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Integrated regional water management: Collaboration or water politics as usual?

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Abstract

This report analyzes the effectiveness of integrated regional water management (IRWM) in the San Francisco Bay-Area of California for decreasing fragmentation and increasing collaboration among water management stakeholders. The theory identifies the elements of traditional water management politics that lead to fragmentation and conflict. The water-politics-as-usual model is then compared to the collaborative model of integrated water management. The evolution of IRWM in California is briefly described. A survey of Bay Area stakeholders is used to assess whether participation in the Bay Area IRWM achieves the goals of collaboration and integration. The basic results suggest the Bay Area has made only incremental progress away from the fragmentation and conflict seen in the past.

Introduction and Problem Statement

Many researchers and practitioners propose Integrated Regional Water Management (IRWM) as a solution to the fragmentation and lack of cooperation that typifies watershed management when regional decisions encompass multiple political and administrative boundaries (Margerum 1995, 1999; Pahl-Wostl and Hare 2004; Partnership 2000). In California, IRWM is one of the main strategies of the overall state water plan, with the idea that state agencies will set up funding programs to promote integrated planning at the regional level. This study uses a quantitative case study of the Bay Area IRWM to analyze the extent to which the program has increased collaboration and integration on water management issues.

Experiments in collaborative and integrated management are occurring throughout environmental policy and other public policy arenas (O'Leary et al. 2006; Sabatier et al. 2005). It is also an international phenomenon, with local collaborative groups springing up all over the world, often in association with a general decentralization of environmental governance institutions (Saleth and Dinar 2000). From the outset, collaborative management was seen as a way to solve many of the environmental problems that were challenges to more centralized, command-and-control institutions (Lubell et al. 2002). But as research and experience with collaborative management increases, more critical views have emerged and there is currently a very lively debate as to its effectiveness (Biswas 2004; Blomquist and Schlager 2005; Lubell 2004). In particular, while some research has demonstrated positive changes in attitudes, behaviors, and plan contents(Leach et al. 2002; Lubell 2003), evidence about environmental outcomes is scarce at best(Koontz and Thomas 2006). The analysis in this report fits squarely in the broader context of the debate over collaborative management.

This analysis takes a somewhat different approach by considering how IRWM represents an evolution of water management from a fragmented system with high levels of conflict to a more integrated system with more cooperation. We call the fragmented system the "water politics as usual" (WPU) model, and discuss how the "collaborative" model of IRWM attempts to solve the collective-action problems that exist under the status quo situation. In the WPU model, collective-action problems are caused by geographic interdependence, localism, and a bias towards economic development. The

collaborative model of IRWM assumes that integration requires cooperation due to the interdependence among watershed functions. IRWM facilitates cooperation by providing opportunities for the development of social capital, increasing the availability of information to accelerate the diffusion of innovative ideas, and offering financial incentives for integrated projects. From a theoretical perspective, IRWM functions to reduce the transaction costs of bargaining, monitoring, and enforcing cooperative agreements (North 1990).

The empirical study of the Bay Area IRWM provides some clues as to whether or not IRWM is increasing cooperation and integration. Unfortunately, the basic answer to this question is that the Bay Area IRWM appears to have only produced incremental changes away from the WPU situation of fragmentation and conflict. Bay Area stakeholders who participate in the IRWM generally have more negative views of Bay Area water policy, and do not feel IRWM has helped achieve water management goals, increased integration, or changed the nature of on-the-ground water projects. The water supply infrastructure stakeholders continue to be the most powerful actors—they have the highest levels of collaboration, the most positive views, and receive the most money from the state program. On a more positive note, stakeholders report some increase in the frequency of cooperative behaviors, and note that IRWM has increased networking and funding opportunities. Hence, to some extent the analysis invokes a "glass half-empty or half-full" metaphor, and raises the important question of how quickly we should expect cooperation to evolve in the context of water management.

Objectives: Understanding Institutional Change in Water Management

1. Analyze institutional change in water management by comparing the "water politics as usual" status quo to the "collaborative policy" model of IRWM
2. Describe the history of IRWM in California and the Bay Area
3. Use a quantitative survey of the Bay Area IRWM to analyze levels of collaboration, integration, and achievement of program goals.

Objective 1: Institutional Change in Water Management

This study views IRWM from the perspective of neo-institutional economics theories of institutional change and evolution (Aoki 2007; North 1990; Ostrom 1990; Williamson 1985). This approach starts with the assumption that institutions evolve to capture gains from cooperation, including both the emergence of new institutions and

change in existing ones. In particular, institutions influence the transaction costs of searching for mutually beneficial agreements, negotiating over the distribution of the resulting gains from cooperation, and monitoring and enforcing the agreements. The existence of collective-action problems creates a niche for the evolution of institutions that reduce transaction costs. Translated into water management, the argument is that the WPU model creates a variety of collective-action problems, and that IRWM serves to reduce transaction costs and facilitate cooperation. [1]

Two important considerations about institutional change and evolution are the role of political power (Moe 2005; Knight 1992) and rate of change (Lindblom 1959; Baumgartner and Jones 1991). Institutional economics focuses on the efficiency gains from cooperation, that is, cooperation increases overall social welfare. However, more sophisticated analyses recognize that the gains of cooperation are not always evenly distributed among all actors, and actors will use their political bargaining power to capture more of the gains of cooperation(Bowles 2004). In some instances, the overall efficiency gains from cooperation may cause some actors to lose resources. These potential losing actors could use their political power to thwart institutional change, preserving their preferred status quo. In the context of water management, the water supply infrastructure organizations, with their links to economic development, are traditionally viewed as the most powerful actors with the largest stake in the status quo and the most power to influence bargaining over the gains from cooperation.

The conditions under which institutional change is incremental versus rapid is an enduring question in political science and economics (Baumgartner and Jones 1991). The same debate occurs in evolutionary biology, where evolution is generally gradual but sometimes there is an explosion of diversity. What should the expectations be for IRWM? It is very unlikely that IRWM would cause a major increase in cooperation overnight; the political and economic interactions in the WPU model have been evolving for at least two hundred years in California. Incremental change is a much more likely outcome, so the question is whether or not IRWM is moving in the right direction.

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[1] From an economic game theory perspective, the water politics as usual is a Pareto-inefficient Nash equilibrium. Gains from cooperation (e.g.; Pareto-superior outcomes) are available but the incentive structure of status quo water management institutions maintains the Nash outcome. The aim of integrated water management is to change the institutional structure in a way that enables cooperative outcomes to be achieved.

Achieving the goal of integration, which from a theoretical perspective means solving all of the collective-action problems involved with water management, is probably a much longer-term process. And with dynamic environmental changes over time, such as climate change, there will probably always be new collective-action problems to solve.

Fragmentation: The Water Politics as Usual Model

The fragmentation that usually characterizes watershed management is driven by three main factors: geographic interdependence, localism, and the political power of water supply/economic development interests. Geographic interdependence occurs because water management issues operate at hydrological and ecological scales that span jurisdictional and political boundaries. For example, the Bay Area IRWM categorized water management into the following functional areas: water quality, water supply, wastewater, recycled water, flood protection, stormwater management, and habitat protection/restoration. These issues encompass what Ostrom (1990) calls appropriation problems and supply problems. Appropriation problems involve the use of common-pool resources like water and fisheries, and supply problems involve the provision of natural capital (e.g., habitat) and manmade infrastructure (e.g.; levees).

