UC Berkeley
IURD Working Paper Series

Title
Evaluating the Effectiveness of Collaboration in Water Resources Planning in California: A Case Study of CALFED

Permalink
https://escholarship.org/uc/item/21n711rg

Author
Hudzik, Catherine M.

Publication Date
2003-09-01

eScholarship.org Powered by the California Digital Library
University of California

Working Paper 2003-06

Evaluating the Effectiveness of Collaboration in Water Resources Planning in California: A Case Study of CALFED

Catherine Marie Hudzik, M. L.Arch.

Institute of Urban and Regional Development
University of California at Berkeley

Evaluating the Effectiveness of Collaboration in Water Resources Planning in California: A Case Study of CALFED

Catherine Marie Hudzik

ABSTRACT

This thesis examines the collaborative processes used by the CALFED Operations Group (Ops Group) and the outcomes achieved by these processes. The CALFED Bay Delta Program is a complex partnership of over 20 state and federal agencies that seeks to balance competing needs and interests in the Sacramento-San Joaquin Delta. The Ops Group coordinates the operations of the two large water export projects in the south Delta—the Central Valley Project (CVP) and State Water Project (SWP)—with environmental and water quality regulations.

Participants in the Ops Group were brought together by a conflict between environmental protection and water supply reliability. Fish populations were declining, while actions taken under the Endangered Species Act threatened the stability of the water supply. Through collaboration, dialogue, and detailed modeling of the system, the Operations Group was able to overcome decades of mistrust, legal barriers, financial risks, and scientific uncertainty to develop new tools for managing the complex Delta water system.

The Ops Group moved from a system of isolated bureaucratic decision making and prescriptive standards for protecting endangered fish in the Delta to a system based on cooperative real-time management, where minor modifications to the CVP and SWP were made on a daily basis based on real-time monitoring data. The program at the center of this breakthrough was the Environmental Water Account. The Environmental Water Account is a program that was designed to let the Operations Group maintain reliability in the SWP and CVP water supply while reducing the amount of water pumped out of the Delta when the pumps pose a danger to fish.

It is too soon to tell whether the Ops Group and the Environmental Water Account have improved either fish populations or long-term water supply reliability. However, this thesis describes several notable achievements that Ops Group members would not have been able to accomplish without collaboration. Agency staff and stakeholders with a history of adversity were able to create positive working relationships and shared understandings of the Delta water system. The social capital and

new institutional structures built by these processes have enabled the Ops Group to creatively deal with challenges that would have previously resulted in an impasse.

Table of Contents

Acknowledgments....8

CHAPTER ONE
Introduction....9

CHAPTER TWO
Collaboration in Policy Making....13
The Growth of Collaboration in Policy Making....14
Potential Benefits of Collaboration....16
Evaluating Collaborative Processes....17

CHAPTER THREE
Methods....19

CHAPTER FOUR
Background and Historical Context: The California Water System and the CALFED Bay Delta Program....21
California Water History....21
Water Development: History and Context....21
Moving Water North to South....22
The Central Valley Project....22
The State Water Project....23
The Delta....29
The Cost of Progress: The Water Wars....29
The Endangered Species Act....30
Water Quality Standards....32
A Collaborative Approach....33
A Truce in the Water Wars: The CALFED Bay-Delta Program....34

CHAPTER FIVE
The Ops Group and the Environmental Water Account....37
What is the Ops Group?....37
How Did the Ops Group Develop?....38
How Was the Ops Group Structured?....40
Challenges....42
The Impasse....43
What is the EWA?....45
Designing the EWA....47
EWA Games....47
The CALFED Record of Decision....48
How the EWA Works....49
How the EWA is Managed....51
CALFED Operations after the Record of Decision....51

CHAPTER SIX
Discussion 55
Successful Processes 55
Successful Outcomes 58
Challenges and Uncertainty 62
Broader CALFED Goals 64
CHAPTER SEVEN
Conclusions 67
BIBLIOGRAPHY 69
APPENDIX A: List of Acronyms and Abbreviations 73

List of Tables

Table 2.1: Process Criteria and Outcome Criteria 18

Table 3.1: Interview Guide 20

Table 4.1: Calculating ESA Take Limits 32

Table 4.2: CALFED Agencies 35

Table 5.1: Regular Members of CALFED Ops & Subgroups 38

Table 5.2: Important CALFED Operations Subgroups, Late 1990s 41

Table 5.3: The Three Tiers of Environmental Protection in CALFED 49

Table 5.4: EWA Tools 50

Table 5.5: Important CALFED Operations Subgroups, After the 2000 Record of Decision 52

List of Figures

Figure 4.1: Water Supply for Human Uses in 1995 24

Figure 4.2: Major Central Valley Project and State Water Project Facilities 25

Figure 4.3: State Water Project Service Area 26

Figure 4.4: State Water Project Service Area 27

Figure 4.5: The Delta Watershed 28

Figure 4.6: The Sacramento-San Joaquin Delta 28

Figure 5.1: Decision-Making Structure for the CALFED Ops Group, Mid-1990s 42

Figure 5.2: The Basic Idea: Before and After 46

Figure 5.3: Decision-Making Structure for the CALFED Ops Group After the Record of Decision 53

Figure 5.4: Timeline of Important Events for the CALFED Ops Group 54

Acknowledgments

The research for this thesis was funded by the National Science Foundation (Project NSF 00-152).

I am indebted to Marcia McNally and to my committee members, Judy Innes, Randy Hester and Tim Duane, for providing valuable feedback and guidance. All four of them helped me to shape the story that is told in this thesis and pushed me to tell it better. Thank you to Judy for introducing me to this topic and for working with me over the last year and a half to figure out how to focus the research and frame the story. Thanks to Tim and Randy for taking the time to provide detailed and thoughtful feedback on short notice, and for pressing me to include broader context. Thanks to Marcia for being so organized and dependable, and providing just the right balance of nurturing encouragement and toughness.

I want to thank the people that I interviewed for sharing their time and their stories with me. I really enjoyed meeting them and learning about their work.

I also want to thank my parents for unwavering support and for proofreading many drafts, my EP buddies for encouragement and for making graduate school fun, and my husband Chris for love and support through the whole Master's program experience and for reading many drafts of this thesis with bias.

CHAPTER ONE

INTRODUCTION

The CALFED Operations Group and the Environmental Water Account have changed the way that water is managed in California. Through dialogue and collaborative decision making, the Operations Group and related CALFED subgroups have moved from a system based on prescriptive standards for protecting fish in the Sacramento-San Joaquin Delta to a system based on flexible, adaptive management. This thesis examines the collaborative processes used by members of the Operations Group and managers of the Environmental Water Account, and the outcomes that they achieved.

For decades, Californians have waged water wars that pitted environmental interests against agricultural and urban water users in battles over the scarce resource. The Sacramento-San Joaquin Delta, a complex system of wetlands and sloughs that drains 42 percent of the state's surface water, is at the heart of this conflict. The Central Valley Project (CVP) and State Water Project (SWP), the two large public works projects that pump water out of the Delta for use in Southern California, are at the center of the Delta's woes. The currents caused by the CVP and SWP pumps confuse fish, causing them to swim towards the pumps where they are killed. The large-scale export of water has also changed salinity levels in the Delta's water, causing water quality problems for both humans and wildlife.

After years of battles and heated negotiations over water quality standards, environmental protection, water rights and water storage, the CALFED Bay Delta Program, a complex partnership of state and federal agencies, was formed as an attempt to end the water wars and find solutions to water management in the Delta that balanced all of the competing needs and interests. The scope of CALFED is broad and includes many interrelated problems in addition to the impacts of the pumps in the Delta. Pesticides, fertilizers, and urban pollutants that run off into Delta waters have caused additional water quality problems, and in many cases, attempts to solve problems for one group of interests worsen problems for another. Urban and rural development, along with a myriad of small dams and diversion projects, has impacted habitat for aquatic wildlife in the tributaries to the Delta, adding to stresses that migratory species, such as salmon, face downstream in the Delta. Tectonic activity and the sheer age of some structures have caused concern over the stability of levees in the Delta. CALFED's work is to jointly address planning for

water supply reliability, ecosystem restoration, levee stability, and water quality.

This thesis focuses on the CALFED Operations Group (Ops Group) and its related subgroups, which together deal with issues related to operation of the Central Valley Project and State Water Project facilities. The story of the Ops Group is remarkable for the degree to which its members have changed the way they do their work. Threatened or endangered Delta fish species have traditionally been protected with prescriptive standards that set fixed limits for the number of fish that could be killed by the project pumps. The standards were set by agencies that protect fish and wildlife, without much understanding or consideration of the water supply system. The water supply facilities, in turn, were operated without much consideration of environmental impacts. Although both fish protection and the water supply were managed by government agencies, sometimes within the same federal department,[1] the agencies' mandates and priorities were often in opposition. The agencies also made decisions largely in isolation from one another and from outside stakeholders.

Through collaboration, the CALFED Operations Group has moved from the old system of isolated bureaucratic decision making and prescriptive standards for protecting fish to real-time management of the water system, where minor modifications to the system are made on a daily basis, based on real-time data about fish in the Delta. The agencies involved in CALFED Ops were able to overcome decades of mistrust, legal barriers, financial risks, and a high degree of scientific uncertainty to develop new tools for operating an incredibly complex system. The tool at the center of this breakthrough was the Environmental Water Account (EWA), a program that lets the agencies reduce pumping when there is a danger to fish without imposing any risk to the water supply of the CVP and SWP. The EWA was developed in response to an impasse in negotiations to balance environmental protection with water supply reliability. The agencies that manage fish and wildlife wanted to be sure they could protect endangered fish, which sometimes meant reducing water exports. The agencies that run the water projects wanted to be assured that their water supply was reliable, and that exports would not be unexpectedly cut due to endangered species actions. Through a long series of meetings and modeling exercises, representatives from the environmental interests and the water supply interests were able to design

[1] The US Fish and Wildlife Service, which protects endangered fish in the Delta, and the Bureau of Reclamation, which operates the Central Valley Project, are both part of the US Department of the Interior.

a program that attempts to meet the needs of both interest groups by introducing flexibility into the system.

The agreements and innovative new operational procedures that the Ops Group members formed are important. In addition, the processes that Ops Group members used to develop these agreements and procedures are also important—perhaps even more important in the long term. Through collaboration, dialogue and consensus building, agency staff and stakeholders with a tradition of adversarial relationships were able to build working relationships and shared understandings of the complex Delta water system. Participants in the Ops Group may not always agree, but the social capital built by this process has enabled the participants to creatively deal with challenges that previously would have resulted in an impasse or a lawsuit.

Much of the "old" bureaucratic system is still in place and still plays an important role in managing California water. So, too, do the courts, national and state politics, rational scientific inquiry, and interest-based advocacy. However, collaboration has had a significant impact on the environment for California water policy making, and has fundamentally changed many aspects of the way that agencies and stakeholders[2] do their work. This thesis will trace the history of the Ops Group and the Environmental Water Account, examine the processes used by participants in these groups, and the outcomes that these groups have achieved.

[2] In the context of CALFED, the term "stakeholder" refers to non-governmental stakeholders.

CHAPTER TWO

COLLABORATION IN POLICY MAKING

Collaboration and dialogue in planning and policy making are emerging as important tools for resolving conflicts and managing complex, changing systems (Connick and Innes 2001; Connick 2003). These processes are an important addition to the decision-making and conflict resolution processes that have dominated natural resources planning and management until recent history.

Modern American government institutions for managing natural resources were largely developed in the early 20th century, when planning was dominated by an instrumentally rational approach relating means to ends in logical and systematic ways (Healey 1997). This modernist approach to planning championed objectivity and the scientific method in decision making. Professional managers with specific expertise were responsible for managing and planning for natural resources, and decisions about resource management were to be made objectively based on scientific fact. Natural resources management was also dominated by a utilitarian view of natural resources that emphasized control and use (Connick 2003) rather than ecological or intrinsic value.

In the 1980s and 1990s, theorists began to question the ability of the rational planning process to solve problems in complex, adaptive systems, as well as the ability of instrumentally rational planning to deal with politics and social values (Healey 1997). Even the most conscientious manager makes decisions that are influenced by his or her own assumptions and value systems (Ozawa 1991). In addition, it is virtually impossible for isolated managers to consider the entire spectrum of issues and consequences related to their actions (Connick and Innes 2001). Scholars began to examine how cultural values and traditions influenced scientific inquiry and policy. Healey explained,

> "The critique of the hegemony of modernity also fosters a move beyond the preoccupation with utilities and material things, to challenge the narrowness of scientism, by which is meant the faith in the material objectivity of scientific inquiry … we now see science itself as infused with assumptions about value, as both the potential provider of material benefits and as a threat to our welfare (Healey 1997:41)."

In the last two decades, scholars have developed new ways of thinking about planning and policy making that recognize the limitations

of the instrumentally rational approach. Habermas's theory of communicative rationality provides particular insight into the value of collaboration in planning and policy making. Communicative rationality is an idealized form of discourse in which people can achieve shared understandings that encompass more than what their own institutions or norms would provide them on their own. Through dialogue, individuals learn from one another and build understandings together. The process of internalizing each other's experiences and attitudes transforms both the actors and their relationships to one another. Habermas identified a set of four ideal speech conditions that were necessary for communicative rationality in dialogue. One condition is comprehensibility, which means that all of the actors understand the statements that are made. The second condition is that all statements be supported by logic or evidence, which helps all actors understand the statements. The third condition is that each actor has the qualifications or access to knowledge necessary to legitimate his or her claims. Finally, each actor must be sincere and act in good faith (Innes and Booher 1999; Connick 2003). Habermas's concepts of ideal speech conditions and communicative rationality in dialogue have provided a useful lens through which theorists can study the collaborative processes that have begun to emerge in American policy making.

The Growth of Collaboration in Policy Making

Increasing numbers of scholars and planning practitioners are looking to collaboration as a tool for developing policy and management processes that function better than traditional practices (Connick 2003), particularly for solving interorganizational problems (Gray 1989). Collaboration is growing in popularity in many sectors of society (Gray 1989). Gray explained, "Collaboration is a process in which those parties with a stake in the problem actively seek a mutually determined solution. They join forces, pool information, knock heads, construct alternative solutions, and forge an agreement." Collaborative processes are increasingly being used to deal with planning for natural resources management or to resolve conflicts over environmental problems. Connick (2003) wrote,

> "A wide range of collaborative processes for shaping environmental policy through stakeholder participation is practiced in the United States. These processes span from relatively small, locally-based group processes to large processes involving multiple stakeholders, addressing issues over a large geographic scale."

Although efforts to use collaboration for environmental planning have increased, collaboration is not a panacea for environmental problems. Collaboration is more likely to be successful when certain conditions are met. Susskind (1987) pointed out that consensus building, one form of collaboration, is particularly useful in distributional disputes, as opposed to constitutional disputes. He described constitutional disputes as occurring when the legality of something is question. Distributional disputes, in contrast, focus on the allocation of something, the setting of standards, the siting of facilities, etc.

Gray pointed out that interdependence among the stakeholders is another important ingredient for collaborative efforts to succeed (Gray 1989). Stakeholders must recognize that their interests are dependent on one another to have the motivation to collaborate. Equitable power relationships among participants are also important for successful efforts at collaboration (Fisher and Ury 1981; Duane 1999). In contentious disputes, each participant must also see the possibilities of a resolution through collaboration as being more attractive than his or her BATNA, or "best alternative to a negotiated agreement" (Susskind and Cruikshank 1987).

