however, in general, the regional approach specified in section 208 was largely ignored by EPA and the States (Adler, et al., 1993). The provisions of 208 have recently been "rediscovered" as part of efforts to control nonpoint source pollution and the promotion of ecosystem management principles. Section 319 of the amended legislation, which provides funding for the control of nonpoint source pollution, provides an additional avenue for focusing attention at regional scales such as the watershed.

### **Modern Era: New Federalism and Federal Devolution**

The water quality management framework developed in the 1972 act, as amended, is a prime example of the concept of "Cooperative Federalism," since the States (if desired) assume a lead role in implementing and enforcing the federally approved standards (Sax and Abrams, 1986). By the 1980s, Cooperative Federalism was giving way to the States-rights philosophy known as "New Federalism," which had become the battlecry of the incoming



Reagan administration. Under New Federalism, the States have been encouraged to take the lead in water management innovations; and in the West, the States have responded with several innovations concerning issues such as instream flows, water transfers and third party effects, and the conjunctive management of surface water and groundwater (MacDonnell et al., 1989; Colby et al., 1989). However, developing regional arrangements in these and related policy areas has thus far proceeded slowly under State leadership, largely due to the overwhelming institutional barriers (ACIR, 1991). Overcoming these barriers in the context of interstate resources is a particularly difficult challenge in this era of New Federalism, which has featured a virtual hiatus in the use of Federal study commissions and financing to address regional water issues.

An early casualty of the "New Federalism" movement was the Title II Commissions. The Federal orientation and makeup of most of the commissions, along with their inability to meet challenges of a managerial nature, hindered their ability to cultivate a supportive constituency. Consequently, the Title II Commissions, the WRC, and the associated planning framework established under the Water Resources Planning Act (WRPA) were terminated—without significant protests—by President Reagan in 1981 and 1982. As Gregg (1989:16), former chairman of the New England River Basins Commission, has observed, the demise of the WRPA system can primarily be attributed to "institutional limitations and historical obsolescence." One of the primary "institutional limitations" of the commissions was their inability to make enforceable decisions. Since final decisionmaking authority in most areas remained with Congress and the member agencies (and was not transferred to the commissions), most commissions felt compelled to reach unanimous agreements in order to provide a reasonable chance of having decisions implemented.<sup>55</sup> As foreshadowed by the Advisory Committee on Intergovernmental Relations (1972:125), this political necessity ensured that the Title II Commissions were no more effective as forums of conflict resolution and decisionmaking than the preceding basin interagency commissions:

*The unusual voting procedures stipulated by the Act attempt to produce virtually unanimous approval for commission basin-wide planning activities. As such, they continue the tradition of*

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<sup>55</sup> The WRPA called for the commissions to make decisions by "consensus," an ambiguous term which was defined differently by the various commissions (ACIR, 1972). The selection of decisionmaking rules for the commissions was a major element of debate during the genesis (1961-1965) of the Water Resources Planning Act (Hart, 1971).

*earlier, less formal basin-wide institutions which placed a premium on the exchange of information among Federal and State agencies in an attempt to reach agreement on a plan that might be utilized as a further justification for Federal and federally assisted water resource projects. These extraordinary voting procedures are perhaps appropriate for this kind of forum-type mechanism. Such procedures would not be appropriate if the Title II Commissions were to be given management responsibilities.*

As the ACIR observed, the organizational structure of the Title II Commissions provided a framework that was adequate for regional communication and debate, but was often unable to fulfill the conflict resolution and regulatory functions associated with resource management. Yet, the commissions were created at a time when water development was waning due to environmental protests, fiscal concerns, and the exhaustion of good dam sites, and calls for improved resource management were intensifying.<sup>56</sup> This factor—described earlier by Gregg (1989) as "historical obsolescence"—meant that the commissions were designed for an era that had passed. In those commissions where an effort was made to embrace this new emphasis on creative and environmentally sound water management—primarily the New England River Basins Commission—the deficiencies in authority hampered many otherwise feasible innovations (Foster, 1984).<sup>57</sup>

Despite the relatively uncontroversial dismantling of the regional water management rubric of the WRPA, the desire for regional management did not completely erode in the affected basins, as many of these regions developed replacement organizations (McDowell, 1984). The most innovative and widely praised of these "post-Title II organizations" is the Northwest Power Planning Council (NWPPC), which emerged almost simultaneously with the termination of the Pacific Northwest River Basins Commission (Volkman and Lee, 1988; Wandschneider, 1984). The Pacific Northwest Electric Power Planning and Conservation Act of 1980 authorized the creation of the NWPPC as part of an effort to address future energy needs in the Columbia

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<sup>56</sup> This change in the direction of national water policy was identified by the National Water Commission (1973:58), which reported that "in the future, increased emphasis must be placed on the management of existing water developments as a means of improving regional growth potential rather than relying as heavily in the past on new projects."