The outcomes of these issues are a product of the joint decisions of many actors within the affected geographic area. The actors are thus interdependent—the decisions of one actor will influence the costs and benefits of decisions by other actors. The ecological links among water management issues multiplies this interdependence while simultaneously introducing a substantial degree of uncertainty. The resulting set of strategic interactions are characterized by collective-action problems where some actors will free-ride on the efforts of others by not contributing their fair share to the development of natural capital and human infrastructure, or will appropriate natural resources at a rate that is not economically optimal or ecologically sustainable.

The problem of localism is intrinsically tied to these overall collective-action dilemmas. Water politics are often noted for their "pork-barrel" qualities, where higher-level (e.g., state, national) political actors prefer to deliver benefits to their local districts and supporters (Ferejohn 1974). Water project expenditures are particularly vulnerable to the pork-barrel dynamic, because the benefits of a water project are concentrated on the local district while the costs are spread to all taxpayers. All local districts desire a piece of the water management pie, and their representative politicians have political incentives

to deliver water project money. Consequently, the number of water projects and expenditure level is probably higher than might be optimal given the overall benefits to a region or state, and there will be a dearth of projects built in one district that have spillover regional benefits. At the same time, local actors do not have a strong incentive to pay attention to the consequences of their decisions for their neighbors. Thus given the natural interdependence of water issues, localism reinforces collective-action problems.

The combination of geographic interdependence and localism creates a fundamental tension for defining the appropriate regional scale for water management (Blomquist and Schlager 2005). From the standpoint of maximizing ecosystem services, the region must be large enough to encompass the management trade-offs created by geographic interdependency. However, management costs are a function of regional size because larger regions usually encompass greater numbers of actors with more heterogeneous preferences, which makes it more difficult to forge political bargains (Libecap 1989). Greater geographic distance can also increase the capital investments needed to build linking infrastructure. In the Bay Area, these tensions commonly manifested in complaints that the region was too large for practical decision-making. For example, some water management stakeholders in the northern and southern parts of the Bay Area expressed the opinion that it was unnecessary to collaborate at the Bay-wide scale because the local water management contexts were sufficiently independent.

Water politics also tends to be dominated by well-organized economic interests like water supply and flood control agencies, which have several advantages over more diffuse public interests like environmental groups or environmental justice groups. Water supply and flood control are perhaps rightfully the first priorities of most civilizations—people need enough water to drink and want to avoid having their livelihoods washed away. The economic benefits and risks of water supply and flood control are often short-term and directly observable in the market. Water quality and habitat issues have historically been addressed later in the water management process, and often have longer-term and less observable benefits.

Water supply agencies are usually smaller in number, organized as a business, have more financial/expertise resources than environmental interests, and experience more concentrated benefits and costs from water management decisions. For example, recent reductions in water exports from the California Delta significantly increased water

districts' costs for maintaining reliable supplies of drinking and irrigation water. Thus, on a per actor basis, water supply agencies have more incentive and are better able to overcome the costs of organizing for political action (Olson 1970). Politicians will pay more attention to water supply agencies because their decisions have short-term economic consequences that will affect political decisions in the upcoming electoral cycle (Stigler 1971). For example, recent court decisions in California to reduce water exports from the San Francisco Bay-Delta to protect the endangered delta smelt had political reverberations throughout the state. Taken together, these factors produce an asymmetry in political power between water infrastructure organizations and environmental interests, which may hamper the ability to maximize the benefits of water management across multiple watershed functions.

This asymmetry in power leads to the formation of distinct advocacy coalitions in water politics (Sabatier and Jenkins-Smith 1993). On the one hand are the water infrastructure interests that historically have enjoyed more of the benefits of water policy but often impose environmental and social costs. On the other side are environmental and social groups that advocate for the non-market benefits of watersheds like habitat quality and biodiversity. Conflicts between these two advocacy coalitions are played out in legislative decision-making, courtrooms, agency hearings, and other political venues. Reducing the costs of such conflicts is another benefit of IRWM above and beyond the benefits from improved management of water resources (Libecap 1989).

The WPU model thus leads to fragmentation on multiple dimensions. Geographic (horizontal) fragmentation refers to the inability of local actors to realize regional goals. Institutional (vertical) fragmentation occurs when government agencies from multiple levels of a system are unable to coordinate policies. In the United States, there is very often conflict among local, state, and Federal government agencies; many other countries have this type of nested if not explicitly federal structure. Ideological fragmentation occurs when advocacy coalitions with different social values and policy preferences are unable to find common ground, and asymmetry in political power will typically skew water management towards well-organized economic interests. Technical fragmentation occurs when different water projects are unable to connect inputs and outputs in ways that maximize benefits and efficiency. Collective-action problems and interdependence

are at the heart of all dimensions of fragmentation—actors fail to make decisions that take advantage of opportunities for mutual gains, and avoid the risk of mutual costs.

Integration: The Collaborative Model

The concept of integrated water management offers institutional mechanisms for overcoming the collective-action problems associated with fragmentation. IRWM attempts to change the status quo of water politics and policy in order to increase cooperation among stakeholders. An important underlying assumption (that continues to be questioned) of this argument is that water management is not a zero-sum game where policies that benefit the environment require decreasing the welfare of economic interests. Rather, the fragmented nature of water management means there are a variety of gains to cooperation. These are the same basic arguments applied to collaborative management in general.

IRWM provides a collective-choice forum where stakeholders can build networks, trust, and norms of reciprocity. In many cases, IRWM provides a physical meeting space where stakeholders who were previously confined to their own buildings can be in the same room together. Interaction in the context of these planning forums allows stakeholders to learn about each others' perspectives; empathy of this sort is an important predictor of trust and cooperation (Batson et al. 1995; Singer et al. 2006). Stakeholders have the opportunity to collaborate and share information on a variety of matters, building the relationships that are the basis of policy networks (Thatcher 1998; Scholz et al. 2008). Multiple periods of interaction allow stakeholders to employ reciprocal strategies, where each actor will cooperate as long as the others contribute to joint goals. The stakeholders may also recognize that these types of interactions are likely to continue into the future. Reciprocal strategies and a long "shadow of the future" are also predictors of cooperation (Axelrod 1984).

IRWM programs increase the availability of information about water management issues and activities in a given region. Stakeholders share information and innovative ideas spread through the resulting policy networks (Rogers 2003). Effort is often put towards new studies on water issues, investigating causal processes influencing various problems, the effectiveness of different types of policy solutions, and many other questions. The sharing of technical information about water infrastructure projects helps discover links between inputs and outputs that may increase overall efficiency, such as

with inter-ties between water delivery systems. In general, the sharing of information reduces the overall transaction costs of cooperation (Lubell et al. 2002).