Some scholars have criticized collaboration in environmental policy-making. They take issue with the focus on resolving disputes in collaborative processes and suggest that adversity is important in some situations. They feel that "when important issues are at hand, the best thing to do is fight for what is right" (Connick 2003). However, collaboration does not necessarily mean that conflict is eliminated; participants in a collaborative process can maintain opposing viewpoints, while collaboration can sometimes help find ways to work around an impasse created by conflict (Susskind and Cruikshank 1987).

Other critics have contended that weaker parties in a collaborative process may feel coerced into going along with an agreement that they would not have otherwise supported. There is a danger that people will feel they should "go with the flow," and that the desire to maintain relationships built through collaboration can inhibit participants' abilities to defend their interests (Cestero 1999). Fisher and Ury (1981) pointed out the importance of balance in power relationships to prevent this from happening, and Susskind and Cruikshank (1987) stressed the importance of mediation in particularly contentious disputes.

In addition, some critics have argued that collaborative processes sometimes take a lot of effort to produce an outcome that would have happened anyway through traditional processes (Connick and Innes 2001). Supporters of collaborative processes counter that agreements reached

through collaboration are likely to be more resilient because they have the support of many stakeholders and are not seen as being imposed from a separate or higher authority (Susskind and Cruikshank 1987). Other critics have contended that the traditional system of decision-making for resources involving the legislature, bureaucracies and the courts has evolved with checks and balances over a long period of time, and that there are not enough safeguards to prevent collaborative processes from going awry. Indeed, advocacy, traditional land management processes, and the courts continue to play important roles in resolving environmental disputes (Cestero 1999). Susskind (1987) suggested that collaboration (in the form of consensus-building) must be seen as a supplement to, rather than a replacement for, traditional decision making.

Potential Benefits of Collaboration

Collaboration can be seen as another tool that can, in the right circumstances, provide benefits that other methods of planning or dispute resolution cannot (Susskind, van der Wansem et al. 2000). Collaborative processes can build working relationships among stakeholders with conflicting interests. These relationships, or social capital, have value in helping participants to find creative solutions to difficult problems. Putnam (2000:19) described social capital:

> "The core idea of social capital theory is that social networks have value. Just as a screwdriver (physical capital) or a college education (human capital) can increase productivity (both individual and collective), so, too, social contacts affect the productivity of individuals and groups. Whereas physical capital refers to physical objects and human capital refers to properties of individuals, social capital refers to connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them."

Putnam further distinguishes among "bonding" and "bridging" social capital. Bonding social capital happens within a group of people and tends to exclude people from outside of the group. Bridging social capital is inclusive; it brings together people from different groups or interests (Putnam 2000). Collaborative processes have the potential to build bridging social capital because they bring together traditionally opposing interests to attempt to solve problems collectively. Through dialogue, participants in collaborative processes gain an understanding of each other's needs and interests (Connick and Innes 2001).

Innes and Booher (2002) identified network power as another potential benefit of collaboration:

> "Network power is a shared ability of linked agents to alter their environment in ways advantageous to these agents individually and collectively… Network power emerges as diverse participants in a network focus on a common task and develop shared meanings and common heuristics that guide their action (Booher and Innes 2002)."

When the right combination of a diversity of stakeholders, interdependence of interests, and authentic (i.e., accurate and trustworthy) dialogue is in place, participants in collaborative processes can develop and exercise power through their network of relationships in ways that would not be available to them as individual interests (Booher and Innes 2002).

Finally, collaboration has the ability to break through an impasse where other methods of decision-making or dispute resolution have failed (Susskind and Cruikshank 1987).

Evaluating Collaborative Processes

With collaboration gaining popularity as a method for resolving disputes and managing natural resources, there is a need to evaluate the outcomes of these processes (Connick and Innes 2001). Traditional methods of evaluation that focus on formal agreements miss other important outcomes like social capital and network power.

Building on the concepts of communicative rationality developed by Habermas and their own research on collaborative planning and policy making, Innes and Booher (1999) developed a framework for evaluating collaborative planning efforts that involve consensus building. They identified both process and outcome criteria for evaluation:

TABLE 2.1

Process Criteria

- The process includes representatives of all relevant interests.
- It is driven by a purpose and task that are real, practical and shared.
- It is self-organizing, allowing participants to decide on ground rules, objectives, tasks, working groups and discussion topics.
- It engages participants, keeping them at the table, interested, and learning.
- It encourages challenges to assumptions and the status quo and fosters creative thinking.
- It incorporates many kinds of high quality information and ensures agreement on its meaning.
- It seeks consensus only after discussions have fully explored issues and interests and significant effort has been made to find creative responses to differences.

Outcome Criteria

- The process produces a high-quality agreement.
- It ends stalemates.
- It is cost-effective compared to other planning methods.
- It produces innovative, creative ideas.
- It results in learning and change that go beyond the immediate group.
- It creates social and political capital.
- It sets in motion a cascade of changes in attitudes, behaviors and actions, and new practices or institutions.
- It results in institutions and practices that are more flexible and networked, allowing the community to more readily adapt to change and conflict.

(Innes and Booher 1999)

These criteria for evaluating collaborative processes provide an important supplement to traditional methods of evaluation that focus on formal agreements.

CHAPTER THREE
METHODS

California water management offers a case study for empirically examining how collaborative processes work in a real, complex, changing environment. The government agencies that manage California's water system and protect California's wildlife were developed under the model of instrumentally rational planning. The agencies operated for decades making decisions in isolation from each other, under narrowly focused and often conflicting mandates. Legislation in the 1960s and 1970s led to changes in the balance of power that gave the environmentalists ammunition for the water wars. These changes resulted in a policy gridlock that hurt all parties involved; none of the parties were strong enough to advance their own interests, but they were all strong enough to block others'. In the last two decades, the environment for policy making related to the California water system has changed dramatically, moving from a traditional bureaucratic system of resource management to one that increasingly uses collaboration as a tool for resolving conflicts between opposing interests. These changes culminated in the creation of the CALFED Bay Delta Program. Recent research has documented that the collaborative processes in the CALFED program produced a number of innovative approaches to water management, environmental restoration, and interagency and stakeholder interaction (Connick 2003).

This thesis examines one programmatic area—Operations—within the CALFED program in detail, and evaluates the processes used by the actors and the outcomes that they achieved. The story of the CALFED Operations Group involves many decision-making processes. Conventional methods of management and dispute resolution have played important roles. The traditional system of large bureaucratic agencies is still well-intact and central to the way decisions are made. The courts and regulation play an important role, and rational scientific inquiry has been very important. However, the introduction of collaborative processes into the mix of management tools was key to breaking an impasse in negotiations over water management, and has significantly changed the environment for policy-making in California water. This thesis describes and evaluates the collaborative processes used within the Operations Group and the Environmental Water Account.

I conducted the research for this thesis between December 2001 and March 2003. I interviewed a representative group of close to 30 agency staff and stakeholders who were involved in the CALFED

Operations Group and the Environmental Water Account. The basic framework that I used for interview questions is described in Table 3.1.

I also gathered information through observing public meetings and taking detailed notes, and through reviewing meeting minutes, newspaper articles and historical documents related to the CALFED program.

I used notes from interviews and meetings and CALFED documents to construct a narrative describing the development of the Ops Group and the Environmental Water Account. I then used the evaluation framework developed by Innes and Booher (1999) to organize a discussion of the processes used by the Ops Group and the EWA.

TABLE 3.1

Interview Guide

I explained that my research was looking at collaborative processes within the Ops Group and the Environmental Water Account. I asked participants:

- about their backgrounds, their roles within their agencies or organizations, and their involvement in CALFED.
- to describe the evolution of the programs with which they had been involved.
- what they saw as the most successful aspects of CALFED in general and the workgroups that they were involved with in particular. Did the workgroups have any particular accomplishments that stood out? Was there anything particularly notable about the way those workgroups did business? Was there anything that they personally got out of the effort? Was there anything that was particularly useful to their agencies or organizations?
- about the main challenges in the CALFED program, how CALFED has dealt with them, and how successful the efforts to overcome challenges were.
- whether and how CALFED changed the way water is managed in California.
- to identify turning points or important events in CALFED.
- to reflect on what they have learned personally.

CHAPTER FOUR

BACKGROUND AND HISTORICAL CONTEXT: THE CALIFORNIA WATER SYSTEM AND THE CALFED BAY DELTA PROGRAM

California Water History

California owes much of its economic success and growth to the massive public works projects that have brought water over long distances to its cities, industry and agriculture. The state's Central Valley, which is heavily dependent on water imported for irrigation, is one of the most productive agricultural regions in the world. California has the largest population of any state in the US and boasts several thriving metropolitan areas. These urban centers are also heavily dependent on water imported from other regions. The scale and scope of the water development projects that allowed for this growth are impressive. This massively engineered system has also caused widespread environmental damage, altering or destroying habitat for many species.

Water Development: History and Context

An understanding of California's climate, hydrology, and geography is key to understanding the history of California's water supply development. From a human water supply perspective, California's water is generally in the wrong place at the wrong time.

California has a Mediterranean climate, with warm dry summers and mild winters. In much of the state, rainfall happens only during the winter months, with no precipitation occurring at all for several months during the summer. California's river systems generally have flashy hydrology; most rivers have long periods of low flow for much of the year, and then experience large or even catastrophic floods with rain or snowmelt in the spring. California's weather patterns also vary significantly from year to year, and the state experiences cycles of drought that last for several years. This variability in hydrology and weather patterns causes uncertainty in the water supply for the state.

California's water is also unevenly distributed throughout the state. Almost 75 percent of the water that is accessible for human use is naturally found north of Sacramento, while 80 percent of the demand for water occurs south of Sacramento, in the southern two-thirds of the state. To deal with its variable climate and the mismatch between the geographic location of water and the location of human need, California has a

complex system for storing water and transporting water from one region to another.

Modern development of California's water system—engineering projects to alter the natural distribution of water for human use—began as early as the Gold Rush of the mid-1800s. Fortune seekers who came to the state in search of gold built more than four thousand miles of ditches in the streams and rivers of the Sierra Nevada to move water for use in hydraulic mining (Brickson, Hartshorn et al. 2000). Not long after the Gold Rush, unsuccessful '49ers settled in the fertile soils of the Sacramento-San Joaquin Delta and the Central Valley to try their luck at farming. Much of the Delta was then drained and leveed for agricultural use. In the arid Central Valley, farmers pumped groundwater to irrigate their crops. The cost of groundwater pumping and the uncertainty of surface water supplies led farmers to organize many small private water projects. Public irrigation districts began to be formed in the late 1800s.

By the early 20th century, California's cities also realized that they could not depend on local water supplies if they were going to grow. In 1905, Los Angeles filed for rights to divert water from the Owens River basin in the Eastern Sierra Nevada, and in 1913, the Los Angeles Aqueduct was built to carry the Owens River water 250 miles to the city. Also in 1913, Congress passed the Raker Act, authorizing the construction of the Hetch Hetchy project to supply San Francisco with water from the Yosemite area. In 1928, Los Angeles looked even further for its water supply; the Metropolitan Water District of Southern California was formed to build an aqueduct to deliver water from the Colorado River. A bond for the Colorado Aqueduct was passed in 1931, and it was completed 10 years later (Brickson, Hartshorn et al. 2000).

Moving Water North to South

The projects of the early 20th century were not small in scale or ambition, but California's future growth would need a more comprehensive approach to moving and storing water. In the mid-20th century, two major water projects were built to store water and convey it from northern California to southern California.

The Central Valley Project

The Central Valley Project Act, which authorized construction of a large public water project, was passed by the California legislature in 1933. Financing of the Central Valley Project was slowed by California's economic struggles during the Great Depression. In 1935, with passage of the Rivers and Harbors Act, the federal government took responsibility for

the project and the federal Bureau of Reclamation took over construction of the project in 1937.

The CVP is massive in scale, with 20 dams and reservoirs and over 500 miles of canals that bring water from northern California and the mountains to the southern part of the state (see Figures 4.2 and 4.3). The Shasta Dam on the upper Sacramento River was completed in 1945. Shasta Lake, formed by the dam, is the largest reservoir in the state, and can hold 4,493,000 acre-feet[3] of water—enough to cover the entire state of Connecticut to a depth of 1.5 feet (1998). Most of the remainder of the project was completed by 1951. Today the CVP delivers about 7 million acre-feet of water in a normal year, 95 percent of it going to irrigate over 3 million acres of agricultural land. The project also delivers water to about two million urban customers in southern California.

The State Water Project

California's population doubled between 1940 and 1960, and more water was needed to support the growing population—particularly in the Los Angeles area. The California Department of Water Resources began to implement water supply planning and published the first California Water Plan in 1957. The Plan called for construction of a dam on the Feather River that would both store water and provide protection against flooding. The Feather River project quickly evolved into a more comprehensive plan to construct the State Water Project, a water storage and delivery system rivaling the Central Valley Project in scale and complexity (see Figures 4.2 and 4.4). The State Water Resources Development Act, also known as the Burns-Porter Act, was ratified in 1960. The Act authorized a bond issue to pay for development of the State Water Project. Today the SWP includes 22 dams and reservoirs and the California Aqueduct, which carries water over 600 miles from the Sacramento-San Joaquin Delta through the Central Valley to Los Angeles. Seventy percent of this water is dedicated to urban uses, including residential, municipal and industrial use. The remaining 30 percent goes to agricultural use in the Central Valley. The project delivers about 3 million acre-feet of water in a normal (i.e., average) year, although its contracts call for 4.2 million acre-feet. The project was never completed to its original design, and controversy still rages over the completion of additional storage facilities (Brickson, Hartshorn et al. 2000).

---

[3] An acre-foot of water is the amount of water it would take to cover an acre of land with water one foot deep, or 325,851 gallons of water. It is the common unit of measurement for water supply.

Today, the Central Valley Project and the State Water Project supply a substantial portion of California's water. The 1998 California Water Plan, published by the Department of Water Resources, estimates that the projects together supply about 22 percent of the state's total water for human uses in an average year (See Figure 4.1).

FIGURE 4.1

Water Supply for Human Uses in 1995*

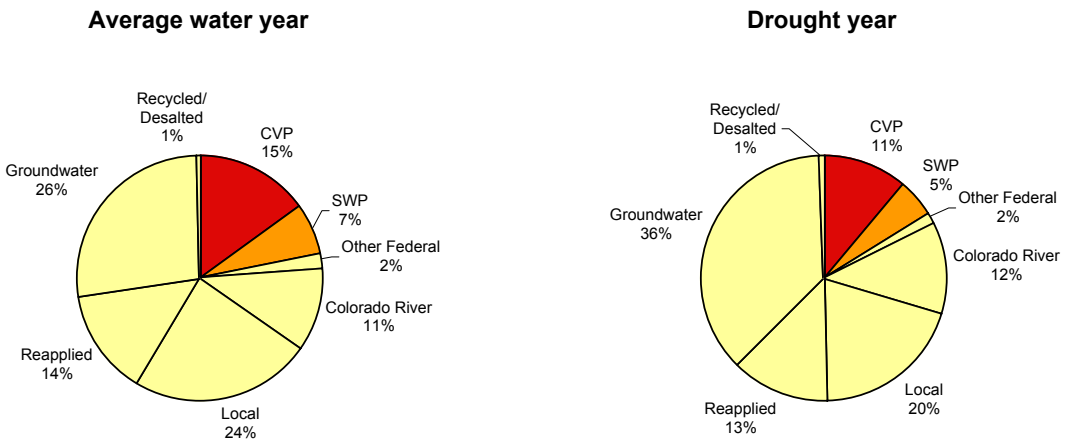


*Figure 4.1 does not include dedicated environmental water or uncaptured surface water.