<sup>57</sup> The New England River Basins Commission is the most widely studied, and praised, of the Title II Commissions. Case studies are provided by Ingram (1971), Foster (1984), Derthick (1974), and Hart (1971).

River basin and surrounding areas while protecting fishery interests. The NWPPC is an interstate compact body comprised of governor appointees from the States of Washington, Oregon, Idaho, and Montana, funded by revenues from the Bonneville Power Administration (BPA) the Federal agency created in 1937 to market the region's wealth of federally generated hydropower.

The impetus for formation of the Council was twofold. First, this region known for its abundant and cheap hydroelectricity was mistakenly thought to be on the verge of a major energy shortage, a potentially devastating scenario to the many power-intensive industries located in the basin. Second, the vast network of hydropower facilities blocking the Columbia River and its major tributaries was contributing to increasingly unacceptable degradation of the region's anadromous fishery. Further development would certainly exacerbate this condition. The NWPPC was charged with responding to these two concerns by preparing a fish and wildlife plan and a regional energy plan. Both plans influence the manner in which the region's plumbing system is operated and direct the nature and scope of future water development. In developing these plans, NWPPC seeks input from the basin's fish and wildlife agencies, Indian tribes, power and business interests, and other related parties before aggressively seeking public input.

The plans developed by NWPPC are primarily implemented by the affected Federal agencies. The BPA, the Corps, Reclamation, and the Federal Energy Regulatory Commission are all involved in the operation of hydrofacilities in the region. Under the terms of the 1980 legislation, these Federal agencies are required to follow the plans developed by NWPPC, a multistate regional organization. The constitutionality of this arrangement was initially questioned by many parties, including the Department of Justice, but has since been upheld as constitutional by the Ninth Circuit Court in *Seattle Master Builders Association v. Pacific Northwest Electric Power and Conservation Planning Council* (1986).

The institutional features of the NWPPC are widely praised in the literature,<sup>58</sup> even though salmon and steelhead runs continue to drop precipitously, and the region's energy surplus has dissolved. Of the regional organizations in American history, few (if any) exhibit the high level of regional focus and accountability, environmental consciousness, and formal management authority of NWPPC. Consequently, interstate councils on this

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<sup>58</sup> For example, see Volkman and Lee (1988), Wandschneider (1984), and Lee and Clark (1985).

model are endorsed by many authors and are favorably described by Volkman and Lee (1988:577) as "descendants of Powell's idea of river basin government, adapted to the realities of State boundaries, and to the possibilities inherent in the new era of water management."

Aside from the innovation in the Pacific Northwest, however, the 1980s and 1990s have been relatively devoid of major organizational and policy initiatives in the realm of river basin administration. For perhaps the first time in American history, it is at the substate (i.e., watershed) level—rather than the scale of interstate river basins—where the most notable institutional experiments and innovations are occurring in regional water management. Nationally, this trend is perhaps best illustrated by the Great Lakes region, which has historically responded to issues involving lake levels, water quality, and fisheries with an unusually high level of international and interstate coordination (Donahue, 1987). In recent decades, water quality programs have sparked a flurry of substate innovations, as "remedial action plans" are developed to address water quality hot-spots identified through a process established in the Great Lakes Water Quality Agreements of 1972 and 1978 (as amended in 1987), administered by the International Joint Commission (MacKenzie, 1996).<sup>59</sup> Throughout the Nation, efforts to integrate so-called "ecosystem management" concepts into Federal programs, including reauthorized versions of the Clean Water Act<sup>60</sup> and the Endangered Species Act, have sparked an explosion of scholarly research and interest in substate regional water institutions.<sup>61</sup> This trend has been further buoyed by the "Federal devolution" movement, in which Federal control (and even ownership) of natural resources is being pushed down the governmental hierarchy to State, local, and, ultimately, to the private sector.

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<sup>59</sup> The International Joint Commission was established in 1909 as part of the Boundary Waters Treaty between the United States and Canada.

<sup>60</sup> Improving the efficiency of water quality programs is a common theme in many of the modern "ecosystem/watershed management" proposals, including those forwarded by EPA, the Association of Metropolitan Sewerage Agencies, the American Planning Association, the USGS, and Water Quality 2000 (Goldfarb, 1993b; Water Quality 2000, 1992). Many of these proposals feature the "nested watershed" concept, which states that institutional arrangements for regional water management should feature interrelated, but discrete, organizational arrangements designed in accordance with nested hydrologic units—from large river basins, to regional subbasins, to local watersheds.