A nearly universal feature of IRWM programs is the availability of funding from some higher level of government to facilitate regional planning. For example, the California IRWM program evaluates proposals for planning and project implementation funding on the basis of the level of integration achieved. These plans revolve around a set of specific water management projects that are prioritized in terms of how well they address multiple watershed functions. The government funding supplements the local funding for these projects, and thus provides an incentive for cooperation. Such funding "carrots" are the norm in IRWM programs in the United States; they very rarely utilize the "stick" of enforcement.

IRWM is also designed to be inclusive in terms of geography, ideology, and institutional location. The representation of many different interests is believed to increase the procedural fairness of water management, bringing other interests on more equal footing with the traditionally powerful water supply interests. The perceived procedural fairness of a policy process is another predictor of cooperation(Tyler 1990). Previous research has found that participants in such inclusive processes are less likely to rely on ideological predispositions to shape their views of watershed problems (Lubell 2000). Diverse groups are sometimes better at solving problems than groups consisting of homogenous experts(Page 2007; Hong and Page 2004).

The question is whether or not the purported benefits of IRWM institutions are able to shift away from the status quo political equilibrium of the WPU model. Some more critical perspectives on IRWM have emerged recently from the earlier burst of enthusiasm. (Lubell 2004) argues that collaborative management can serve as "symbolic" policy that quells political discontent without changing underlying problems. The collaborative nature of IRWM decision-making can lead to least-common denominator outcomes where single actors can veto decisions (Kenney 2000). IRWM may increase decision-costs because it adds a new policy game to the complex set of pre-existing institutions and expands the number of actors (Blomquist and Schlager 2005). Higher level governmental authorities may have problems of credible commitment such that regional stakeholders do not believe the promised incentives are forthcoming. All of

these criticisms should be kept in mind when evaluating the effectiveness of IRWM programs.

An effective IRWM program should have some observable short-term outcomes. Participants in IRWM should have higher levels of collaboration and more positive attitudes towards water management than non-participants. For example, participants should be more likely to believe water policies are fair and effective. IRWM participants should report broader networks, and increased contact with stakeholders from different functional areas. IRWM should lead to new projects that feature more integration, rather than taking off-the-shelf projects that were developed under status quo water policy institutions. The priority given to these projects should reflect the priorities of a broad set of stakeholders, not just the traditionally powerful water infrastructure agencies. The analysis of survey data from the Bay Area will provide some initial evidence on these questions. Next, we provide an overview of the IRWM experience in California, especially in the San Francisco Bay-Delta.

Objective 2: The California Experiment in Integrated Regional Water Management

The American state of California is large, geographically heterogeneous, and faces a wide diversity of water management issues including water supply, water quality, flood control, biodiversity, etc. There are no centralized water management institutions that encompass all of the issues, water management functions, and geography of the state. Consequently, the management responsibility is fragmented horizontally across space, and vertically across levels of federal system.

At the local level are hundreds of different types of water management districts that make decisions mainly about drinking water, flood control, and irrigation (DWR 1994). Some of these water agencies are independent special districts, while others are affiliated with local city or county governments. The two most important water agencies at the state level are the Department of Water Resources (DWR), which primarily regulates the construction and operation of water infrastructure, and the State Water Resources Control Boards (SWRCB), which in conjunction with its regional divisions has the primary responsibility for water quality regulation. At the Federal level, the US Environmental Protection Agency regulates water quality and the Bureau of Reclamation and the Army Corp of Engineers manages water infrastructure. State and Federal wildlife agencies play an important role throughout the system in particular with respect to

protection of endangered and threatened species. The above list is necessarily partial and identifies only some of the most visible actors.

The most important watershed in California is the San Francisco Bay-Delta, which is created by the confluence of the two largest rivers, the Sacramento and the San Joaquin. The source of approximately seven million acre-feet of fresh water for drinking and irrigation, the Bay-Delta is the beating heart of the California water system. More than 7,000 diverters and two-thirds of California's population obtain water from the Delta, and these diversions account for roughly 40% of all flows that would naturally pass through the Delta(Lund et al. 2007). The Delta provides an array of other ecosystem services, including agricultural lands, flood control, shipping, recreation, and wildlife habitat. The Bay Area IRWM focuses on the Bay portion of this ecosystem, while most of the water diversion comes from the freshwater Delta.

Collaborative environmental policy and integrated water management has been evolving throughout California since at least the 1980s. The most prominent example is the CALFED program in the Bay-Delta, which is one of the most widely-recognized examples of collaborative environmental management (Heikkila and Gerlak 2005). The basic themes of CALFED were incorporated into the 2005 and 2009 State Water Plans, both of which identify IRWM as a major strategic initiative (www.waterplan.water.ca.gov/docs/cwpu2005/vol1/v1ch02.pdf). Funding was set aside for the official IRWM program (http://www.water.ca.gov/irwm/index.cfm) in Propositions 50 and 84, which were created through the California initiative process whereby a petition signed by a minimum number of registered voters (roughly 5% in California) forces a statute to be placed on the ballot for a public vote. Proposition 50 (officially named the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002) was passed with a 55.4% majority, and Proposition 84 (Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006) was passed with a 53.7% majority.

CALFED

The CALFED Bay-Delta Program emerged from a conflict between the US Federal government and California State over the water quality standards in the Delta, in particular salinity. In the early 1980s, California's water quality standards were rejected by the courts and after a series of court and administrative battles, the US Environmental

Protection Agency was threatening to impose its own standards on the Delta (Owen 2007). An all-out water war was averted by the signing of the 1994 Bay-Delta Accord, in which the state and Federal governments agreed on water quality standards for the Delta and began moving towards restoration efforts. The newly formed collaborative group produced an overall plan for Delta management and restoration (the 2000 Record of Decision). In 2003, the California state legislature established the California Bay-Delta Authority to oversee implementation of the management plan. The overall CALFED program has all of the typical features of collaborative policy, including multi-stakeholder committees, science advisory boards, citizen participation, voluntary implementation, and attention paid to multiple watershed functions.

Unfortunately the CALFED program is not very healthy at this time. Critical environmental problems in the Delta continue to persist, including loss of biodiversity like the endangered Delta smelt, degrading levees, and water shortages. The courts have intervened in several cases, curtailing the Delta water exports to protect environmental values. The CALFED program has been criticized in a variety of oversight processes, and several key personnel have resigned. One of the main criticisms has been that despite spending a lot of money on individual environmental projects, there has been little improvement in environmental conditions. Despite these criticisms, calling CALFED a failure may still be premature because it may take a long time to achieve CALFED goals. These are exactly the types of concerns facing the Bay Area IRWM, which is basically a complement to CALFED in the same ecosystem.

State Level Commitment to IRWM

As noted earlier, IRWM appeared as a major statewide initiative in the 1998 and 2005 state water plans. Proposition 50 dedicated approximately $380 million dollars to the IRWM program out of a total of $3.44 billion dollars for overall water management activities. Proposition 84 authorizes approximately $180 million dollars of additional spending allocated across specific IRWM regions, but the funding is currently unavailable due to the state budget conflicts. Initially, the IRWM program was jointly administered by DWR and SWRCB, but later rounds of the grant process were administered solely by DWR.