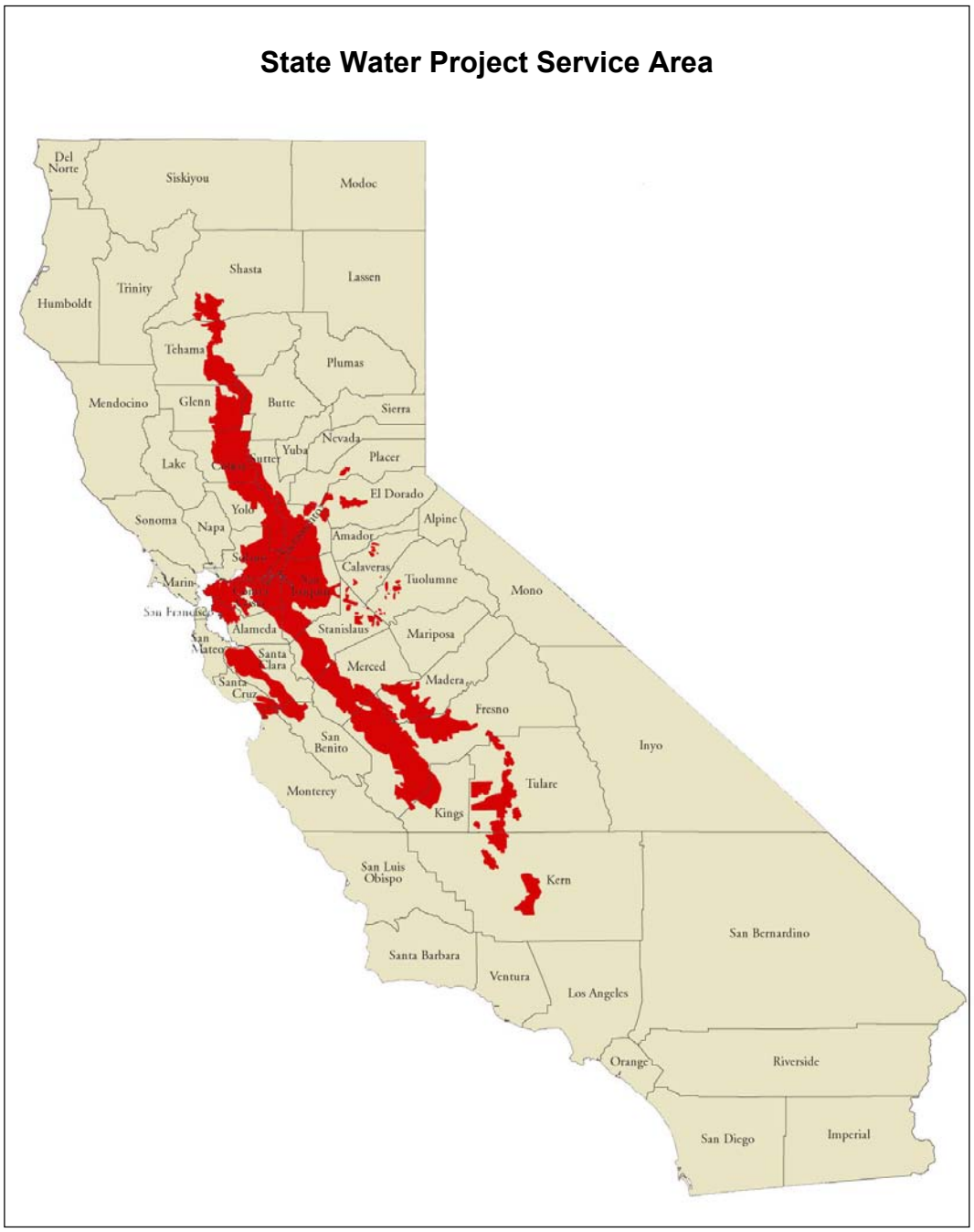
Source: Department of Water Resources 1998 California Water Plan Update

FIGURE 4.2

Major Central Valley Project and State Water Project Facilities

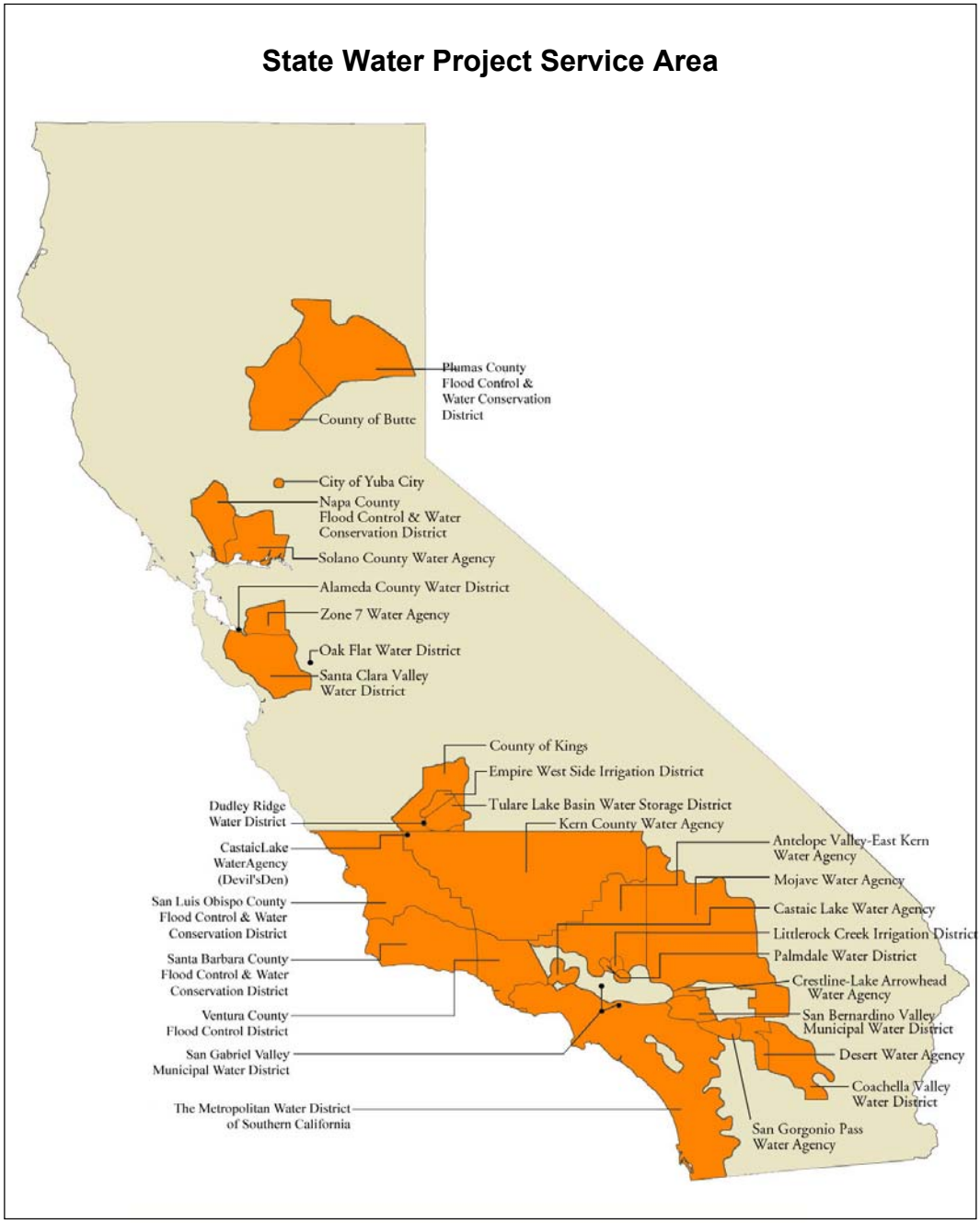
Source: Department of Water Resources

FIGURE 4.3



Source: Department of Water Resources

FIGURE 4.4



Source: Department of Water Resources

FIGURE 4.6

The Sacramento-San Joaquin Delta

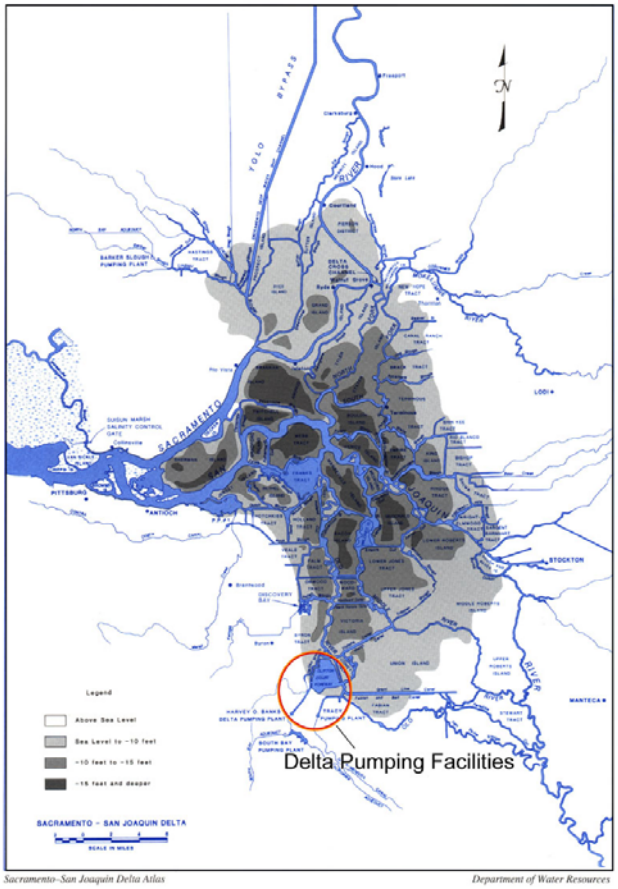
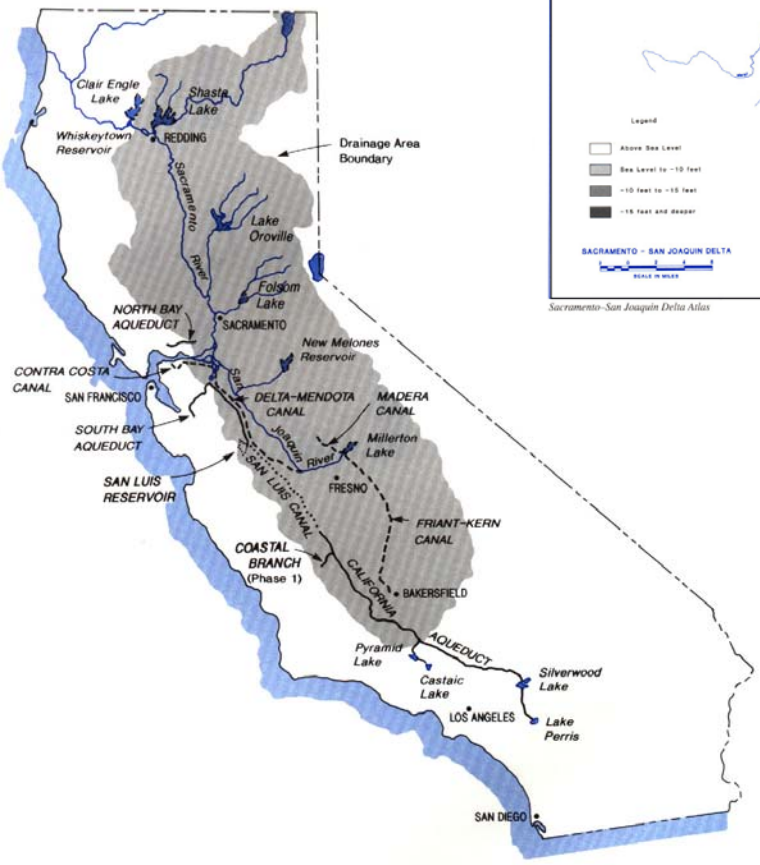


FIGURE 4.5

The Delta Watershed



Source: Department of Water Resources

The Delta

The San Francisco Bay Delta—738,000 acres of canals, sloughs and lowlands—is the heart of California's water system (see Figures 4.5 and 4.6). It conveys, on average, 42% of the state's annual run-off each year. Waters from the Sacramento and San Joaquin river systems drain into the Delta before flowing into Suisun Bay, San Pablo Bay, and finally San Francisco Bay. Both the Central Valley Project and the State Water Project use canals and natural waterways to move water to large pumping facilities in the southern Delta. The pumped water is exported to water users in the southern part of the state. Two-thirds of the people living in California get a portion of their drinking water from the Delta.

The Delta is also the West Coast's largest estuary and is home to more than 130 species of fish. The mixing of salt water from the San Francisco Bay and fresh water from the river systems that drain into the Delta form rich habitat supporting an incredible diversity of life. The Delta is also a waterfowl migration and wintering area of international importance; half of the birds that migrate along the Pacific Coast use the Delta's wetlands for wintering (San Francisco Estuary Project 1995).

The Cost of Progress: The Water Wars

The Central Valley Project and the State Water Project enabled Southern California to grow and allowed for the development of the Central Valley into one of the most productive agricultural regions in the world. However, the environmental costs of this growth have been significant. The export of water from the Delta is only part of the story of environmental damage in the region, but it is a significant part. The large-scale export of water has changed the level of salinity in the Delta, disturbing sensitive habitats and causing water quality problems for both wildlife and human water users. The changes to Delta hydrology have also caused harm to many of the species that live in the Delta or pass through it during their migration. The pumping facilities of the State Water Project and Central Valley Project in the south Delta create strong currents that confuse fish. Instead of swimming towards the ocean, many fish swim towards the pumps where they are entrained, or killed, by the pumps. The facilities also include large holding areas for water near the pumps that are favored habitat for non-native lake fish that eat the confused river fish. The CVP and SWP were never without controversy, but the growing environmental movement in the 1970s began to seriously question if the impacts of water development outweighed the benefits.

For years, water development in the state had moved forward without much regard to environmental or social costs. In the last few

decades, however, California has seen a major shift in the way that these projects are operated. Environmental regulation—in particular, the Endangered Species Act and the Clean Water Act—has played a significant role in this shift. Actions taken to protect the environment have forced decision makers to make significant modifications to the way water is managed in the state, and have increased uncertainty in the state's water supply.

The Endangered Species Act

Environmental regulation has had an impact on many areas of California water supply, but it took the listing of two Delta fish species under the Endangered Species Act (ESA) to really change the balance of power in the management of water in the Delta.

The federal Endangered Species Act, signed into law in 1973, is a powerful tool for environmental regulation. The law provides protection for species that are listed as threatened or endangered. Under the law, it is illegal for anyone (an individual or group) to "take" a listed species. The statute reads that 'take' means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (USFWS 2001)," but the taking of an individual has also been interpreted to mean significantly modifying its habitat (Babbitt v. Sweet Home Communities 1995). There are provisions that allow for some taking of a listed species, but the administrative burden is significant. A biological opinion must be issued by the agency responsible for listing the species (either the US Fish and Wildlife Service or the National Marine Fisheries Service). One part of the biological opinion sets an "incidental take limit" for the species, which states how many individual members of the species can be taken without causing further harm to the species as a whole. Upon completion of a Habitat Conservation Plan that provides for mitigation, an individual or group can get an Incidental Take Permit, allowing them to alter habitat or take a specified number of species (Albrecht and Christman 1999).