<sup>61</sup> The Clinton administration (including Secretary of the Interior Babbitt) has been a strong proponent of "ecosystem management," establishing an Interagency Task Force on Ecosystem Management, the National Biological Service, and the Council on Sustainable Development. While the Republican Congress has not generally been supportive of the creation of these new entities, the principles of bottom-up public-private decisionmaking strategies have broad appeal (Yaffee et al., 1996).

Experimentation at the watershed scale in the West is also becoming widespread, as a variety of "watershed groups" has recently emerged to address water issues of local and national concern (Natural Resources Law Center [NRLC], 1996). Although regional water supply and sanitation efforts of municipalities and irrigation districts and some soil conservation programs (e.g., the small watersheds program) have stimulated the creation of intergovernmental watershed-level experimentation in the past, until recently, the western experience with localized regional resource management was primarily limited to issues of land management, especially Federal lands overseen by the Department of the Interior and private lands organized within soil conservation districts (Clarke and McCool, 1985). The high degree of Federal ownership (and control) of land resources gives western intergovernmental efforts a unique quality, with the balancing of Federal and local interests often being a highly contentious issue. Historically, this is perhaps best illustrated by the turbulent history of the advisory board system utilized by BLM in the 1950s, in which "captured" Federal land managers are generally considered to have failed to ensure that Federal interests were adequately balanced against local prograzing objectives (Foss, 1960; Culhane, 1981).<sup>62</sup> As western economies have diversified, resource agencies have been provided with broader multiple-use mandates and more stringent cost-sharing rules have tempered the enthusiasm of local groups for programs of questionable economic merit, the fear of local capture has subsided, and Federal agencies are increasingly finding that local community groups are highly useful resource management tools—for both land and water management.<sup>63</sup> The majority of watershed groups established in the West in the past decade originated with the assistance of one or more Federal agencies and receive some Federal funding, although most efforts still exhibit a highly decentralized and bottom-up orientation (NRLC, 1996). Many States have also found local watershed groups to be useful planning and dispute resolution devices, and some—most notably, Oregon—have taken steps to promote additional experimentation (NRLC, in press).

In addition to taking on chronic issues of interagency coordination and the balancing of roles among Federal, State and local actors, the current experimentation with substate regional water institutions is also notable in

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<sup>62</sup> A "captured" agency is one which is controlled by its constituency group. The BLM of the 1950s is the classic example, as described by Foss (1960).

<sup>63</sup> A few environmental activists are still fearful that Federal-local cooperation will result in locally driven resource degradation, since the influence of major environmental groups is perhaps more effectively exercised in national decisionmaking forums.

that many efforts are addressing resource issues from a more integrated and comprehensive perspective than ever before, with broad issues of resource and community sustainability being at the center of several watershed initiatives.<sup>64</sup> Thus, the watershed of the 1990s has become a focal point for addressing fundamental issues of resource management and democratic administration, emphasizing many of the ideas expressed a century earlier by John Wesley Powell—including the importance of a regional perspective, the integration of institutions for land and water, the link between environmental sustainability and community stability, and participatory government.

## Conclusions

The preceding historical review suggests that the relative inability of the Nation to develop effective institutional arrangements for the control of regional water resources cannot be attributed to a lack of interest or effort. To the contrary, regional water resources have attracted a wealth of scholarly attention and, more impressively, intergovernmental experimentation.<sup>65</sup> Yet, few river basins of the United States possess institutional arrangements that are widely perceived as innovative, and the watershed has only recently emerged as an active regional scale for meaningful institutional experimentation for broadly focused water management efforts. While it is easy and common to attribute this disappointing track record to those intergovernmental and interagency and intra-agency factors that promote narrow and short-sighted thinking, the reality is that the fragmentation of institutions is inevitable in a Nation that embraces decentralized government and diffused power and that encourages individuals, interest groups, and even agencies to pursue different objectives derivative of distinct ideological perspectives and self-interests. Given this

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<sup>64</sup> A variety of publications and web pages have emerged in recent years summarizing well over 1,000 of these recent institutional experiments occurring at the watershed scale. Among the most useful of these collections have been those produced by researchers at the University of Michigan and University of Colorado, the former reviewing 619 cases of "ecosystem management" throughout the United States, while the latter focusing on 76 of the most significant "watershed groups" operating in the Western States (Yaffee et al., 1996; NRLC, 1996).