DWR and SWRCB disbursed Prop 50 funding through one round of planning grants and two rounds of implementation grants. Round 1 planning grant proposals were

due in May 2005, and 33 of 55 proposals were funded with amounts ranging from $145,000 to $500,000. Round 1 implementation grant proposals were due in July 2005, and 16 of 55 proposals were ultimately awarded in March 2007 with amounts ranging from $7 million to $25 million. It is important to note that Round 1 implementation proposals were due before planning grants were awarded, which prevented the regional stakeholders from developing many new projects beyond those already outlined in previously existing strategic plans. Round 2 implementation grants were due in August 2007, and funded nine additional proposals.

The IRWM guidelines outlined the state's preferences for regional plans, including providing integrated projects with multiple benefits, improving water supply reliability, improving water quality, protecting biodiversity/habitat, and serving disadvantaged communities. IRWM plans were also expected to support other ongoing water management programs such as CALFED. However, the guidelines were fairly vague about exactly how those goals would be achieved, allowing the regions to develop their own governance structure. For example, applicants could define their own regions and explain why their region was appropriate for integrated management. The planning process required participation of at least three agencies, two of which have statutory authority over water, and the applicants need to demonstrate that all agencies and organizations necessary to satisfy plan objectives were involved in the process.

Regional stakeholders expressed a variety of criticisms about the state administration of the IRWM program. The short time frame for developing the implementation grants prevented the initiation of new projects that feature higher levels of integration than existing projects. The vagueness and frequent changes in state guidelines left some stakeholders confused about criteria for successful proposals. The decision-making involved negotiations between DWR, local stakeholders, and politicians vying to deliver state money to their regions, most notably when some of the regions initially denied implementation money were later awarded some funding (including the Bay Area IRWM). Finally, the continued delay in the release of Proposition 84 funding has undermined the credibility of the state's commitment to IRWM. While these types of management issues are not unexpected as an organization learns how to run a program, they contributed to a negative view of the program among many stakeholders.

The Bay Area IRWM

The Bay Area IRWM followed the timing of the statewide planning and implementation grant process, but with a couple of unique differences. Because of the size and scope of the Bay Area plan, two separate planning grants totaling $838,230 were awarded for the development of different elements of the IRWMP. The State Coastal Commission organized the planning grant for watershed, flood, and stormwater groups, and the Zone 7 Water Agency (a water supply agency) organized the water quality and waste water elements. At the same time, four different water infrastructure organizations submitted separate implementation grants, requesting over $100 million dollars in project funds. DWR asked these agencies to consolidate their requests into a single grant that was then submitted by Bay Area Clean Water Agencies (BACWA), which is a joint public powers authority whose members include public utilities that collect and treat municipal wastewater. BACWA requested $25 million in implementation, and after being initially denied, received $12.5 million in Proposition 50 funding. Although not completely confirmed, some stakeholders suggested Bay Area stakeholders asked their legislative representatives to pressure DWR to reverse the initial denial of implementation funding. This story is consistent with the importance of localism in water politics.

The Bay Area IRWM planning process focused on the production of four "functional area documents": water supply and water quality; wastewater and recycled water; flood protection and stormwater management; and watershed management, habitat protection and restoration. Each functional area document identifies water management challenges, strategies for meeting the challenges, and probably most importantly, a list of specific implementation projects that would maximize benefits and increase cooperation within the region. Each functional area document was coordinated by a relevant lead organization, and the documents were integrated together by a Technical Coordinating Committee (TCC) comprised of representatives from each of the four functional areas.

Three important elements of the Bay Area process should be highlighted for the subsequent analysis. First, there was a lack of coordination among Bay Area agencies from the outset that reflected a division between water infrastructure agencies like Zone 7 and more environmental agencies like the State Coastal Commission; state agencies took steps to increase coordination. Second, the implementation grant was clearly separate

from the planning grant, and the implementation grant focused mainly on the water supply infrastructure projects. Although the story is not entirely clear from our stakeholder interviews, some political deals were apparently made where the environmental project stakeholders agreed to support the initial implementation grant with promises of further collaboration on later grants for Proposition 84 funding. The delay of Proposition 84 funding demonstrates the importance of being first in line. Lastly, the implementation funding received was substantially lower than the initial amount requested, making the IRWM funds only a small part of the overall water management funding portfolio.

Objective 3: The Bay Area IRWMP Survey

This section presents describes the procedure and results from a survey of Bay-Delta IRWM stakeholders to illustrate levels of collaboration, attitudes towards water management, and project implementation activities. The main goal of the survey is to evaluate whether participation in the IRWM increased levels of collaboration or integration.

Procedure

The web-based survey was sent based on a purposive sample of 329 IRWM stakeholders in April and May of 2008. The survey was administered via a mixed-mode (Dillman 2000)method, with an introductory letter delivered by first class mail, an internet survey to study participants, three email reminders, and then a telephone follow-up with opportunity to answer the survey via telephone. A total of 167 responses were received (157 via Internet, 10 via telephone) for a response rate of 50.8 percent.

Table 1: Administrative Classification of Bay Area Stakeholder Types

Organization Type	*Description*	*Percentage of Respondents*	*Average Level of IRWM Participation*
Federal Government	Federal government agencies (e.g. US Army Corp of Engineers)	5.79%	2.85
State Government	State government agencies (e.g. Department of Water Resources, State Coastal Conservancy)	9.09%	4.09
Local Government	Municipal or County governments	27.27%	3.00
Researcher	Universities or research oriented NGOs	6.61%	2.25
Private Business	Any private business, mainly hired consultants	9.09%	1.63
Non-Governmental Organization (NGO)	NGOs, primarily environmental and social justice organizations, watershed groups and some researchers.	15.70%	4.52
Environmental Special District	Environmental special districts with a mission of conservation outreach, preservation of open space, and other environmental goals. Mostly Resource Conservation Districts in this study.	5.79%	4.85
Multi-Agency Partnership	Partnerships comprised of multiple agencies (e.g., Dublin EBMUD Recycled Water Authority).	5.79%	3.00
Water Management District	All water supply, waste water, and flood control agencies that are special districts (e.g.; Santa Clara Valley Water District)	20.66%	7.84

The sampling frame was constructed from attendance lists of public meetings and outreach workshops that were part of the IRWM plan, lists of partner organizations and priority projects identified by the IRWM plan, and also a limited amount of new contacts added based on preliminary semi-structured interviews and communications to develop contact information. Contact people were identified for each partner organization

through web searches or by emailing or calling the organizations directly. The overall goal was to identify a broad set of stakeholders who were involved in water management in general in the Bay Area, not just those involved in IRWM. This allows us to compare the IRWM participants to non-participants in terms of attitudes and behaviors.

The research design has some important limitations that should be kept in mind when evaluating the results. Despite our attempt to encompass stakeholders outside of the IRWM, we did not find many organizations that were not at least listed as a planning partner for a project somewhere in the document. The IRWM was thus fairly inclusive at the organizational level, although our survey results suggest individuals did not participate themselves in the planning process or did not participate frequently enough to indicate it on the survey. There was also a large amount of item non-response to the survey, with many respondents completely skipping questions. Hence, the effective sample size for any given analysis is smaller than the total number of respondents. The Bay Area plan is also one of many IRWM plans within the state, and while officials at the DWR did not consider it the worst program in the state, they also did not consider it the most successful. Since this was an initial pilot study, we chose to study a "middle-of-the-road" program to get an initial idea of the political dynamics at hand. The data limitations and scope of the study prevent conclusively generalizing our findings to IRWM as a whole. Rather, these initial findings should set the stage for future research that examines a broader range of programs and builds on the lessons of this study.