In 1989, Sacramento Winter Run Chinook Salmon were listed as a threatened species. These fish migrate through the Delta twice in their life cycles. Adults swim upstream from the ocean to spawning grounds in small tributary streams in the mountains. After hatching, juvenile fish swim downstream to the ocean. In the mid-twentieth century, around 100,000 adult fish made the journey back to their spawning grounds every year. In 1994, the population was counted to be 189 fish (Natural Resources Defense Council 2001). The impact of the water projects on the species was of concern to environmental and fishermen's groups for years,

but they couldn't do much about it. When Winter Run Salmon were listed under the Endangered Species Act, a whole series of actions were set into motion to protect the fish. The most significant change for the water projects was that it became illegal to take fish at the pumps. An incidental take permit was established for the species that allowed for some entrainment (see Table 4.1), but the impact of the fish's protected status on the reliability of CVP and SWP water supply was significant.

In 1992, another Delta fish called the Delta Smelt was listed as endangered. This little fish spends its entire life in the Delta. Like Winter Run Salmon, the Delta Smelt also has problems with entrainment at the pumps and predation in the open water areas of the project facilities. The listing of this fish exacerbated the conflict between environmental protection and water supply reliability at the pumps, particularly because Delta Smelt are found near the pumps at different times of the year than Winter Run.

A Change in the Balance of Power. With the listing of these two fish species, the US Fish and Wildlife Service, the National Marine Fisheries Service, the California Department of Fish and Game, and environmental groups advocating for wildlife protection in the Delta suddenly had some influence on the operation of the CVP and SWP facilities; the fisheries agencies now had a legal basis for requesting that pumping be reduced or stopped when endangered fish were near the pumps. This new legal muscle was acquired thanks to the power of the Endangered Species Act and the incidental take permits for endangered fish in the Delta.

The permit for Winter Run Salmon specified the number of fish that can be taken at the pumps on an annual basis. The permit for Delta Smelt specified take limits on a monthly basis. It is impossible to be certain exactly when the fish will be in the vicinity of the pumps, so operators of the pumping facilities could not plan in advance when to reduce exports. When fish were near the pumps, biologists estimated how many fish were being killed based on how many fish were salvaged in facilities that were set up to capture the confused fish and transport them back to safety. When the number approached the incidental take limit, the agencies that protect the fish and the agencies that run the projects were required to "consult." This consultation did not always result in a reduction or cessation of pumping, but it happened often enough in the mid-1990s to cause serious concerns about the reliability of water supply from the CVP and SWP.

TABLE 4.1.

Calculating ESA Take Limits

Take limits for Winter Run Salmon and Delta Smelt are based on historical levels of project impacts on the species. For example, before the fish were listed, the projects generally killed 1% to 2% of juvenile Winter Run migrating downstream (Swanson 2001). The ESA take limit for Winter Run therefore limits the projects to 2% of the estimated population of juveniles.

The number of juveniles is predicted from counts of adults that returned to spawn the previous year combined with the predicted survival rate of the eggs based on environmental conditions such as water temperature.

The number of fish taken at the pumps is statistically estimated based on the number of fish that are "salvaged," just upstream of the pumps. These fish are trucked downstream of the pumps and released.

The impact of environmental regulation went beyond the difficulties of planning based on an uncertain water supply. Agricultural water users in the Central Valley who had junior water rights had difficulties getting loans because they could not be certain of water to irrigate later in the season. Urban customers were affected, too; at one point, the concern over uncertainty was so significant that Moody's threatened to downgrade the City of Los Angeles's bond rating.

Water Quality Standards

In addition to the controversy between endangered species and the pumps in the Delta, there was also a good deal of conflict over Delta water quality going back well into the 1980s. Pesticides, fertilizers and urban runoff had had a negative impact on Delta waters. There were also serious concerns over the impact of water exports on the salinity of Delta waters. The Delta has a natural salinity gradient that is influenced by many factors, including climatic conditions. Many species are dependent on the rich variety of habitats created by the salinity gradient. The large-scale export of fresh water caused the salinity to increase further inland than it naturally would, affecting both wildlife and people who relied on the Delta for drinking water. The state tried to come up with water quality standards that would address salinity in the 1980s and early 1990s. However, new standards dealing with salinity were too controversial because they

included the regulation of the flow of fresh water into the Delta, which had an impact on water rights.

The Clean Water Act gave the US Environmental Protection Agency (EPA) the authority to regulate water quality, including the authority to approve state water quality requirements. In the early 1990s, the EPA asserted its authority over water quality in the Delta, refusing to approve water quality standards set forth by the State Water Resources Control Board that did not address freshwater flows. The EPA then proposed its own standards, causing controversy over states' rights because states generally hold authority over water rights (Connick 2003).

The conflicts over water quality, environmental protection, and water supply reliability led to a gridlock in the system. The water supply was not reliable, water quality was deteriorating, species were declining, and none of the interests' needs were being met.

A Collaborative Approach

In the late 1980s and early 1990s, the government agencies and stakeholders with interests in Delta issues began to experiment with collaborative approaches to solving their conflicts (Connick 2003). The first large-scale effort at collaboration in California water issues began in 1987, when the San Francisco Estuary Project was formed as part of the National Estuary Program, which supported collaborative planning in US estuaries. For the first time, the five-year program brought together agencies that had traditionally been adversaries to work on finding solutions to the Delta's problems. The Estuary Project did not accomplish much in the way of management solutions, but participants did come to agreement on a definition of water quality and built a foundation of relationships among agency staff and stakeholders (Connick and Innes 2001).

Collaboration took another step forward in late 1992, when the conflicts over water quality standards in the Delta led then-governor Pete Wilson to create the State Water Policy Council, a group of leaders of state agencies that had responsibilities in the Delta. At the same time, he created the Bay Delta Oversight Council (BDOC), a group of stakeholders that advised the Water Policy Council. In 1993, the federal agencies with Delta responsibilities took their own step towards integrating their work and formed the Federal Ecosystem Directorate, known as Club FED. The intention of Club FED was to provide a forum for the federal agencies to coordinate and speak with one voice with regard to Delta issues (Connick 2003).

A Truce in the Water Wars: The CALFED Bay Delta Program

In June 1994, the Governor's Water Policy Council and Club FED signed the groundbreaking Framework Agreement, a Memorandum of Understanding in which the state and federal agencies committed to jointly address water quality standards, CVP and SWP operations, and long-term solutions to the problems facing the Delta. In December 1994, just before the deadline after which the EPA had said it would impose water quality standards, the agencies signed the "Principles for Agreement on Bay-Delta Standards between the State of California and the Federal Government," which became known as the Bay-Delta Accord. The accord laid the foundation for CALFED (the California Water Policy Council and Federal Ecosystem Directorate), a program involving over 20 agencies that supporters touted as an end to California's water wars (see Table 4.2). The program's mission was "to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta."

CALFED was officially a partnership of government agencies, but the program also involved non-governmental stakeholders through the 35-member Bay Delta Advisory Council, which included nongovernmental interests, Indian tribes, and local water agencies. Stakeholders also participated in a number of CALFED's subgroups.

TABLE 4.2

CALFED AGENCIES	
FEDERAL AGENCIES	**STATE AGENCIES**
Department of Interior	**Resources Agency**
Bureau of Reclamation	Department of Water Resources
Fish and Wildlife Service	The Reclamation Board
Geological Survey	Department of Fish and Game
Bureau of Land Management	Delta Protection Commission
	Department of Conservation*
Department of Agriculture*	San Francisco Bay Conservation and Development Commission*
Forest Service	
Natural Resources Conservation Service	
	California Environmental Protection Agency
Environmental Protection Agency	State Water Resources Control Board*
Army Corps of Engineers	
	Department of Health Services*
Department of Commerce*	
National Marine Fisheries Service	**Department of Food and Agriculture**
Western Area Power Administration	

*These agencies were not official CALFED members at the start of the program, although the State Water Resources Control Board was regularly involved. As the program grew in scope, more agencies were added as members. Today, all the agencies in this chart are listed as members.

(CALFED Bay-Delta Program 2001; Connick 2003)

CHAPTER FIVE

THE CALFED OPERATIONS GROUP AND THE ENVIRONMENTAL WATER ACCOUNT

The conflict between endangered fish and the pumping facilities of the State Water Project and the Central Valley Project is only one of the problems that CALFED was formed to solve, but it is a substantial one, and it is at the center of the work of the CALFED Operations Group

What is the Ops Group?

The CALFED Operations Group and its related subgroups are responsible for coordinating the operations of the State Water Project and Central Valley Project facilities with regulatory requirements for water quality, endangered species, and the Central Valley Project Improvement Act of 1992 (CVPIA). The main players in the Ops Group are the "project agencies," known as the PAs, and the "management agencies," known as the MAs. The project agencies run the water export projects, and the management agencies are charged with protecting fish and wildlife. Historically, the MAs and the PAs have had adversarial relationships. The goal of protecting wildlife—particularly endangered fish—was seen as being in direct conflict with the goal of providing water for human use, and the MAs and the PAs were on opposing sides in California's famous water wars that pitted environmentalists against urban and agricultural water users.

Besides the MAs and the PAs, a few other CALFED agencies, as well as some stakeholder groups, are also regularly involved in the Ops Group (see Table 5.1). When the group was first formed by the 1994 Framework Agreement, its meetings included only agency representatives. Soon after the Bay-Delta Accord was signed in 1994, however, meetings were opened up to allow public stakeholders to participate. The agencies ultimately retained all decision-making authority, but the Ops Group was supposed to give stakeholders an opportunity for input into discussion. As one staff person described the stakeholders' involvement in Ops, "The stakeholders kind of sit around and provide input and criticism or critique…but at the end of the day it's the agencies that need to make decisions. The Ops Group does not usurp any agency's responsibilities."

TABLE 5.1

Regular Members of CALFED Ops & Subgroups
The PAs • California Department of Water Resources: runs the State Water Project • US Bureau of Reclamation: runs the Central Valley Project
The MAs • US Fish and Wildlife Service: responsible for protecting Delta Smelt • National Marine Fisheries Service: responsible for protecting Winter Run Chinook Salmon • California Department of Fish and Game: responsible for protecting both fish
Other Government Agencies • US Environmental Protection Agency: authority from Clean Water Act • State Water Resources Control Board: issues water rights and implements Clean Water Act
Stakeholder Groups • The Bay Institute: environmental stakeholder • Environmental Defense: environmental stakeholder • Natural Heritage Institute: environmental stakeholder • Metropolitan Water District of Southern California: water user stakeholder

How Did the Ops Group Develop?

The foundation for the CALFED Operations Group was laid before CALFED was formed. In 1989, when Winter-Run Salmon were first listed as a threatened species, a group of operators from the Department of Water Resources and the Bureau of Reclamation began to meet with biologists from the agencies that protect fish and wildlife to discuss the impact of the projects' operations on fish. According to one staff person at DWR, "Because of the controversy over the listing, we felt we needed a forum where we could address it at the management level…no more biologists saying, 'Turn off the pumps!'" Inter-agency groups were also

developed to look at Delta Smelt protection and project operations. This was the power of the Endangered Species Act; prior to the conflicts over endangered species, operations decisions were made by DWR and the Bureau without any outside input.

Once the ESA gave the fish and wildlife agencies some influence over project operations, all of the agencies realized they had to work together. The changing legal landscape related to the Clean Water Act and state water quality standards also encouraged collaboration, and inter-agency groups formed in response to the new water quality standards as a way to manage the flexibility that was built into the standards. One agency scientist described the changing environment of California water management:

> "The Clean Water Act and the Endangered Species Act were big enough hammers that the old balance was disrupted, so the Accord, the Ops Group, the Plan, and CALFED all came out of that clash because the clash was not working for anyone and so we adopted a more collaborative approach—it's just an ongoing thing, and CALFED really helped, but CALFED came because we were already doing these negotiations around the X2[4] and the other issues that were disrupting water operations."

These pre-CALFED inter-agency groups began to provide forums for ongoing discussion about operations between the management agencies and project agencies. However, according to one agency manager, decisions were still made without much coordination between the agencies.

When the Framework Agreement establishing CALFED was signed in June of 1994, it established the CALFED Operations Coordination Group, or Ops Group as it came to be known. The inter-agency groups that had been meeting separately to work on issues related to project operations were brought together as one group through CALFED. The Bay Delta Accord of December 1994 and the State Water Resources Control Board water rights decision in 1995 solidified the Ops Group's responsibilities and procedural requirements; the CALFED Ops Group was responsible for coordinating changes in operations to protect fish and to take advantage of the flexibility that was built into the new water quality standards. A senior management agency staff person described the process:

---

[4] The X2 is a water quality standard that is based on a measurement of salinity at specific points in the Delta.

> "And what we did as a result of the Bay Delta Accord was that we took all of these groups that were meeting on operational functions and turned it into a monthly operations group meeting, so that the state and federal organizations could be working off the same information base on a monthly basis, making essentially very real-time operational decisions for water supply and environmental issues."

How Was the Ops Group Structured?

Since its formation, the Ops Group has had several subgroups to help it do its work (see Table 5.2). The structure and function of these groups have evolved throughout CALFED's history; new groups have been created as needed, and the focus of individual groups has changed as new problems or opportunities have popped up. The Ops Group itself has also changed over time. In the early days, the Ops Group agency members were high level managers with the power to make many decisions. One project operator described the Ops Group just after its formation in 1995: "At the time, it was envisioned as a high-level agency coordination group where you would have policy level/management level people that were plugged into it working together to come up with solutions." Today, for a variety of reasons that will be discussed later in this chapter, Ops Group members are a level or two lower in seniority than their earlier counterparts. However, the central focus of the Ops Group is the same as it was when the group was first formed: to coordinate project operations with environmental and water quality requirements.

The Ops Group was designed to increase efficiency and consistency in coordinating the operation of the project facilities with environmental and water quality requirements. Decisions were made at the lowest level possible. When decisions were too controversial for Ops Group members to make, they were elevated to the CALFED Policy Group, which consisted of top agency decision makers (See Figure 5.1).

Ops group meetings were held once a month and were run by a chair from within the group. They were not professionally facilitated. At meetings, reports from individual agencies or CALFED subcommittees were presented, and Ops group members discussed possible changes in the operation of the project facilities.