<sup>65</sup> This is perhaps best seen by reviewing the history of the West's largest river, the Columbia, which features massive depression era developments and a corresponding attempt (albeit unsuccessful) to establish a TVA-style organization, followed by the subsequent establishment of a firebrick commission, a Title II Commission, and an innovative interstate council. Additionally, the basin is currently one of the most active breeding grounds for watershed groups.

uniquely American "playing field" upon which regional water institutions must evolve, it is clear that the expectations frequently placed on these institutions are unrealistically high. It is also undoubtedly true, however, that there is abundant room for improvement.

In general, regional water institutions have evolved in accordance with broad trends in Federalism, something that is best illustrated by changes in the Federal-State balance of power in regional water organizations over time. Historically, these shifts have been gradual and incremental; however, recent decades have brought transformations to the water resources realm that have overwhelmed the institutional capacity for change. Water institutions are still struggling to adapt to the revolutionary changes initiated in the 1960s (Gottlieb, 1988). The most significant and fundamental product of the 1960s was the "beginning of the end" of the massive Federal water development era, due to a combination of factors including increased environmental activism, growing fiscal conservatism, the exhaustion of many good dam sites, the declining status of Federal water agencies (and "scientific" decisionmaking), and the desire to recognize and empower previously disenfranchised groups in the public policy process. The policy subsystem known as the iron triangle of water development politics has collapsed as a more diverse and inclusive group of actors have found a seat at the policymaking table, and the courts have emerged as a major player in conflict resolution and policymaking. Cooperative Federalism and then New Federalism have placed State leaders at the center of this revolution, seeking novel ways to instill efficient water management practices within institutions that have primarily evolved to suit the needs of the preceding water development era.

As a new century approaches, the control of water resources at regionally defined scales is again a fashionable idea, especially at the watershed level; and new strategies will continue to be championed to deal with the seemingly ubiquitous problems deriving from intergovernmental and interagency and intra-agency competition. These strategies will likely build upon existing trends. In the context of the intergovernmental relationship, the events of recent decades suggest that the trend toward greater State and local empowerment in regional water management programs will continue, although a significant Federal presence—especially in the West—is likely to continue indefinitely. It is somewhat unclear, however, which branch of government, if any, will assume the leadership role. The idea of "unbiased scientific management" that was at the heart of efforts in the progressive and depression eras to centralize decisionmaking authority in the executive

branch waned in the postwar era in deference to the more politically pragmatic calculus of Federal water development politics overseen by the legislative branch, and then collapsed entirely in the environmental movement when agencies lost further credibility and legislators found that the regulatory nature of environmental politics and resource management did not yield the same political bounties as did water development. Given this situation, the roles of the judiciary, regulatory agencies, and the private sector in water management have expanded, leading to a "new intergovernmental environment" frequently characterized by policy gridlock and a leadership void. Consequently, new organizational arrangements and decisionmaking methods are now at a premium.

In the context of interagency and intra-agency competition, functional specialization continues to be a dominant feature of the institutional landscape at both the Federal and State level. At the Federal level, over 25 agencies have some jurisdiction over water resources (Smith, 1995). To a large extent, this is derived from the fact that most bureaucracies are still empowered to act at regional scales that have only a tenuous relationship to prevailing biophysical systems, although innovations such as "district level" water management in Nebraska and Florida and the emerging "areawide management" focus of the new Reclamation appear to be significant innovations. Furthermore, many notable efforts have been made to deal with the problems associated with bureaucracies and statutes with narrow scopes that ignore the systemic qualities of the resources they control. For example, many statutes require interagency coordination and consultation, with the intention of broadening the perspective of agencies and resource management programs. EPA has actively promoted additional coordination at the watershed scale (EPA, 1996a; EPA, 1996b). Similarly, resource management investigations have become considerably more interdisciplinary, as the role of the social scientist has expanded with the realization that solutions to modern resource issues usually are institutional, not technical. The term "ecosystem management" has become part of the vocabulary (and, in some cases, the mandate) of many water agencies—although the term has predictably defied a clear definition or expression. The fear of additional "train wrecks"—such as the precipitous salmon declines and spotted owl/timber industry battles of the Pacific Northwest—has provided a powerful stimulus for more integrated thinking. Despite two centuries of research and experimentation, putting theory into practice remains a formidable challenge.



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## Interviews

Interviews with the following individuals were utilized heavily in the preparation of case study materials and in the formulation of recommendations. Most interviews were conducted recently, explicitly for this study; however, some earlier interviews are also cited if they were utilized in the construction of the case studies.