To get a better idea of the type of organizations involved with Bay Area water management, Table 1 reports our classification of water management stakeholders into a variety of administrative categories, for the 121 respondents that provided organizational information. The administrative classification is based on the type of organization, but there are a small number of overlaps between categories. For example, one respondent reported representing both a multi-agency partnership (the San Francisco Estuary Project) and a local government association (Association of Bay Area Governments). The administrative classification suggests that local governments, water management districts, and non-governmental organizations are the main players in Bay Area water management. Local governments are involved because they provide services like waste water treatment and drinking water. Water districts generally provide some of those same services, but are also more likely to provide irrigation water. The NGOs are mostly

environmental groups, some of which have an environmental justice focus due to the urban nature of the Bay Area region. Under the water politics status quo, local governments and water districts are more likely to be allies that are opposed by coalitions of environmental groups; this is same divide between economic development and environmental values that typifies environmental policy.

Results: The Effect of IRWMP Participation on Cooperative Attitudes and Behaviors

If IRWM is changing the water politics status quo, IWRM participants should exhibit higher levels of collaboration and more positive attitudes towards Bay Area water management. To analyze this hypothesis, the survey asked stakeholders whether they participated in eleven different IRWM activities ranging from informal interaction like speaking with IRWM representatives to more formal activities like signing statements of support and developing plan documents. From this list, we constructed an *IRWM Participation* index that sums up the number of "yes" answers to these questions and ranges from 0-11. The last column of Table 1 shows the average level of participation for the various stakeholder types. Water districts have a very high rate of participation in IRWM, followed by NGOs and environmental special districts, and then state and local government. State government participation is high relative to the number of respondents because of the leadership role taken by state agencies like the California Coastal Commission.

Collaborative implementation is measured by asking respondents if they have shared any of seven different water management activities with other agencies in the last three years; the summed scale ranges from 0-7. We ask four different attitudes on 7-point Likert scales: *cooperation* among water management stakeholders (1=very low cooperation; 7=very high), ability of water management to *improve problems* (1=very unlikely; 7=very likely), *fairness* of current water management policies (1=very unfair; 7=very fair), and the *policy efficacy* of the respondent's participation on water management outcomes (1=no difference at all; 7=makes a large difference). An important aspect of these variables is that they are indicators of cooperation in Bay-Delta water management in general, not just the IRWM program. Hence it is informative to the difference between IRWM participants and non-participants.

Figure 1: Cooperative Behaviors and Attitudes among IRWM Participants and Non-Participants

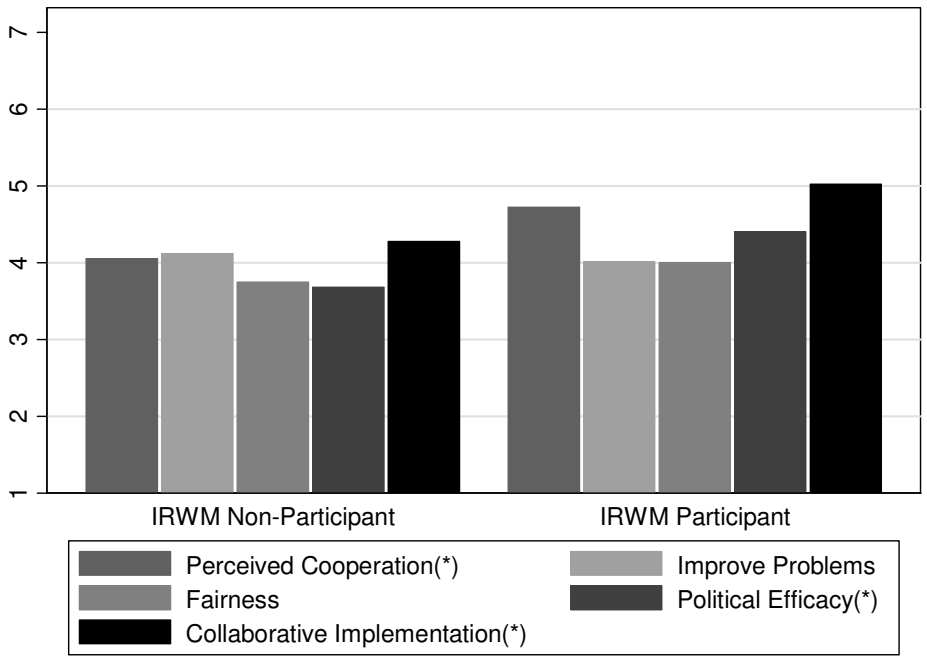


Figure 1 gives a basic description by showing the average scores on these variables for IRWM participants and non-participants, where participants are defined as having a score greater than zero on the IWRM Participation index. An asterisk (*) after the legend label indicates a significant difference between participants and non-participants using a t-test (reject null hypothesis of difference = 0, $p<.10$). These results suggest that in comparison to non-participants, IRWM participants perceive slightly higher levels of cooperation, think they have more influence on decisions, and have higher levels of collaborative implementation. However, this basic comparison does not control for stakeholder type, and we know from Table 1 that water districts, NGOs, and local government have high levels of participation.

Table 2: Effect of Participation on Cooperative Attitudes and Behaviors

	Perceived Cooperation	*Improve Problems*	*Perceived Fairness*	*Political Efficacy*	*Cooperative Implementation*
IRWM Participation	-.02(.04)	-.09(.04)*	-.08(.04)*	-.02(.05)	.11 (.05)*
Water District	.20 (.37)	-.10(.43)	1.07(.40)*	.65(.45)	.67 (.49)
Environmental NGO	-.69 (.40)*	-.35(.44)	-.39(.42)	-.64(.46)	-1.16 (.49)*
Local Government	-.27(.34)	-.04(.39)	.34(.36)	-.46(.40)	-.18 (.40)
Constant	4.78 (.26)	4.58(.30)	4.04(.29)	4.40(.32)*	4.39(.30)*
Model Fit	Adj. R^2=.01 F(4,88)=1.27 N=93	Adj. R^2=.03 F(4,84)=1.63 N=89	Adj. R^2=.09 F(4,78)=3.12* N=83	Adj. R^2=.05 F(4,88)=2.27 N=93	Adj. R^2= .13 F(4,113)=5.76* N=118

Note: Cell entries are unstandardized linear regression coefficients with standard errors in parentheses. *Reject null hypothesis of parameter=0, p<.10.

Table 2 provides a slightly more sophisticated regression analysis using the participation index as an independent variable, and controlling for NGO, local government, and water district organizational types. These three organizational types are the main environmental and water infrastructure stakeholders involved in Bay Area water management. Overall, the regression models are not very good fits to the data with the exception of the perceived fairness and cooperative implementation models, which are slightly better. Hence, in general IRWM participation does not appear to be a major influence on cooperative attitudes and behaviors throughout the entire Bay Area.