TABLE 5.2

Important CALFED Operations Subgroups, late 1990s

- The Data Assessment Team (DAT)

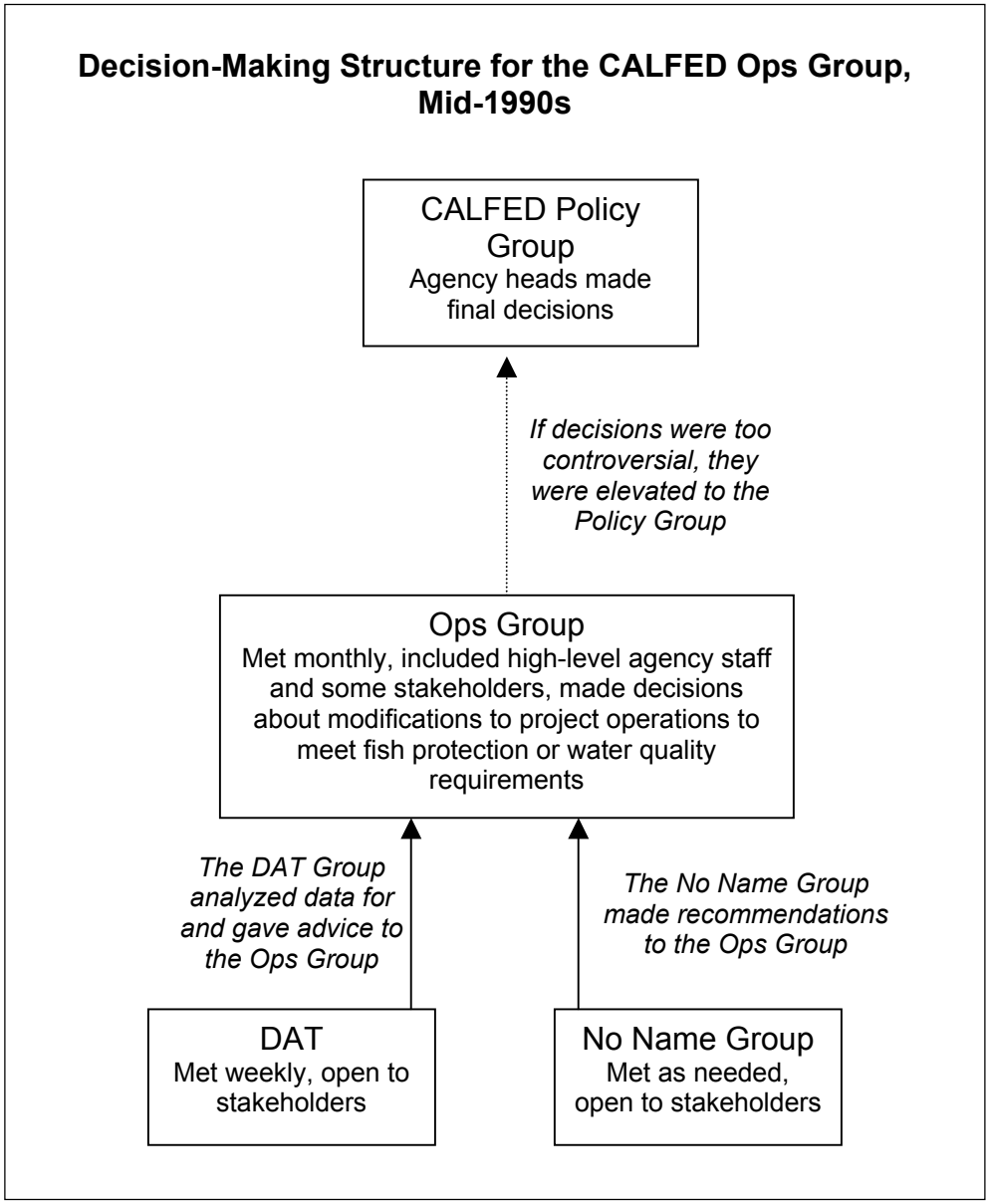
  The Data Assessment Team consisted of staff from the management agencies and project agencies as well as stakeholders involved in the Ops Group. It was formed not long after the Ops Group was formed in 1994. The group analyzed data about endangered fish in Delta and upstream tributaries, hydrology, and project operations. The group met via conference call on a weekly basis for most of the year (during the summer, when there were no endangered fish migrating near the project pumps, DAT did not always meet). When necessary, they consulted more frequently. Although DAT was open to the public and did involve stakeholders, its meetings were not advertised and those stakeholders who participated were regularly involved and knowledgeable about operations issues. After reviewing data, DAT made recommendations about modifying project operations.

- The No Name Group

  The No Name Group was created to provide a way of getting information out to all the stakeholders and also was used as a forum for getting input from stakeholders. In addition, stakeholders used it as a way of focusing discussion to provide input to the agencies. A project agency staff person provided an example:

  > "In December of 1999, the Delta Cross Channel gates were closed as part of a fish protection. We couldn't get the gates open and ran into water quality problems for Contra Costa … the discussion started to evolve about, 'Well, is there a more efficient way to operate the gates?' ... the agencies were interested, but we didn't really have the time to investigate. So the No Name Group, in conjunction with the Bay Delta Modeling forum, put together a workshop, and once the workshop was set up, we had no choice but to participate! So they garnered support from the agencies for modeling, and it really did open up the possibilities for how we might operate the Cross Channel gates in the future."

FIGURE 5.1



Challenges

In the three years after the Bay-Delta Accord was signed, the Ops Group made a great deal of progress in building relationships between agency staff and stakeholders and in coordinating project operations with environmental needs. However, there were institutional and regulatory barriers that prevented them from taking many actions to protect fish when those actions would reduce water deliveries. For example, in 1997, the MAs and the PAs agreed to cut exports to protect Winter Run Salmon that were near the pumps. Exports were reduced for several days, causing a

reduction in water deliveries to some downstate contractors. The contractors sued and won, causing the PAs to be more reluctant to cut exports.

Although the Ops Group is generally seen as a successful example of collaboration, some members expressed frustration at the way meetings were run. At times, individual group members were allowed to monopolize discussion. One agency staffer complained, "The biggest problem [with the Ops Group] was that it provided a platform for people to talk, and some folks just love to talk, especially in front of an audience, and there's a couple of them that just took the whole Ops meeting to expound their viewpoint."

By the late 1990s, the Ops Group evolved into less of a decision-making body and more of a showcase. Many people that I interviewed for this study attributed this to the fact that Ops Group meetings were open to the public. One staff person said that agencies simply don't want to air their dirty laundry in public. However, another person suggested that the lower seniority of Ops Group representatives was a reflection of increased efficiency, and attributed this to new programs and workgroups that were created as part of the overall Ops Group structure, as will be discussed later in this chapter.

The Ops Group, DAT and the No Name Group were all open to stakeholder participation, but not all of the relevant stakeholders participated regularly. Many stakeholders simply did not have the funds to send representatives to meetings in Sacramento on a regular basis. Others did not have the technical expertise to participate in the work of the subgroups; those stakeholders who did participate had staff with scientific or technical backgrounds. In addition, some of the stakeholders simply did not buy into the process. In particular, several Central Valley water contractors were skeptical of CALFED's work. Because of the structure of California's water rights system, some agricultural water users were hit harder than others by previous actions taken to protect the environment, and some of these water users took a hardline position against allocating any additional water for fish protection.

The Impasse

As part of their involvement in CALFED, the project agencies and water user stakeholders wanted assurances as to how much water they could count on without worrying about actions being taken under the Endangered Species Act that would reduce their water yield. Since the early 1990s when take limits were established for Winter Run Salmon and Delta Smelt, they had experienced uncertainty in their supply of water

because of the possibility of ESA actions. At the same time, the management agencies and environmental stakeholders wanted to be assured that they had the resources they needed to protect endangered fish.

In early 1998, a CALFED subgroup called the Diversion Effects on Fish Team (DEFT) was tasked with identifying alternatives for how the projects would operate in order to provide the best possible protection for fish populations in the Delta. According to staff from both the management and project agencies, the best alternative that they could come up with was an isolated facility that would move water for export around the Delta. This was seen as too similar to the politically controversial Peripheral Canal idea that had been defeated by voters in 1982. Despite agreement by many stakeholders that it was the best alternative, the decision was made by agency staff at a policy level that it was not a politically viable alternative. DEFT was then tasked with developing prescriptive regulatory standards for project operations that would provide the same level of fish protection as a new isolated facility. One project agency staff person described the process as "trying to get the fisheries agencies to identify their bottom line."

DEFT came up with a list of measures that they felt would provide adequate fish protection, but these measures would also cost the projects a lot of water. In order to get assurances that ESA actions would not impact their water supply, the project agencies would have to comply with these tough new prescriptions. One management agency staff person recognized that the proposed prescriptions "took away the water supply benefits that CALFED was meant to achieve."

While DEFT was developing recommendations for new standards, another CALFED group—the No Name Group—was working on how to increase water supplies and came up with a list of actions to make more water available for human use. Not surprisingly, the recommendations of the two groups clashed. The groups were combined for a period into the DEFT–No Name Coordination Team (DNCT), but they were unable to resolve the conflict between the new standards recommended by DEFT and the water supply actions desired by the No Name Group. This created an impasse that, according to some agency staff, threatened to stall the whole CALFED process.

At the time of this impasse, the idea of an account for water specifically dedicated to the environment was being discussed by DNCT. Dave Fullerton, an environmental consultant who was part of the group, is credited with developing the idea into a concrete proposal for the Environmental Water Account (EWA) and bringing it to management staff at the agencies. The EWA concept got an official start at a high level

meeting with US Secretary of Interior, Bruce Babbitt, and the heads of the agencies involved in the impasse. One CALFED staffer described the meeting:

> "In this room were all the chiefs of all the water agencies and the fisheries agencies. Then he [Bruce Babbit] looked at Mike Spear, the regional head of the Fish and Wildlife Service, because the biggest issue was Delta Smelt at the time, and Tim Quinn [of the Metropolitan Water District], the biggest gun in the water supply side, and he said, 'Do you two guys represent the rest of these guys?' They looked around and said yeah … and he said, 'Okay, I'll tell you what I'm gonna do.' He looked at Mike and Tim and said, 'There's a room at the side over there, and you two guys are gonna go in there. I'm gonna give you 20 minutes, and you're gonna come out of there and tell us whether we have an impasse and we ought to quit, or you've got a way to solve this and you think we've got a process, a way to solve it. You can take anybody in there you want to, but you're going to come out and tell us whether we quit now and just fight.' … One of them's got the Endangered Species Act on their side, the other side's got 2,500,000 people drinking—and they did, they went off."

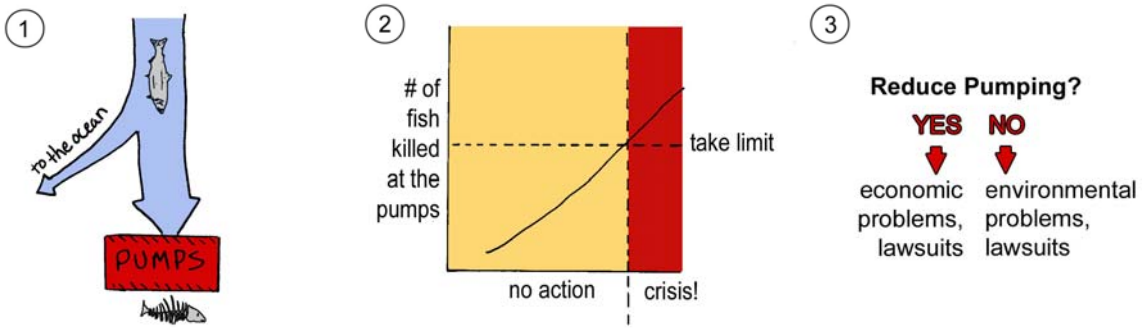
Spear and Quinn proposed that the concept of the Environmental Water Account be explored as a way around the impasse. The Spear-Quinn group was formed as a result of this meeting, and subgroups were then tasked with developing the EWA.

What is the EWA?

The Environmental Water Account (EWA) is a program intended to provide protection to endangered fish in the Bay-Delta estuary without causing any harm to the project agencies or their contractors—the farmers and cities that use the water exported from the Delta. It does this through a flexible account of water "assets" that are set aside for environmental purposes. The program acquires water or rights to water that are kept track of in the account. When the management agencies are concerned that project operations pose a threat to endangered fish, they can modify those operations. The management agencies then use the EWA assets to compensate the projects for any reduction in water yield. The concept sounds simple in the abstract, but it required a major shift in the way that both the management agencies and the project agencies did their work.

FIGURE 5.2

The Basic Idea: Before and After



Before: When endangered fish were being killed by the pumps, no action was taken until the legal take limit was reached, and then there was major conflict between environmental needs and water supply needs. The Ops Group members were basically "damned if they did, damned if they didn't;" if they reduced pumping, they would face economic problems and likely lawsuits from water contractors whose contracts they were breaking. If they didn't reduce pumping, they were breaking the law under the Endangered Species Act, and would likely face lawsuits from environmental interests.

After: Subgroups in CALFED Operations use daily monitoring data to keep track of endangered fish in the system. When fish are approaching the pumps, they can use EWA assets to reduce exports without imposing any risk on the water supply.

Designing the EWA

For the next several months, the agency staff and stakeholders worked out the details of how an Environmental Water Account would function. One environmental stakeholder said much of the success of the effort to develop the EWA was due to the leadership skills of CALFED's executive director at the time, Lester Snow. She said, "We knew we had to get to a Record of Decision … and if we didn't do something now that really got to this issue of water supply reliability and environmental restoration, the opportunity might have been lost … our marching orders were, 'Give Lester something real and do it fast.'" They began by developing a list of assets; potential places where the EWA could acquire and store water. According to one stakeholder, this was a difficult process. Many water contractors were reluctant to agree to sell water or water storage. Several scenarios for lists of potential assets were developed, but the group had trouble getting agreement from the CALFED participants on any one scenario.

EWA Games

The turning point came when they developed a series of modeling exercises, or games, using real data on hydrology, project operations, and fish populations from past years, to experiment with different ways of managing the system. Participants in the gaming, which included staff from the management agencies, the project agencies and key stakeholder groups, looked at how they could have used an environmental water account in past years to try and protect fish, and simulated running the CVP and SWP under these conditions. A June 1999 article in the newsletter *Estuary* described the games:

> "Each 'game' takes a period in history and punches information on the conditions that occurred in that period into models, maps and minds of the assembled strategists. In one game period, fish are few, flows large, and water quality good, so the pumps go full bore. In another game period, export conditions are not so favorable."

The games were complex and time-intensive to run, but necessary for figuring out the details of how the account would work and for getting all of the participants on board. The 1999 *Estuary* article went on to describe a conversation with CALFED staff member Ron Ott:

> "According to Ott, 'It's like playing three-dimensional chess all day long. When we get out of the gaming room we're all brain dead.' But the work that follows the game is even more important. 'For every eight hours of gaming, it

takes another 12 hours to figure out if we did any good. Did we do better than a standard? Did we make more water? Did we use it more efficiently? How many fish did we lose?'"

The engineers and scientists who participated in the gaming developed an understanding of the water system as a whole that went well beyond the understanding each of them had brought to the process as individuals. The games showed them tangible examples of the interconnections between water supply activities and fish populations. One participant in the gaming said, "All of a sudden it made it seem more real to people. Because instead of talking about this list of assets that could mean nothing potentially, once you started plugging them into these models and looking at how that changed management in the system, then people started perking up and people realized, 'Okay, we mean business here.'"

The CALFED Record of Decision

Thanks in part to political pressure to complete the CALFED Record of Decision (ROD) before the 2000 elections, the EWA gaming was completed in time for the program to be incorporated into ROD when it was signed in August of 2000. Implementation of the EWA began just two months later in October of 2000 (the beginning of water year 2001).

Investment in the EWA's success was high, as it provided a way around the impasse that had threatened to stall the CALFED program in 1998. The ROD included the EWA as a central part of its framework for environmental protection (see Table 5.3). Every year, after assuring that the necessary EWA assets are in place, the management agencies send the project agencies a letter giving them assurances that their water supply will not be reduced due to actions taken under the Endangered Species Act.

TABLE 5.3

The Three Tiers of Environmental Protection in CALFED

The environmental protections in the CALFED Record of Decision are organized into three tiers; the EWA is part of the second tier, and its design assumes that all three tiers are functional.

Tier One

This baseline level of environmental protection consists of the 1993 Winter-Run Salmon Biological Opinion, the 1995 Delta Water Quality Control Plan, the 1995 Delta Smelt Biological Opinion, and full use of water allocated to the environment (known as (b)(2) water) under the Central Valley Project Improvement Act as defined by the Department of Interior in October 1995.