Name	Title	Affiliation	Date of interview
Bambrick, Dale	Environmental Manager	Yakima Indian Nation	March 11, 1997
Bonomo, Tom	District Manager	U.S. Forest Service, Prescott National Forest	March 4, 1997
Broetzman, Gary	Project Manager	Colorado Center for Environmental Management	January 6, 1996
Dunn, Jim		U.S. Environmental Protection Agency	January 7, 1997
Fliniau, Holly	Remedial Project Manager, Clear Creek	U.S. Environmental Protection Agency	June 6, 1994 January 14, 1997
Gorbach, Chris	Planning Team Leader	Bureau of Reclamation	July 14, 1994
Gourley, Chad	Former coordinator	Lower Truckee River Restoration Steering Committee	March 7, 1997
Graf, David	Coordinator	South Platte Forum	January 16, 1997
Grande Pre, Chuck	Wildlife Manager	Colorado Division of Wildlife	January 17, 1997
Henke, Steve		Bureau of Land Management	July 5, 1994
Hicks, Larry	Resource Coordinator	Little Snake River Conservation District, Wyoming	March 10, 1997
Hicks, Mark	Program Manager	South Fork Dialogue Group; El Dorado County Conservation District	March 4, 1997
Hoshovsky, Marc	Biodiversity Conservation Planner	California Department of Fish and Game	March 11, 1997
Johnson, R.W.	Chairman	Rio Puerco Watershed Committee	July 14, 1994 February 26, 1997
Kaffer, Dan	Liaison between Natural Resources Conservation Service and the Nevada Division of Environmental Quality		July 15, 1994

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Name	Title	Affiliation	Date of interview
Marlow, Ronald	Water Management Engineer	Natural Resources Conservation Service	March 10, 1997
McKinney, Earl		Bureau of Land Management	August 31, 1995
Moore, Pete	Mayor	City of Leadville, Colorado	February 6, 1997
Norbeck, Carl	Watershed Coordinator	Clear Creek Watershed Forum	January 16, 1997
Oswald, Keith	President	Northern Arizona Audubon Society	July 6, 1994
Rapp, Ed	County Commissioner	Clear Creek County, Colorado	June 23, 1994
Robinson, Rob	Reclamation Specialist	Bureau of Land Management	January 8, 1996
Russell, Carol	Animas Team Leader	U.S. Environmental Protection Agency	January 7, 1997
Schmidt, Jane		U.S. Forest Service, Toiyabe National Forest	August 31, 1995
Simon, Bill	Watershed Coordinator	Animas River Stakeholder Group	January 7, 1997
Smitherman, Jim	Branch Supervisor	Nevada Division of Environmental Protection	March 6, 1997
Thompson, Dick	Chairman	Verde Watershed Association	July 7, 1994
Trapani, Jude	Project Coordinator	Lemhi Model Watershed Project	March 3, 1997
Walker, Steve	Member	Lower Truckee River Steering Committee; Natural Resources Conservation Service	July 7, 1994
Wall, Jerry	Soil Scientist	Bureau of Land Management	February 25, 1997
Wiederhold, Kathi	Former Project Manager	McKenzie Watershed Council	March 5, 1997
Wilcox, Jim	Coordinator	Feather River Coordinated Resource Management Group; Plumas Corporation	March 4, 1997
Zippen, Jeff	Team Leader	Truckee-Carson Coordination Office, Department of the Interior	March 5, 1997

*Bibliography*

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## **Project Advisory Board**

A Project Advisory Board (PAB) was established jointly by the Natural Resources Law Center and the Western Water Policy Review Advisory Commission (Commission) to provide guidance to this research effort. This report contains many ideas articulated by PAB members at a project meeting in Portland, Oregon; December 16, 1996. The following individuals were in attendance at that meeting: John Zirschky, Corps of Engineers (and member of the Commission); Jack Robertson, Bonneville Power Administration (and member of the Commission); Denise Fort, University of New Mexico Law School (and chairman of the Commission); Patrick O'Toole, Ladder Livestock LLC (and member of the Commission); Janet Neuman, Lewis and Clark Law School (and member of the Commission); Karen Hamilton, U.S. Environmental Protection Agency; Dave Duncan, Bureau of Reclamation; Ed Hastey, Bureau of Land Management; Nick Gephardt, U.S. Forest Service; David Cottingham, U.S. Department of the Interior; Mary Lou Soscia, Columbia InterTribal Fish Commission; Charles Carelli, Washington Department of Ecology; Charlotte Haynes, Oregon Water Resources Department; John Marsh, Northwest Power Planning Council; Marc Prevost, Rogue Valley watershed groups; Reed Benson, Waterwatch; Bill Bradbury, For Sake of Salmon; and Michael Jackson, Quincy Library Group.