Despite the overall weakness of the models, there are a couple of intriguing results. IRWM participants are *less likely* to believe water management policies are fair or will improve problems, but IRWM participants do have higher levels of collaborative implementation. One possible interpretation of this finding is that while more collaboration is required to receive state grant money, the participants do not necessarily believe this collaboration will help solve water management problems. Consistent with the politics as usual model, water districts are generally more optimistic regarding the fairness of the policies while environmental NGOs have lower levels of cooperative

implementation. As will be seen below, water districts receive most of the funding, possibly as a result of their aforementioned advantages in political bargaining.

One important caveat to the positive influence of IRWM on collaborative implementation is that many of the participation activities are similar to the implementation activities, so the distinction between the two variables is not entirely clear. Overall, the evidence suggests that IRWM participation is not strongly linked to an increase in overall cooperative attitudes and behaviors in the Bay Area watershed, and may even be associated with a decrease in perceptions about the fairness and effectiveness of water management. Among the statistically significant results, water districts have the most positive views, and environmental NGOs the most negative.

Results: Views of the IRWM Planning Process

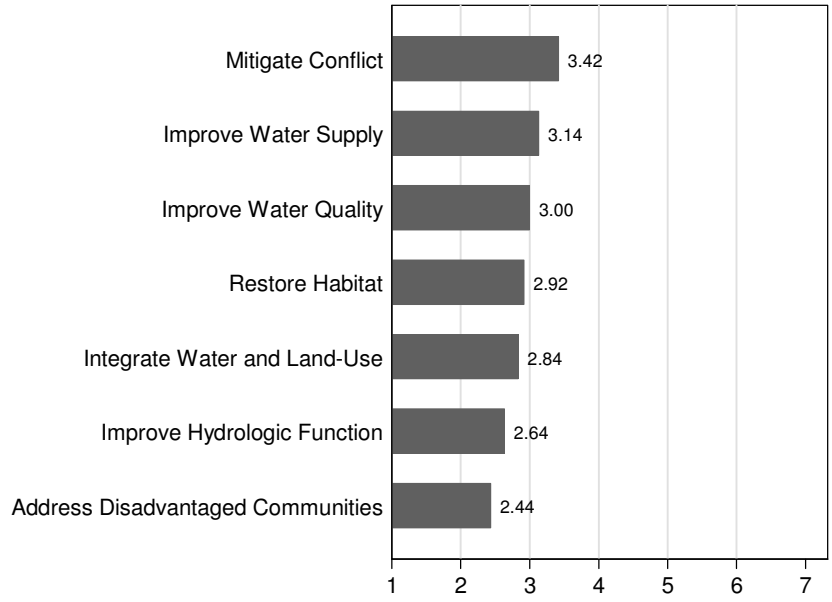
The above analysis provides some initial and circumstantial evidence that IRWM participation is not associated with higher levels of cooperation or more cooperative attitudes, and that water management in the Bay Area is skewed towards the preferences of water districts. One potential problem with the above analysis is that we do not have a large number of organizations outside the IRWM process, and hence the baseline level of cooperation is not accurately measured.[2] Furthermore, participation in IRWM is non-random; if highly collaborative stakeholders choose to participate, the effect of IRWM would be inflated, while if uncooperative stakeholders choose to participate, the effect would be underestimated. There is not enough information in this current dataset to adequately control for this selection bias, which is ubiquitous in program evaluation (Achen 1986).

Additional clues come from questions asking IRWM participants to reflect on their experience with the planning process, and these responses generally corroborate the conclusions in the previous section. Participants rated the contribution (1=No contribution; 7=Major contribution) of IRWM to achieving seven water management goals: mitigating conflict, improving water supply reliability, improving water quality,

[2] According to our data, 53% of the respondents participated in at least one IRWM activity. However, our initial list of stakeholders should have contained a great deal more participants because contact organizations were taken from a variety of IRWM documents. This means that some of the survey respondents did not report or remember participating in IRWM, or that some of the documents were listing non-participants. In fact, our preliminary case studies suggest that some stakeholders were being listed without consultation because they were past participants in IRWM projects.

restoring habitat, addressing disadvantaged communities, improving hydrological function, and integrating water and land-use management. Another set of questions asked about the success of IRWM at integrating (1=No change in integration; 7=Much greater integration) activities with other stakeholders in nine functional areas: water quality, water supply, waste water, recycled water, flood protection, storm water management, watershed conservation, habitat restoration, and land-use planning. These two sets of questions are basically two different ways of asking about the success of IRWM.

Figure 2: Perceived Achievement of Water Management Goals



Figures 2 and 3 provide the average scores for each of the items in the water management goals and integration sets of questions. As can be seen, IRWM participants had a largely negative attitude about the program. Not a single score is above the midpoint of the scale; the participants on average perceive the IRWM program of making only small contributions to achieving goals and increasing integration. To the extent any goals were achieved, IRWM had the biggest influence on mitigating conflict and improving water supply, while largely failing to integrate disadvantaged communities or improve hydrological functioning on large-scale. These are the same criticisms often heard about water management in general, not just IRWM. The greatest integration was

perceived for habitat conservation and watershed conservation, which at least superficially is a positive sign with respect to IRWM going beyond the politics-as-usual.

Because respondents tended to answer each individual item in a similar manner, these results can be summarized by averaging the answers to the sets of questions in Figures 2 and 3 to create two reliable scales, *water management goals* (Cronbach's alpha=.92) and *integration* (Cronbach's alpha=.96). The mean value of the water management goal scale is 2.9 and the integration scale is 2.6. Table 3 compares the mean scores on these two scales for three most frequent types of water management organizations, environmental NGOs, local governments, and water districts. The results show that water districts again have a more positive view of integration than environmental NGOs or local governments. This basic pattern exists for all of the individual functions shown in Figure 3, with the exception of integrating land-use planning and water management. On those criteria, basically all stakeholders have similar negative views about the success of IRWM.

Figure 3: Perceived Integration of Watershed Functions

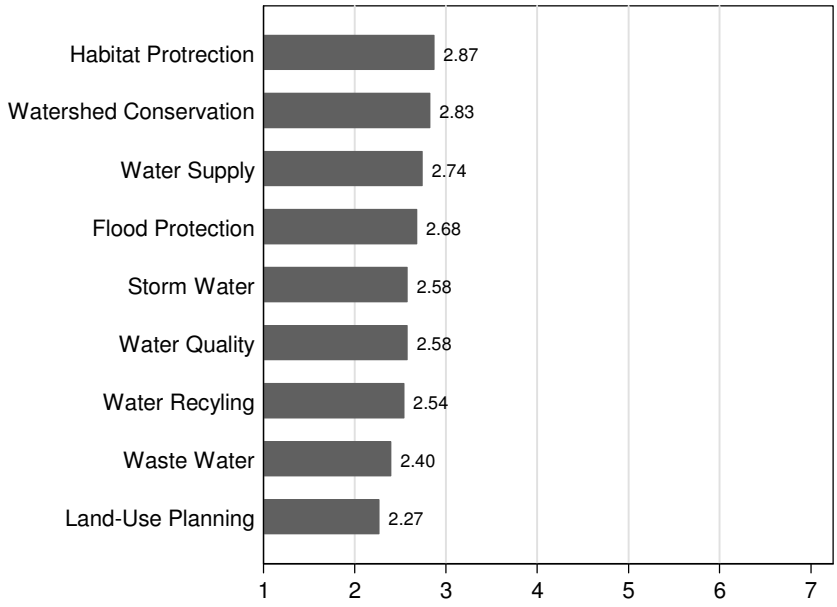


Table 3: Perceived Goal Achievement and Integration by Most Frequent Organizational Types

	Achieve Water Management Goals	Increase Integration
Water Districts (N=19, 18)	2.94	3.39*
Local Governments (N=16,10)	2.97	2.46*
Non-Governmental Organizations (N= 10, 6)	2.36	2.50*

*Means are statistically different from one another by one-way ANOVA using three organizational categories as the factor variable. N indicates the number of respondents from each type of organization for the water management and integration variables respectively. There are fewer respondents than earlier analyses because this table is limited to confirmed IRWM participants.