Tier Two

Tier two is the EWA; when the management agencies decide that the environmental protection tools encompassed by tier one are not enough to protect fish, they can modify project operations to protect them.

Tier Three

Tier three is the commitment of the CALFED agencies to make additional protections available if Tiers One and Two are not enough. To date, Tier Three has never been used. Tier Three says that theoretically, if all else fails, the management agencies and project agencies can agree to make additional export cuts.

How the EWA works

The EWA has several tools through which it can acquire, store and use water (see Table 5.4). Some of the water that makes up its assets is actual water sitting in a reservoir or groundwater bank. Some of it is just "paper water"—added or subtracted to an account when an action is taken that either reduces or increases the water available to the projects for exports.

The EWA has an annual budget of about $50 million in public funds to buy water (and water storage) from willing sellers. Decisions on where and when to purchase water are highly complex. Water is purchased at market rates, but these rates differ depending on where the water is acquired; water south of the Delta is more expensive than water north of the Delta because it has to be moved across the Delta to get to the water users served by the projects. The cost of acquiring, moving and storing water is impacted by a myriad of other factors, and budgeting for the

EWA requires an understanding of hydrology, water rights law, fish biology, engineering, and even the electricity market because several project dams supply hydroelectric power. These transactions happen in an existing water market that is already well-developed and highly competitive. One DWR staff person commented, "You've got a bunch of fish guys and a bunch of engineers going out and buying water—they're not negotiators, they're a bunch of scientists buying water! And dealing with the guys that are the best in the world!"

TABLE 5.4

EWA Tools

- The EWA can buy water from willing sellers, either north of the Delta or south of the Delta.
- It can borrow water from the CVP or SWP to be paid back at a later date.
- It can acquire water by relaxing regulatory requirements when it is safe to do so for fish. For example, it can relax the Export/Inflow ratio, which restricts the amount of water that the projects can pump based on how much water is flowing into the Delta. The "extra" water that the projects pump is then credited to the EWA.
- The EWA automatically gets a portion of water that is released from upstream reservoirs for regulatory purposes. For example, if the State Water Project releases water from Shasta Dam to increase flows in the Sacramento River for environmental purposes, it can sometimes reclaim (pump) that water in the Delta. When this happens, the EWA gets half of the water.
- When the projects don't need to use all of their pumping capacity to meet the needs of their contractors (farmers and urban water users south of the Delta), they can use their excess pumping capacity to pump water for the EWA. This water would then be stored for the EWA. At a later date, when the EWA needs to curtail pumping to protect fish, this water would be used to meet the needs of the projects' contractors.
- The EWA can store water in the project reservoirs, although the EWA has junior rights to the storage. If the reservoir fills up and some water spills over the dam, the EWA loses its water before the project agencies lose theirs.
- The EWA is supposed to have access to 200,000 acre-feet of groundwater storage south of the Delta, but so far the EWA Team, which purchases water for the program, has not been able to secure this storage.
- The EWA can transfer water assets that it has upstream of the Delta to create assets where they are needed for export south of the Delta. Water is significantly more expensive south of the Delta, so a larger amount of water north of the Delta is required to exchange for a smaller amount south of the Delta.

(Winternitz and White 2001)

How the EWA is Managed

Although several stakeholder groups are regularly involved in monitoring the program and providing recommendations to the agencies, the decisions about how to operate the EWA rest with the agencies. The management agencies are responsible for making decisions as to where and when to use the water and when to alter the operations of the project agencies. The project agencies are responsible for acquiring, storing, and conveying the water as well as implementing the operational changes recommended by the management agencies (Winternitz and White 2001). The State Department of Water Resources does most of the accounting for the program. This is a difficult task; according to one senior staff person, there are generally 5–10 people working on the accounting at any given time.

CALFED Operations after the Record of Decision

With the development of the EWA and the signing of the ROD, the structure of the CALFED Ops Group changed significantly (see Figure 5.3). As noted at the beginning of this chapter, Ops Group members in the mid-1990s were high-level decision makers within their agencies. By the late 1990s, members were generally a level or two lower in seniority. This trend towards less and less decision making was solidified with the signing of the ROD in 2000. One staff person said that most of this was due to the EWA. He said that the assurances provided by the EWA to both the MAs and the PAs allow for decisions regarding changes in operations to be made at a lower level; a high level policy person does not need to get involved every time the EWA makes a cut. Another senior staff person said, "The formulation of the EWA has made implementation of the Ops Group incredibly efficient and much more amicable."

Along with the EWA, the ROD created a new operations entity within CALFED called the Water Operations Management Team, or WOMT. According to one stakeholder, after this happened, "A whole block of decision making left the Ops Group because the EWA had its own team now." The Ops Group still exists, but today it serves mainly as a forum for dissemination of information and public discussion of issues regarding operations.

Many of the subgroups that were important to Operations management and decision-making before the ROD are still around. In addition, new groups have been formed to help manage the EWA (see Table 5.5). These subgroups, which involve both agency representatives and public stakeholders, meet regularly to analyze data and make recommendations to WOMT, which has replaced the Ops Group as the

primary decision-making body for project operations (see Figure 5.3). WOMT members from the state agencies are at the director level, and members from the federal agencies are regional directors. They meet weekly, and meetings are not open to the public. Describing the Ops Group after the ROD, one former Ops Group member said, "The way I'd characterize CALFED Ops—it's kind of like a showcase. You don't really make any decisions there … WOMT makes decisions."

TABLE 5.5

Important CALFED Operations Subgroups, After the 2000 Record of Decision

- The Data Assessment Team (DAT)

  DAT continues to analyze data related to project operations. Today it focuses mainly on data related to the Environmental Water Account and plays a key role in the implementation of the program. DAT makes recommendations about modifying project operations to the Environmental Water Account Team and the Water Operations Management Team. Although the group has no official decision making role, it is where much of the nuts-and-bolts of real-time management are handled. Several agency staff have described it as one of the most successful examples of collaboration within CALFED, both for its congenial atmosphere and its ability to get things accomplished. One scientist said, "DAT is everybody. To me, it is even more of a big deal than CALFED Ops." One environmental stakeholder said she couldn't remember a time when WOMT didn't follow DAT's recommendation, and one agency staff person referred to WOMT as the "rubber stamp" for DAT's recommendations, except in a few cases of controversy.

- The Operations and Fisheries Forum (OFF) (formerly the No Name Group)

  The No Name Group that was created during the late 1990s was given a name, the Operations and Fisheries Forum (OFF), after the ROD was signed. In contrast to DAT, which focuses mostly on fish-related data, OFF focuses mainly on operations and water supply. There is a great deal of overlap in members between the two groups. OFF does not meet on a regularly scheduled basis; it meets when there is a need. For EWA-related topics, the need typically arises when DAT makes a recommendation that will have an impact on project operations and water supply. OFF then examines the effect on operations, water supply, and water delivery in more detail. Like DAT, OFF does not make decisions about the EWA. Instead, it makes recommendations to EWAT or WOMT. OFF also considers a broader range of issues related to operations than just the EWA.

- The (b)(2) Implementation Team

  Section (b)(2) of the Central Valley Project Improvement Act (CVPIA) of 1992 allocated 800,000 acre-feet of CVP yield (or 600,000 acre-feet in a dry year) to restore valley fisheries. This water, commonly referred to as (b)(2) water, is taken off the top of the total water available to the CVP in a given year. (b)(2) water is part of CALFED's Tier One of environmental protection. The management of (b)(2) water has a large impact on decisions regarding EWA water, and many people on the (b)(2) team are also on DAT or OFF.

FIGURE 5.3

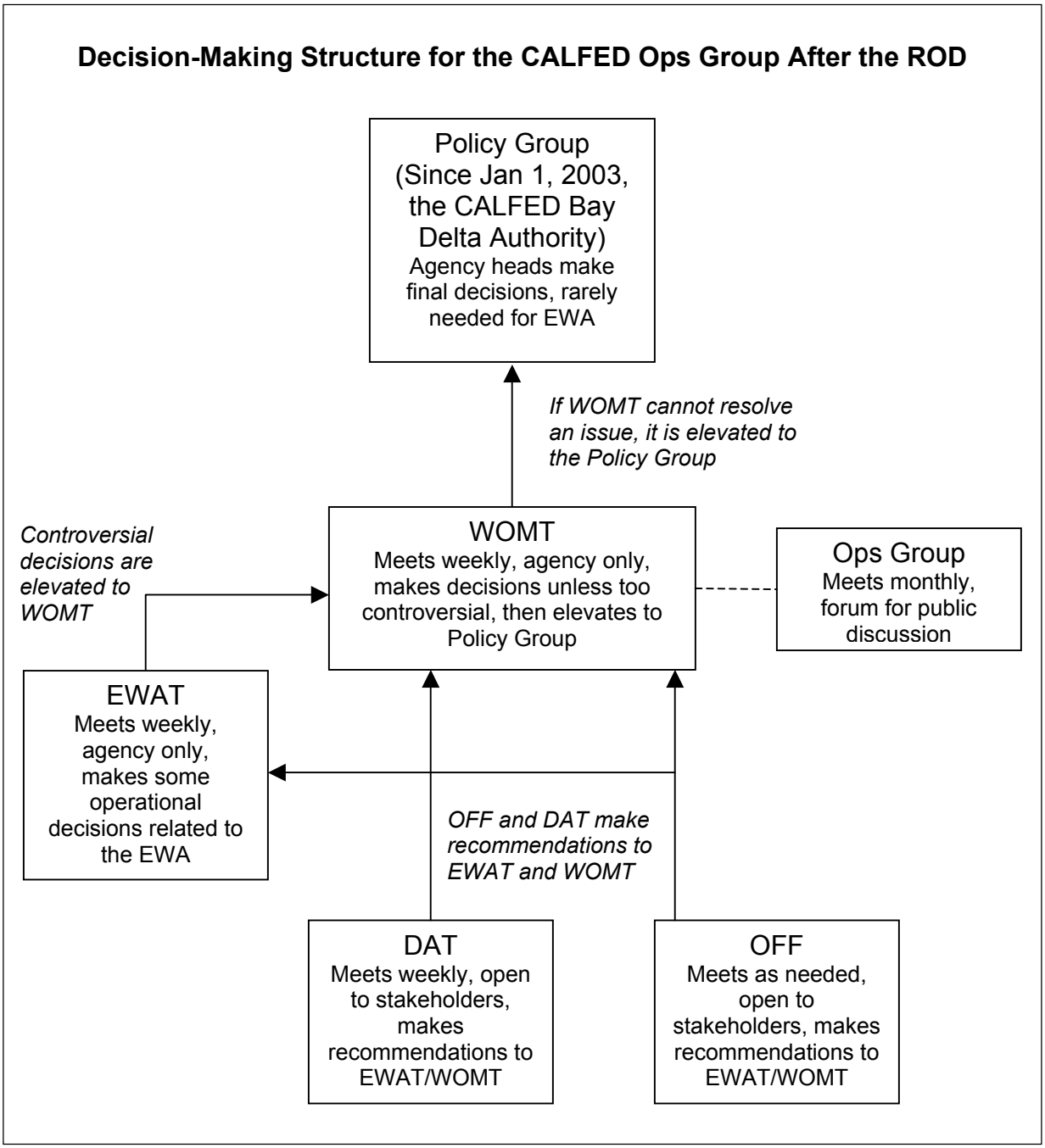
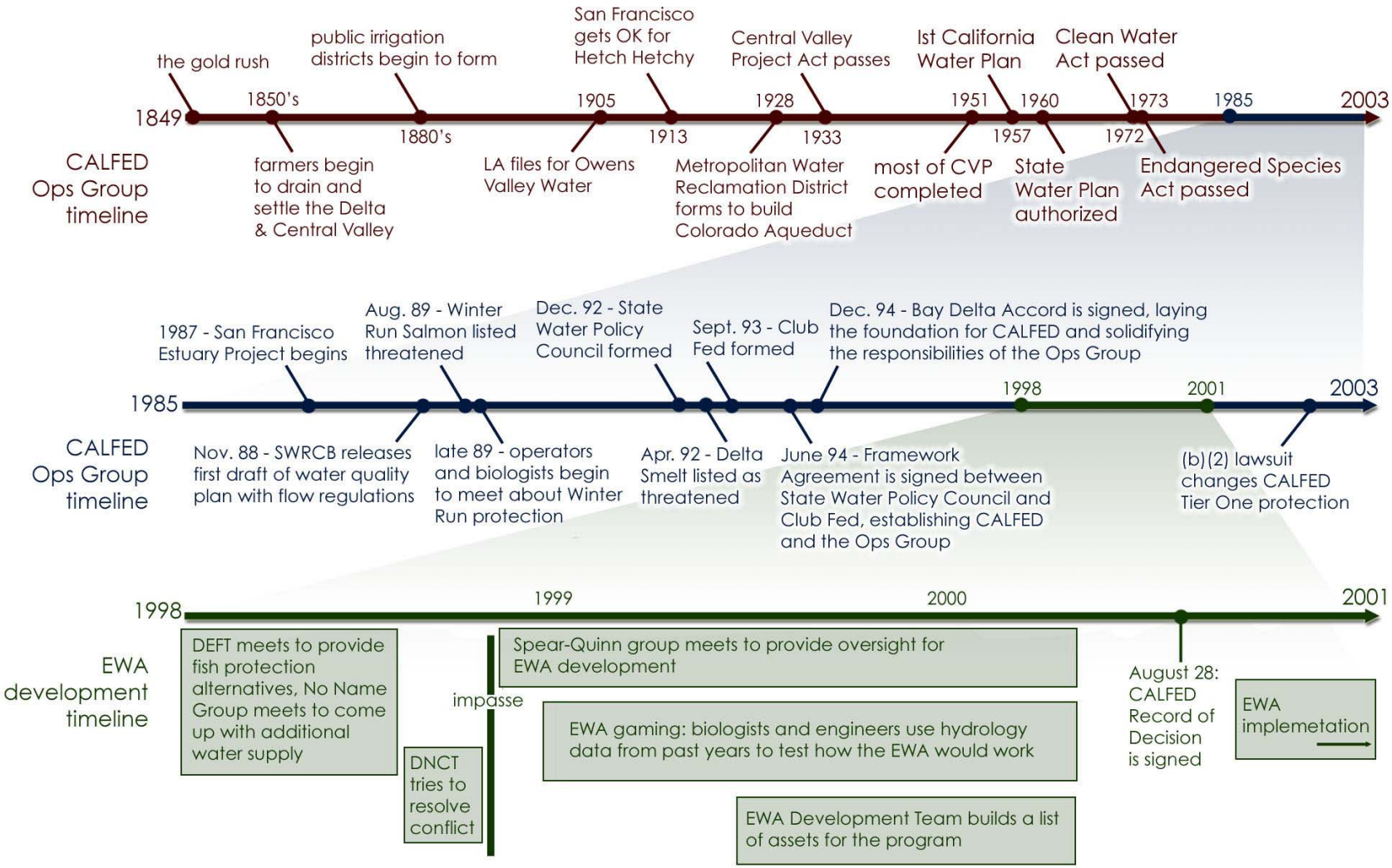

Decision-Making Structure for the CALFED Ops Group After the ROD
Policy Group
(Since Jan 1, 2003, the CALFED Bay Delta Authority)
Agency heads make final decisions, rarely needed for EWA
If WOMT cannot resolve an issue, it is elevated to the Policy Group
Controversial decisions are elevated to WOMT
WOMT
Meets weekly, agency only, makes decisions unless too controversial, then elevates to Policy Group
Ops Group
Meets monthly, forum for public discussion
EWAT
Meets weekly, agency only, makes some operational decisions related to the EWA
OFF and DAT make recommendations to EWAT and WOMT
DAT
Meets weekly, open to stakeholders, makes recommendations to EWAT/WOMT
OFF
Meets as needed, open to stakeholders, makes recommendations to EWAT/WOMT

FIGURE 5.4

Timeline of Important Events for the CALFED Ops Group



CHAPTER SIX

DISCUSSION

Although the Ops Group itself has evolved since its early days, these changes are minor when contrasted with the way operational decisions were made before CALFED. Before the Ops Group was formed, the management agencies had little to no input on project operations. Today the MAs and the PAs talk daily. One project agency staff person said:

> "If you compare it with how we operated when we first started … we sat down with the fish agencies once a year to go through our project operations plans and say, 'Here's what we're planning on doing to protect the fisheries,' and get input from them on what they thought the impacts were. Compared to nowadays, we hardly make any change in operations without giving the fish agencies a call and talking with them to see what the impacts are—we're in constant coordination with them daily."