While the above results suggest a generally negative view of IRWM among most participants, they do not identify specific reasons why the participants were dissatisfied or where they saw more positive outcomes. To delve deeper, the survey asked fifteen questions (1=strongly disagree; 7=strongly agree) about the general operation of IRWM. Table 4 reports the average responses to the seven questions with the most extreme answers, where questions with average scores below three indicate general disagreement and average scores above 4 indicate general agreement. This manner of grouping questions identifies participants' most negative and positive views of the IRWM.

Five of the seven questions report negative views on the IRWM. Participants did not agree that state guidelines were clear and flexible, reflecting at least in part the fact that the guidelines were changing during the time frame of the process. Participants also agreed that the IRWM was a time consuming process controlled by narrow interests, and that individuals had little influence on the overall decisions. On the other hand, participants agreed that the ability of IRWM to encourage collaboration and networking. The findings in Table 4 are consistent with the earlier results that compared IRWM participants to non-participants on Bay Area water management in general. IRWM appears to be associated with some small increases in collaboration and networking, but the process is not viewed as fair or effectively administered.

Table 4: Reasons for IRWM Failures and Successes

Negative Views on IRWM	
State guidelines for IRWM were clear and understandable.	2.77
State guidelines for IRWM were sufficiently flexible to accommodate regional differences	2.77
IRWM was too time consuming	4.79
My participation in IRWM had a large influence on decisions.	2.25
IRWMP was controlled by narrow interests.	4.42
Positive Views on IRWM	
IRWM has helped me network with other stakeholders.	4.4
IRWM has improved the level of collaboration among Bay Area stakeholders.	4.6

Note: Responses provided on a Likert scale where 1= strongly disagree and 7=strongly agree.

Results: Views on IRWM Projects

Most IRWM plans are built around specific projects such as improving or expanding water infrastructure facilities, watershed restoration, invasive species eradication, fish habitat improvements, watershed modeling, water quality monitoring, *et cetera*. It is clearly accurate to say that funding water management projects is one of the primary goals of IRWM and many other collaborative planning programs. Despite being marketed in terms of integration and collaboration, the project funding aspect of IRWM is a tradition in water management. The question is whether or not the collaborative perspective has changed the way in which these projects are prioritized or implemented. It should also be recognized that a great deal of environmental policy research fails to analyze how specific projects are funded(Berardo 2009), while spending a great deal of time analyzing compliance and the effects of regulation or incentive programs. Far more research is needed on project implementation because more money is probably spent on project implementation than on enforcement or monitoring.[3]

One way to examine the effectiveness of IRWM is to see how these individual projects have changed. IRWM should lead to projects having new planning partners,

[3] We do not have any data to support this claim; it is just an educated guess. Answering the question about the relative expenditures on monitoring and enforcement versus project implementation, and the politics of funding distribution, would make for a worthy research project of its own.

increased geographic scope, and addressing new functional areas. All of these criteria are linked to moving from the status quo of fragmentation to a more integrated and collaborative pattern of management relationships. The financial and information resources provided by the state should make integrated projects easier to implement and fund. The assumption is that IRWM will accelerate project integration relative to the level of integration that existed prior to the regional process. In the extreme case of the water politics as usual model, prior cooperation and integration would be minimal. In reality, a number of collaborative projects existed in the Bay Area prior to IRWM (e.g., CALFED) and thus IRWM may only lead to a small increase in integration.

The survey asked Bay Area stakeholders whether they were involved with one of the priority projects identified by the planning process. Forty-nine respondents (29%) then indicated whether their projects have changed *as a result* of the IRWM process, for six different water management goals (Table 5). Overall, the project partners indicated only small changes in project implementation. The largest changes involved new funding and planning partners, which is not surprising given that IRWM is a grant program that encourages broad participation. IRWM was less effective at promoting functional and geographic integration; less than one quarter of the project partners reported any changes at all to existing plans. According to our interviews with Bay Area participants, most of the projects were not new and had been in the planning stages for a number of years, so any changes were likely to be marginal. And regardless of how the projects changed, all of them are technically or politically complex, thus none of the partners indicated the projects became easier to implement. Indeed, adding partners may increase the difficulty of implementation even when subsidized by additional grant funding (Berardo 2009).

Table 5: Percentage of Project Partners Indicating Changes to Project Implementation

Added new planning partners	24% (12/49)
Expanded in geographic scope	14% (7/49)
Addressed new functional areas	14% (7/48)
Required changes from existing plans	17% (8/48)
Received more funding	29% (14/48)
Become easier to implement	0% (0/46)

Project prioritization is another important aspect of IRWM planning. Any planning process can be thought of in terms of matching resources to issue priorities. A

fair and effective process should put more resources on higher priority issues, while an unfair and probably less effective process would concentrate resources on the issues of concern to the most powerful constituency. The WPU model would predict the most resources and highest priority would be given to the water infrastructure projects, while the collaborative model would predict a more balanced spread of resources across issue priorities. The inclusive nature of collaborative planning is designed to give access to stakeholders who in the past were excluded from setting the agenda on resource allocations.

The IRWM plan contained a list of 130 priority projects that were identified by each of the functional area working groups. Table 6 reports our classification of those projects into ten different water management activities, where any project could claim to provide more than one benefit. The majority of projects focused on habitat restoration, flood protection, recycled water, and drinking water quality. The percentage of estimated capital costs is calculated by dividing the estimated costs of projects in one of the categories (e.g. habitat restoration) by the total estimated costs of all projects ($1,816,666,973).

There appeared to be very little integration among these projects; 69% of the projects were classified as only providing a single benefit, while 29% were classified as providing two benefits. Twenty-seven of the 33 flood control projects also claimed habitat benefits; these constituted the vast majority of the projects that claimed two benefits. Flood control projects often have habitat benefits when they involve bank restoration and other activities to reduce runoff, but most of the flood control/habitat projects still involved hard infrastructure components like canal improvements.

While the planning process identified a high percentage of habitat restoration projects in addition to water infrastructure projects, the amounts requested in the subsequent implementation grant (submitted by BAWCA) showed a different priority. The total amount of implementation money requested by the Bay Area IRWMP at the time of our study was only $18 million dollars—5% of the total estimated capital costs of the projects under consideration (they only received $12.5 million). Over half of the requested implementation funding was allocated to recycled water projects, with the next largest category going to water supply. Habitat restoration was allocated only eleven

percent of implementation funds, despite constituting more than one-third of the capital costs of the priority projects.