Successful Processes

What were the characteristics of the processes used by participants in the Ops Group and the EWA that allowed them to make breakthroughs in working together?

Ops Group participants had equal seats at the table. When CALFED was formed, the listing of two fish under the Endangered Species Act had already changed the balance of power in California water. The project agencies and water user stakeholders no longer had the upper hand in managing the water export projects. This change in the regulatory environment had leveled the playing field, and the CALFED Ops Group brought all of the players together at one table. The development of the EWA furthered the process, with environmentalists and water users having equal access to modify the system during the gaming exercises. As one stakeholder scientist described the process, "For the first time, everybody was at the same table and not in the bleachers. That in itself was a huge step forward … the biologists and the engineers started to understand each other."

They were kept at the table by a legal threat. The threat of fish protection actions that could be taken under the Endangered Species Act kept the water users and project agencies at the table. This legal threat made the CALFED Ops Group more attractive than the BATNA (best

alternative to negotiated agreement) for the water users. One scientist described the influence of the ESA: "I guess the word impetus comes in; it provided the impetus for things to happen in a collective spirit. A lot of this stuff had to happen anyway. You had to have something like a DAT, something like a WOMT, when you have three[5] listed species." The environmental interests also had a reason to try to find a solution through CALFED; despite the power of the ESA, take limits were routinely exceeded for both Delta Smelt and Winter Run Salmon in the late 1990s because of the difficulties involved in reducing exports.

They had a clear, focused purpose and shared goals. From the outset, the CALFED Operations Group had a clear and focused purpose; they were to manage the operations of the CVP and SWP facilities in accordance with requirements for environmental and water quality protection as outlined in the Bay-Delta Accord. The agency staff and stakeholders who developed the Environmental Water Account had a similar clear purpose in their work.

They had the pressure of a deadline. The EWA was key to overcoming an impasse in the negotiations over the CALFED Record of Decision, and the CALFED agencies wanted to complete the ROD before a potential change in federal administration in 2001. One participant in the gaming described the atmosphere:

> "We knew we had to get to the Record of Decision because the elections were coming, and we knew that if Gore didn't win, Babbitt was gone, and Babbitt had played a really, really key role in CALFED, keeping CALFED going at different critical points, and if we didn't do something now that really got to this issue of water supply reliability and environmental restoration, the opportunity might have been lost."

This shared goal and the shared pressure of a deadline helped people stick with the negotiations when they were difficult.

They moved from advocating for positions to articulating interests. As people developed shared understandings of the issues they were dealing with, they were able to critically examine the positions of each interest group. Through participating in the Ops Group and related groups, stakeholders were able to get beyond the position-based mentality of the past and look at what their fundamental interests were. For example, instead of advocating for a fixed amount of water to be set aside for endangered salmon, environmental stakeholders focused on

[5] Sacramento Split-Tail, another Delta fish, was also listed as endangered in 1999.

their underlying interest in protecting the fish and were open to exploring multiple ways of doing that. One stakeholder described the meetings that led to the creation of the Environmental Water Account and the push by Lester Snow, CALFED's executive director, to get past the position-based mentality of many stakeholders:

> "Lester could not care less about what he called 'the religion'—you know, people who would just pound the table and say, 'Over my dead body; our contract says we're supposed to get this amount, and that's how much we're gonna get,' and there are lines in the sand and all that nonsense. He hated all that, and there were many meetings where Lester would say—he'd sit there and listen—and then he'd say, 'Okay, are you done? Spare me the religion, and talk to me about the information.'"

Another scientist credited the dialogue between the individuals involved in the process with helping them to get beyond rigid positions, saying, "That education and communication stuff is really what has changed us away from that religion viewpoint."

Strong leaders kept the dialogue moving forward. The effective leadership of Lester Snow and Secretary Babbitt was cited by several interviewees as integral to the success of CALFED. As discussed above, Snow pushed participants to get past the positions they had brought with them to the table and focus on searching for common ground. One stakeholder said, "Lester is incredibly smart. He is a master at communication, and he really believed that there was a way to get something for everybody. Not everything that you wanted, but something for everyone to keep everybody talking. That was his ultimate goal, was just keep everybody at the table." Babbitt was credited with facilitating the negotiations that led to the Environmental Water Account. Both of these leaders were able to control the direction of discussion while maintaining the engagement of the participants.

They invested the time and effort to really understand the system. The learning processes of the CALFED Ops Group went beyond participants increasing their understandings about each other's views and needs. The group took the time and effort to really learn about the system as a whole. The modeling games run by the developers of the EWA were a key component of this process.

They increased transparency in decision making. The agencies involved in th e Ops Group did not give up any of their decision-making authority, but they did increase the transparency of the decision making process. Agency staff deliberated in front of each other, and at

times, in front of stakeholders as well. They moved from a model of making decisions in isolation and then announcing their intentions, to actively involving multiple interests in the deliberations. As one scientist summed up the change, "The main thing is that decisions are now made very much in the open."

The Data Assessment Team and the No Name Group (now the Operation and Fisheries Forum) both provided opportunities for stakeholders and agency staff to engage in real and substantial discussion about issues related to project operations, water quality and fish. At the end of the day, the agencies made the decisions, but the stakeholders that participated in DAT and the No Name Group knew that they'd been heard.

Successful Outcomes

The collaborative processes described above have achieved several successful outcomes worth noting:

They built social and political capital. Participants in operations-related groups have developed personal relationships with one another. For example, at one Ops Group meeting, environmental stakeholders and project agency engineers teased each other about their views and asked about each other's families. One project agency staff person described a retirement party he had just gone to for a management agency staff person as an example of how the agencies had built relationships. In every interview completed for this study, the person being interviewed recommended several people from opposing interest groups to talk with.

While these interactions may seem trivial at first glance, the social capital created by these personal relationships are important for working toward solutions to problems that require political coalitions (Connick and Innes 2001).

They built shared understandings. Through participating in CALFED Ops or the development of the EWA, agency staff and stakeholders built shared understandings of the Delta and the California water system. Some people involved in the Ops Group summed up the change in attitude as the management agencies learning to think like project agencies and vice versa. Through the development and implementation of the EWA, agency staff and stakeholders began to understand and even respect the needs of their opposing interests. The participants didn't always agree with each other on management choices, but their newfound understanding of and respect for each other's views helped them to break down old barriers and search for solutions to

problems that helped everyone. An agency scientist involved in the Ops Group said:

> "CALFED's biggest accomplishment is that all the agencies, at all levels, are communicating. At the technical, management, even political levels, there's a real understanding of each other's issues, and as with most things, when you understand each other's issues, you start trying to find solutions that work for both of you, instead of you want it all and you want it now."

A project agency manager said,

> "I think initially the fishery agencies were operating more like regulatory agencies. 'Okay, we're going to issue this biological opinion, with criteria and things that the projects will operate to, and then we'll go away and they'll do what they're supposed to.' I think they learned very early on that they have to take a very active role in managing their resources, and by and large, all three agencies [USFWS, NMFS, CDFG] have embraced the idea that they've got to be there at the table all the time. And they're learning about things—concerns about safety, recreational use—and they're trying to take those things into account too."

Through their involvement in the Ops Group and the EWA, the management agencies gained a much deeper understanding of the concerns of the project agencies and of the impact that fish protection actions have on other interest groups. Now the management agencies are intimately involved in project operations to try and protect fish in ways that do not harm other interest groups. Similarly, the project agencies have developed a better understanding of environmental needs in the Delta, and they are trying to operate the projects in ways that reduce negative impacts.

They developed new, collective knowledge. Through dialogue, participants in CALFED operations built collective knowledge of the Delta and the California water system that none of them could have achieved on their own. For example, participants in the modeling exercises that were run during the development of the EWA were all experts in one topic or another. Some were biologists who knew detailed information about the life history of particular fish, while others were engineers who knew the details of the water delivery system. Through the modeling exercises where each participant contributed his or her own specific expertise, all of the participants developed a much more complex and complete understanding of the water system.

They developed high quality agreements. The participants in CALFED Ops have invested a lot of time and energy into the Environmental Water Account and the agreements they have made, and they are committed to the effort. So far, they have been able to overcome challenges in their work.

The biggest challenge yet happened in 2002, when the Tier One environmental protections on which the EWA is based were reduced by a court ruling. A central component of Tier One was the use of 800,000 acre-feet of water allocated for environmental protection under section (b)(2) of the Central Valley Project Improvement Act of 1992. This water is commonly referred to as (b)(2) water. Rules for (b)(2) accounting were established in October 1999, when the Department of Interior clarified procedures for accounting for the water. This interpretation of the rules was in effect when the CALFED ROD was signed, and was part of the Tier One environmental protection package. A group of water users filed a lawsuit challenging the 1999 interpretation, and in February 2002, they won their case. This ruling threw into question the whole foundation on which the EWA was based. According to one environmental stakeholder, "When the decision came down, it threw CALFED into a tizzy … the whole (b)(2) protection, in my understanding, is gone." When the court decision was made in 2002, the management agencies were only days away from sending the project agencies the letters providing ESA assurances. In light of the new (b)(2) ruling, the MAs may not have issued the assurances. Although at first glance the ruling appeared to benefit the PAs, they had too much invested in the CALFED process to allow it to fall apart. The MAs and the PAs were able to work together to come up with additional protective measures on a temporary basis and exchange letters to get through the next water year. A senior staff person from a project agency described the negotiations as an example of the Ops Group's successes:

> "Look at this year; this year is a huge success, I think. The federal judge came out with a ruling on (b)(2) and that clearly had an implication on the amount of assets that were available for fishery protection, and we all kind of worked together to come up with a strategy … that judge's ruling, when that came out, that had a big impact on the amount of water that the fish agencies had available to them for fish protection. Probably at that point, without this process in place, the environmental side, they could have said, 'We'll just have a lawsuit,' and in the past that could have just derailed the whole process. And that really shows the

cooperative effort we have now by all of the stakeholders and the agencies to really try and keep this thing going."

They developed flexible and networked institutions. Compared to the old system of managing California water, the Ops Group is much more flexible. This flexibility occurs on two levels. First, flexibility in the operations of the project facilities has been the key to attempts to balance the needs of the environmental interests with those of the water users. The old system of prescriptive standards for protecting fish was all-or-nothing. As long as the projects were under the take limits, they rarely did anything to protect fish. When they hit the take limit, it caused major conflicts between the agencies. The new system of flexible management tries to make small adjustments to the system when they are actually needed, based on real-time monitoring data.

The second level of flexibility is the structure of the Ops Group itself. Since the signing of the Framework Agreement in 1994, the Ops Group and all of the groups that are associated with it have evolved to accommodate the changing needs of the agencies and stakeholders. New groups have been invented as needed, and existing groups have modified their procedures or activities.

The new institutions are resilient. The Ops Group has also had to deal with a great deal of uncertainty. The implementation of the EWA provides a good example of this. In addition to the inherent uncertainty of predicting hydrologic conditions and the migration patterns of endangered fish, the program has had to deal with political uncertainty. So far, it has proven to be flexible enough to accommodate changes in the political and regulatory landscape.

Most of the people interviewed for this study had confidence in the resilience of the collaborative efforts within CALFED. One operator admitted that it was easier to manage the system before they had to consider so many other factors, but also said that they had found the best solution they could. Like most people, he felt that the changes in California water management were lasting. He said, "I don't even want to compare the past because my feeling is we've got to move forward. More coordination, that's just a part of the future … I think that the concept of making adaptive changes to our operations, having a forum for stakeholders and other agencies to provide input, that's going to be the way of doing business."

They ended a stalemate. In the long term, CALFED Operations moved California water management from a bureaucratic stalemate, where no interest group was benefitting, to a system that is attempting to get some benefits for all interest groups. When a particular

impasse was encountered that threatened to derail CALFED's efforts at balancing issues related to operations, the creation of the EWA allowed the CALFED agencies to get beyond the gridlock and work together to find solutions.

Perhaps the most telling example of the EWA's importance in resolving this impasse is the enthusiasm that Ops Group participants have for the EWA, despite the fact that not one person who was interviewed for this study could say whether the EWA does a better job of protecting fish than the previous management system did. One fisheries biologist said, "If conflict reduction and water supply reliability are as, or more, important than fishery protection, then the EWA might easily continue to exist even if it were not particularly effective at fishery protection." Another biologist who has been working on Delta fish issues for decades said that the EWA and DAT were truly remarkable to him, right after discussing the lack of evidence that the program does anything for fish. When asked what was so amazing about it, he said, "That people are really trying to make this thing work."

Challenges and Uncertainty

So far this chapter has focused on the successes of the Ops Group and the EWA. The participants in CALFED Operations have made great strides in resolving conflict, building social capital and mutual understandings, and coming up with innovative solutions to problems. However, there are also areas where the group has struggled. Innes's and Booher's criteria for evaluating consensus-building processes (1999) are useful here. As discussed above, the Ops Group and EWA have fulfilled many of the Innes and Booher process criteria. However, some criteria have not been met. Exploring these failures may provide insight into problems that the Ops Group has encountered.

In addition, it is important to address whether the Ops Group has been successful at achieving CALFED's goals of improving water supply reliability and helping the fisheries to recover.

Not all relevant interests were included or brought on board. In her 2003 dissertation on collaborative policy making for California water management, Sarah Connick stated that the most successful area of collaboration within CALFED was among the agencies themselves (p. 254). Efforts at collaboration had a lesser degree of success with non-governmental stakeholders. This distinction is particularly true within the Ops Group. The accomplishments of the CALFED Operations Group and the Environmental Water Account in creating working relationships and joint efforts to find solutions is impressive. However, not

all stakeholders with an interest in California water share the positive feelings that many Ops Group participants expressed. The Ops Group story is largely about government agencies and a few powerful stakeholders. Other stakeholder groups, both environmental groups and water agencies, have felt left out of the Ops Group process. Representation of all relevant interests is one of the criteria for successful collaboration that Innes and Booher (1999) developed.

Some water user groups feel that they unfairly bear the burden of the environmental protection actions taken by the Ops Group, and in fact, some water districts with junior water rights have been disproportionately impacted by efforts to protect the environment. Some environmental stakeholders that have not been involved in the Ops Group feel that the EWA is too much of a compromise and worry that the program will not help endangered fish. Other environmental groups are upset by the EWA's focus on endangered fish in the Delta without regard to upstream or downstream habitat conditions, or other species' needs. The assurances against endangered species actions that are given to the project agencies each year are tied to an operational EWA. Because one of the goals of the EWA is to provide water supply reliability, it has by default been focused on preventing the projects from exceeding the take limits for endangered species.

Stakeholder disenchantment with the project operations under CALFED has led some groups to file lawsuits or attempt to bypass the CALFED process and go directly to their legislators for help. These efforts threaten to erode the legislative support and funding base that has been so key to the success of CALFED's work.

The new programs are expensive and funding is uncertain. For all its success, the designers of the EWA have avoided one of the trickiest issues—who should pay for it if it continues in the long term? Future funding for the program was one of the biggest concerns among both agency staff and stakeholders whom I interviewed. Currently, the EWA is funded through annual appropriations from both the state and the federal government. Several people, particularly environmental stakeholders, did not feel that the program should be funded with public money. In testimony to the Joint Hearing before the Assembly Water Parks and Wildlife Committee and the Senate Agriculture and Water Committee, Sprek Rosencrans from Environmental Defense said,

> "We lament that the account requires annual appropriations that are inherently unreliable. We also are concerned that these appropriations may be contingent on the approval of other actions that are likely to cause harm to fisheries …

> we suggest that an Environmental Water Account is not likely to be successful in the long run if it relies significantly on annual funding from either the state or federal government. We suggest CALFED, with the support of the legislature, replace the EWA assets that now depend on this funding with other supplies that are obtained through the course of project operation."

Many people, even some project agency staff, suggested that user fees might be a better way to fund the EWA, but this topic has remained too controversial for serious discussion.

The EWA has not been implemented as designed. The EWA does not have access to all of the tools that it was supposed to in the ROD, and unexpected complications have hindered its actions. Some of these problems are simply part of implementing an experimental system, and Ops Group members are working to overcome these hurdles as they arise. For example, the initial design of the EWA assumed a level of flexibility to transfer water from one user to another that has proven to be difficult in practice. In response, the Department of Water Resources prepared written guidelines for parties interested in selling water rights to the EWA (Johns 2002).

Solutions to other problems have been more elusive. The EWA was supposed to have an initial deposit of 200,000 acre-feet of water that would start the program off with "something in the bank." The ROD did not identify where this water would come from, and to date, it has not been provided. The program was also supposed to have access to groundwater storage south of the Delta, and no groundwater banks have been willing to provide the storage at a reasonable rate. Finally, and perhaps most importantly, the three-tiered structure for environmental protection outlined in the CALFED ROD is not fully in place. Tier Three was supposed to provide additional protection for endangered fish in years when the EWA fell short, but Tier Three remains undefined and unfunded, and some stakeholders worry that this has made the EWA's managers reluctant to risk using up the EWA's assets when fish protection is needed early in the season. They contend that this has forced the EWA's managers to gamble with EWA assets, betting on whether they will be needed more at a later time in the season.

Broader CALFED Goals

Given the successes and challenges described above, how has the Ops Group done in achieving CALFED's goals of improved water supply reliability and recovering fisheries? In the short term, the Ops Group has

achieved its water supply reliability goals with the ESA assurances provided by the Environmental Water Account. For many reasons, the jury is still out on the fisheries goals.

Estimated counts of the total number of endangered fish are not a reliable way to measure the program's impact on fisheries. The EWA has only been operating for two years, and fish populations fluctuate naturally from year to year. In addition, many other factors besides the pumps have a potential impact on fish populations, including the many habitat restoration projects that CALFED has funded upstream of the Delta. Therefore, the best way to evaluate the EWA's impact on endangered fish is to compare it to the old system of prescriptive take limits. Although the EWA provides an alternative to the old system of take limits, fish take is still monitored, and the goal is to prevent fish kills from reaching the take limit through flexible operations rather than the "on/off" model of the past. The on/off model did not set the bar very high for the EWA; take limits were routinely exceeded in the late 1990s. Still, under this criteria, the EWA has yet to prove its worth. In March 2001, during the first year of the EWA, the pumps exceeded the take limit for Winter Run Salmon by over 100%. When the predicted run of juvenile fish began to arrive near the pumps, the management agencies cut exports, using EWA assets to make up the difference. A much larger run of fish arrived after these cuts had been made, but the MAs had already used up a large portion of the EWA's assets. They were reluctant to make additional cuts because of the potential need for actions to protect Delta Smelt later in the year.

The Winter Run kill caused an outcry from many environmental groups and heavy criticism in the media, but on further investigation the situation was not as clear-cut as the headlines suggested. The Winter Run take limit for 2001 had been set for 7,404 fish, and some estimates have put the number of fish killed at between 14,000 and 20,000 (Beuttler 2001; Swanson 2002). However, other scientists have suggested that the initial population estimates were far below the actual population numbers, and that the take limit was set well below 2 % of the population. In a review of the EWA's first year, the EWA Technical Review Panel wrote:

> "In 2001, the National Marine Fisheries Service may have underestimated the JPE [juvenile population estimate], which in turn may have resulted in setting the number of fish needed to trigger export reductions too low. Essentially, the juvenile production apparently was far larger than expected, thus the EWA interpreted the early arrival of fish from a very large run as the peak migration of what was expected to be a very small run. Consequently, the EWA called for export reductions before the run peak

appeared, expending a relatively large portion of its water for a relatively small ecological benefit."

Given the uncertainty in the Ops Group's and EWA's abilities to meet CALFED's broader goals, how can we compare them to the old system of water management? Water supply reliability has been achieved, but it is based on a fragile structure of scientific assumptions and public funding. It is too early to tell whether the EWA does a better job of protecting fish than the old system. However, the Ops Group and the EWA have achieved positive outcomes that likely would not have been achieved without collaboration, and that may help to meet CALFED's broader goals in the future.

By all accounts, the increases in overall understanding of the water system are a positive outcome of the Ops Group that would not have happened without collaboration. New research is providing information about the life histories and habitat needs of endangered fish that managers could only speculate about in the past. The agency and stakeholder representatives that I spoke with—stakeholders, MAs and PAs—were surprisingly in agreement over what is not known about the system, and where future research should be focused. This is a strong contrast with the advocacy science that was common in California water in the past, where opposing interests had "expert scientists" to back up their opposing viewpoints.

In addition, the change in the environment for California water management that the Ops Group and EWA brought about is drastic. Ops Group members ended a stalemate where no one was winning and attempted to find mutually beneficial solutions. The EWA Technical Review Panel wrote, "The cooperation and collaboration between agency biologists and project operators is a highlight of the first year that has broad, positive implications for subsequent years of the EWA. We were also encouraged by the involvement of stakeholders in the process of managing water in California."

CHAPTER SEVEN

CONCLUSIONS

The CALFED Operations Group and the Environmental Water Account have made remarkable changes in California water management. They have introduced collaborative decision making and operational flexibility into a complex management system. Through building shared understandings and working toward a common goal of improving the Delta system for all interest groups, they were able to move beyond the stalemates of the past and develop management solutions with benefits for all parties involved.

The Environmental Water Account was a key tool in facilitating these changes. The program is significant because it enabled the operational flexibility that was needed to overcome an impasse between environmental protection and water supply reliability. It is also significant because it altered the way that Ops Group members relate to one another. Through the intense process of developing and managing the EWA, the management agencies, the project agencies, and the stakeholder groups constructed new relationships and developed a shared sense of purpose. They also built collective knowledge that allowed them to understand the Delta water system at a level of complexity that was previously unknown.

Strong leadership, political deadlines, rational science, and a legal hammer did play important roles in the development of the Ops Group and the EWA. Specifically, the legal power of the Endangered Species Act and the regulatory requirements created through the listing of two Delta fish species brought all of the interest groups to the table and kept them there. Strong leaders forced progress on difficult issues when deadlines loomed. Technical modeling and scientific research were important tools in designing the EWA. All of these forces were present before CALFED introduced collaboration into the mix. However, through collaborating, Ops Group members were able to accomplish outcomes that they otherwise would not have. In the future, the true test of these innovations will be whether the new networks and flexibility of the CALFED Ops Group can continue to adapt to challenges in California water management and make measurable progress toward improved water supply reliability and recovering fish populations.

Bibliography

Albrecht, Virginia, and Christman, James. 1999. "Overview: Endangered Species Act." Avaliable online: [http://profs.lp.findlaw.com/endanger/endanger_1.html].

Babbitt, Bruce (Secretary of the Interior), et al. 1995. *Petitioners v. Sweet Home Chapter of Communities for a Great Oregon et al.* United States Supreme Court.

Beuttler, John. 2001. *Winter-Run Take Doubles Red Light Limit*. Berkeley, CA: California Sportfishing Protection Alliance.

Booher, David. E., and Innes, Judith E. 2002. "Network Power in Collaborative Planning." *Journal of Planning Education and Research* 21(3):221–236.

Brickson, Betty. 1998. *Layperson's Guide to the Central Valley Project*. Sacramento: Water Education Foundation.

Brickson, Betty; Hartshorn, J. K., and McCarthy, Elizabeth. 2000. *Layperson's Guide to California Water*. Sacramento: Water Education Foundation.

Bureau of Reclamation. 1998. "Bureau of Reclamation Highlights." *Fiscal Year 1998 Interior Accountability Report*. Washington: Bureau of Reclamation, US Department of the Interior.

CALFED Bay-Delta Program. CALFED Bay-Delta Program Home Page. Available online: [http://calfed.ca.gov]

CALFED Bay-Delta Program. *CALFED Bay-Delta Program Record of Decision*. 2001.

CALFED Bay-Delta Program. 2000. *Environmental Water Account Operating Principles Agreement*.

CALFED Bay-Delta Program. 2002. *The Environmental Water Account: Reducing Conflict Between Fishery Management and Water Supply*.

CALFED Bay-Delta Program. 1994. *Principles for Agreement on Bay-Delta Standards Between the State of California and the Federal Government*.

California Department of Water Resources. 1998. *The California Water Plan Update*.

California Department of Water Resources. 2002. *California Water Plan Update 2003*.

Cestero, Barb. 1999. *Beyond the Hundredth Meeting: A Field Guide to Collaborative Conservation on the West's Public Lands*. Sonoran Institute.

Connick, Sarah, and Innes, Judith E. 2001. *Outcomes of Collaborative Water Policy Making: Applying Complexity Thinking to Evaluation*. Working Paper 2001-08. Berkeley, CA: Institute of Urban and Regional Development, University of California.

Connick, Sarah. 2003. *The Use of Collaborative Processes in the Making of California Water Policy: The San Francisco Estuary Project, the CALFED Bay-Delta Program, and the Sacramento Area Water Forum.* Doctoral dissertation, Environmental Science Policy and Management, University of California Berkeley.

Doyle, Michael. 2000. "State urges farm 'water account.'" *Contra Costa Times*. March 31, 2000.

Duane, Timothy P. 1999. *Shaping the Sierra: Nature, Culture, and Conflict in the Changing West.* Berkeley: University of California Press.

Earthjustice Press Release. 2002. "Environmentalists, Sport and Commercial Fishermen File Notice of Intent to Sue for Enforcement of Endangered Species Act in the Sacramento-San Joaquin Delta."

Environmental Water Account Review Panel. 2001. *First Annual Review of the Environmental Water Account for the CALFED Bay-Delta Program*. CALFED Bay-Delta Program.

Fisher, Robert, and Ury, William. 1981. *Getting to Yes: Negotiating Agreement Without Giving In.* Boston: Houghton Mifflin.

"The Game's Up." 1999. *Estuary* 8:1,2,8.

Gray, Barbara. 1989. *Collaborating: Finding Common Ground for Multiparty Problems*. San Francisco: Jossey-Bass Publishers.

Gruber, Judith E. 1987. *Controlling Bureaucracies: Dilemmas in Democratic Governance*. Berkeley: University of California Press.

Healey, Patsy. 1997. *Collaborative Planning: Shaping Places in Fragmented Societies*. Vancouver: UBC Press.

Hill, Elizabeth G. 2001. *Environmental Water Account: Need for Legislative Definition and Oversight*. Sacramento: Legislative Analyst's Office.

Innes, Judith E., and Booher, David E. 1999. "Consensus Building and Complex Adaptive Systems." *Journal of the American Planning Association* 65(4):412–423.

Johns, Gerald E. 2002. *Water Transfers Papers for Water Transfers in 2002 Involving the Department of Water Resources*. Sacramento: California Department of Water Resources.

McCarthy, Elizabeth. 2000. *Layperson's Guide to Water Rights Law.* Sacramento: Water Education Foundation.

McClurg, Sue. 2002. "CALFED Today: A Roundtable Discussion." *Western Water Magazine*, September/October.

Metropolitan Water District of Southern California. 2001. *Report on Metropolitan's Water Supplies*.

Natural Resources Defense Council. 2001. *Bay Area Report Card: Environment Doesn't Make the Grade*.

Ozawa, Connie. 1991. *Recasting Science: Consensual Procedures in Public Policy Making*. Boulder: Westview Press.

Putnam, Robert D. 2000. *Bowling Alone: The Collapse and Renewal of American Community.* New York: Simon & Schuster.

Rosencrans, Sprek. 2002. Letter to S. Thompson and K. Rodgers regarding (b)(2) accounting.

Rosencrans, Sprek. 2001. Testimony of Sprek Rosencrans on the Environmental Water Account: Joint Hearing before the Assembly Water Parks and Wildlife Committee and the Senate Agricultural and Water Committee.

San Francisco Estuary Project. 1995. *Sacramento-San Joaquin Delta*.

State Water Resources Control Board. 1999. *A Guide to Water Transfers*.

Susskind, Lawrence, and Cruikshank, Jeffrey. 1987. *Breaking the Impasse: Consensual Approaches to Resolving Public Disputes.* New York: Basic Books.

Susskind, Lawrence; McKearnan, Sarah; and Thomas-Larmer, Jennifer. 1999. *The Consensus Building Handbook.* Thousand Oaks: Sage Publications, Inc.

Susskind, Lawrence; van der Wansem, Mieke; and Ciccarelli, Armand. 2002. *Mediating Land Disputes: Pros and Cons.* Cambridge: Lincoln Institute of Land Policy.

Swanson, Christina. 2001. *The First Annual State of the Environmental Water Account Report*. The Bay Institute of San Francisco, 2001.

Swanson, Christina. "The Second Annual State of the Environmental Water Account Report." San Francisco: The Bay Institute of San Francisco.

United States Fish and Wildlife Service. 2001. *Habitat Conservation Plans and the Incidental Take Permitting*.

"Water Talk." 2000. *Water Talk* 12(1).

Winternitz, Leo, and White, James. 2001. *Implementing the CALFED Bay-Delta Program's Environmental Water Account - California*.

APPENDIX A

LIST OF ACRONYMS AND ABBREVIATIONS

The Bureau	Bureau of Reclamation, US Department of the Interior
CALFED	California Water Policy Council and Federal Ecosystem Directorate
CDFG	California Department of Fish and Game
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
DAT	Data Assessment Team
DWR	California Department of Water Resources
ESA	Endangered Species Act
EWA	Environmental Water Account
EWAT	Environmental Water Account Team
DEFT	Diversion Effects on Fish Team
DNCT	DEFT No Name Coordination Team
JPE	Juvenile Population Estimate
NMFS	National Marine Fisheries Service
OFF	Operations and Fisheries Forum
Ops Group	CALFED Operations Group
USFWS	United States Fish and Wildlife Service
WOMT	Water Operations Management Team