Table 6 provides a rough comparison of funding priorities to actual stakeholder priorities using survey questions that asked the respondents to rate the severity or problems associated with habitat/biodiversity loss, flood risk, water supply reliability, water pollution, in-stream flows, water storage, and availability of scientific information.[4] Bay Area stakeholders viewed water supply reliability, flood protection, and habitat restoration as the most important problems, although the other issues are not very far behind. In terms of survey responses, it is fair to say that on average stakeholders viewed nearly every issue as moderately important. But to the extent stakeholder priorities are reflected in the relatively fine distinctions among issue perceptions, there is a fairly good match between stakeholders views and priority projects. The three most important problems as perceived by the stakeholders are also three of the four top priority projects.

Again, things are different when it comes to actual implementation funding. The most dramatic difference is for habitat restoration, which receives only 11% of requested funds despite being one of the very top priorities. Habitat and biodiversity concerns did not receive the same consideration in implementation funding as they did in terms of stakeholder priorities and the planning process. These results are consistent with the rest of the analyses that show the privileged position of water infrastructure interests in the WPU model—water infrastructure interests like IRWM better, and they get more money.

[4] The survey did not contain questions above every type of water management benefit claimed by the projects, such as recycled water. The table contains an N/A entry if we do not have corresponding survey information. The survey questions are a bit different than the labels for some of the claimed benefits. The survey based measure of drinking water quality combines answers to questions about industrial pollution, urban runoff, and municipal wastewater discharge. The survey-based measure of research and planning asks about the availability of scientific information. The survey-based measure of in-stream water quality asks about the adequacy of in-stream flows.

Table 6: Project Funding Distribution and Stakeholder Priorities

Project type	*Number of Projects*	*Percentage of Projects*	*Percentage of Estimated Capital Costs*	*Percentage Implementation Funds Requested*	*Perceived Issue Priority (Survey; 1=Not a problem; 7=Severe Problem)*
Habitat restoration	56	43.08%	35.19%	10.56%	5.00
Flood protection	33	25.38%	18.66%	6.55%	4.82
Water supply reliability(including desalinization)	13	11.54%	26.41%	23.82%	5.03
Recycled water	29	22.31%	31.62%	53.47%	N/A
Drinking water	6	4.62%	4.11%	8.01%	4.57
In-stream water	5	3.85%	0.15%	0%	4.68
Water storage	4	3.85%	1.79%	0%	4.23
Research and Planning	9	8.46%	0.45%	0%	4.24
Water conservation	4	5.38%	4.38%	0%	N/A
Public health	5	3.85%	0.10%	0%	N/A

Note: Total number of Priority Projects=129; Total Number of Implementation Projects=15; Total Estimated Capital Costs of Priority Projects= $1.8 billion; Total Estimated Capital Costs of Implementation Projects=$18.3 million; Total Implementation Funding Requested=$354 million.

Conclusion: Maintaining the Status Quo in Bay Area Water Management.

The goal of this paper was to assess the effectiveness of the Bay Area IRWMP in terms of its ability to remedy the fragmentation and collective-action problems associated with the politics-as-usual model of water management. Initial evidence from the Bay Area suggests that IRWM made little change in the status quo. IRWM participants are more likely to perceive water management policies in the overall Bay Area as unfair and ineffective, and do not believe that IRWM has achieved water management goals or increased integration. Most of the optimism about IRWM is concentrated among the traditionally powerful water infrastructure organizations. Among the stakeholders who offered information about specific projects, at most one-third said that IRWM changed implementation, mostly by adding new planning partners and funding. The actual requests for implementation funding were concentrated on water infrastructure projects,

while habitat restoration and biodiversity were largely excluded from initial funding despite being a priority among some stakeholders.

IRWM participants identified some reasons for these outcomes. The administration of IRWM at the California state level was perceived as confusing and inflexible. This is no surprise given how state guidelines were in flux at the time, and funding for later stages of the IRWM project actually disappeared. The complexity of the IRWM process was viewed as too time consuming, especially given the amount of grant funding available relative to the capital costs of the priority projects. Many stakeholders questioned the procedural fairness of the process, feeling their voices had little influence over decisions controlled by special interests. Again, these types of concerns are typical the politics-as-usual model, and do not suggest a major increase in collaboration.

On the other hand, there are some bright spots among this generally negative picture. Participation in IRWM is associated with a higher level of collaboration on implementation activities, although it is hard to disentangle collaboration in the context of IRWM planning from collaboration in other ongoing processes. Similarly, IRWM participants did generally agree that the process added new planning partners and generally increased collaboration. This level of collaboration is reflected in the prioritization of projects, which is more reflective of the distribution of preferences among stakeholders. Hence, in general, it is accurate to say that IRWM had a small but positive influence on levels of collaboration and probably increased the breadth and density of policy networks in the Bay Area.

Despite the evidence that IRWM has not done much to change water politics as usual in the Bay Area, the IRWM concept should not be condemned too hastily. The results in this paper are based on a pilot study of a single region, and the survey data is admittedly sparse in many areas. More research is needed to confirm some of the patterns seen here. There are other regions in California that are perceived at least by state officials to be more successful than the Bay Area, and a comparative study across regions may reveal differences and suggest why IRWM works in one region but not another. Such comparative studies should also be undertaken in other countries that are experimenting with integrated management.

The Bay Area results have implications for this special issue's concept of "synchronized" water management as a self-organized remedy to fragmentation. In

particular, the synchronization process is likely to be incremental and evolutionary. The current water policy status quo in the United States has been evolving for over 200 years (at least). Perhaps the incremental effects of the IRWM in the Bay Area are the first sign that water management is beginning to become more synchronized, and therefore deserves continued investment. Unrealistic expectations of how quickly things will change could cause political will to drain away from an investment that could have longer-term benefits. As one of the authors' colleagues put it, collaborative management may be better than nothing. Unfortunately, like with many water management decisions, these expectations are formed in the face of high uncertainty, and the potential for symbolic policy is very real. How much change, over what time span, is enough to continue investing in integrated approaches? If these integrated approaches will eventually revert back to the water politics status quo, we should not be trying to spread them to every region of California, the rest of the United States, or indeed the whole world.

The overall contribution of this paper is to help set the stage for further research on the problems of fragmentation, and the capacity of institutions like IRWM to encourage integration and collaboration. From the theoretical perspective, we compare the traditional and collaborative models of water management in terms of the main economic and political factors driving the patterns of interaction, decisions, and outcomes. The empirical analysis reveals some intriguing patterns that are more consistent with the water politics status quo and suggest collaborative institutions like IRWM can only make incremental changes in the short-run. Like any research that is breaking new ground, the analysis brings up more questions than it answers, which necessitates more research to uncover the conditions under which the findings here will hold.

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Publications

Under Development

Thesis, Dissertation

Lucas, Lippert. "An Assessment of Integrated Regional Water Management Planning (IRWMP) in the San Francisco Bay Area." UC Davis Master's Thesis, 2008.