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Bridging the Hierarchical and Collaborative Divide: Learning in California's Integrated
Regional Water Management Process

By

Esther C. Conrad

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Environmental Science, Policy, and Management

in the

Graduate Division

of the

University of California, Berkeley

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Professor Jeffrey M. Romm (Chair)

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Abstract

Bridging the Hierarchical and Collaborative Divide: Learning in California's Integrated Regional Water Management Process

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Doctor of Philosophy in Environmental Science, Policy, and Management

University of California, Berkeley

Professor Jeffrey M. Romm, Chair

Collaborative governance holds promise for generating learning and innovative solutions to complex resource management challenges. However, attending to the cross-scale dynamics of many environmental problems requires local or regional-scale networks to engage with state or national level government agencies, which are often hierarchical in structure. California's Integrated Regional Water Management process has sought to encourage local water agencies to collaborate at a regional level in order to build a collective understanding of water management problems and define their own priorities and actions. At the same time, to demonstrate public accountability, the state government has required regions to comply with complex requirements to develop plans and apply for project funds, which may constrain learning and innovation.

This dissertation examines the extent to which learning is occurring in the midst of these tensions. It focuses particular attention on how regional-level capacity for managing a network can help to mediate between hierarchical and collaborative governance forms to enable learning. Analysis of a sample of 19 out of the 48 water planning regions in California revealed that centralized network structures were associated with higher levels of investment in network management activities. Learning was assessed in two case study regions in the Central Valley with respect to three IRWM program goals embedded in IRWM requirements: building a regional vision for water management, promoting environmental stewardship, and addressing the needs of disadvantaged communities. This analysis indicated that a committed and trusted lead agency with staff dedicated to managing a collaborative process played a crucial role in generating learning around these themes. This lead agency helped to bridge the hierarchical and collaborative divide in three ways: by brokering across regional and state-level interests, developing processes that transform external requirements into learning opportunities, and supporting the development of informal dynamics in addition to ensuring formal rule compliance. This research improves our understanding of how networks function in the context of hybrid governance arrangements with collaborative and hierarchical features. It also delineates critical elements of adaptive governance structures that can support learning to manage multi-scalar environmental problems.

For Renjit

Table of Contents

List of Tables and Figures.....	v
Acknowledgements	vi
Introduction	viii
Chapter 1. Networks, collaboration, and learning: A theoretical framework.....	1
Networks and collaborative governance in environmental management	1
Defining networks	3
Evaluating networks: Legitimacy and learning	4
Legitimacy in collaborative governance	5
Learning in networks.....	7
What is learning?.....	7
How does learning occur in networks?	10
Governing networks for learning: “Structure” or “agency”?	11
Network structure	11
“Agency”: The role of network managers.....	13
Linking structure and agency	15
Meta-governance: Managing tensions between collaboration and hierarchy	18
Accountability and the persistence of hierarchy.....	19
Network governance in the context of water management.....	21
Conclusion	25
Chapter 2. The case, research questions, and methods	27
Integrated Regional Water Management in California	27
Analytical and substantive justifications for IRWM as a case.....	28
The IRWM process as a “critical” and “revelatory” case	29
Policy relevance of research on the IRWM process	29
Research questions	31
Methods	31
Study scoping.....	34
Data sources	34
Analysis	40
Chapter 3. The emergence of Integrated Regional Water Management in California	42
California’s water resources: High variability, high demand.....	44
Institutional context: A tradition of local control	45
Origin and intent of the Integrated Regional Water Management program	49
Experiments in regional collaboration	49
The 2002 IRWM Planning Act: Integrating water supply interests	51
Proposition 84 and the 2008 update to the IRWM Planning Act: Multiple benefits, adaptation, and equity.....	53
Operationalizing the IRWM program: Reconciling accountability with collaboration.....	55
The changing role of DWR.....	56
The formation of IRWM regions	58
IRWM plans and projects.....	60

Technical assistance to IRWM regions	63
Conclusion: Integrated Region Water Management Plans, or “I Really Want My Project”?	64
Chapter 4. Negotiating natural and institutional boundaries in the creation of IRWM regions	66
Legitimacy in collaborative watershed governance	67
Legitimacy in the context of the IRWM process	68
Methods	69
IRWM regional boundaries: An overview	70
Building legitimacy for regional governance: Three case studies	74
Overview of three case study regions	74
Building legitimacy through identifying common interests and values	77
Legitimacy in governance: Reconciling representative and deliberative approaches	81
Conclusion	85
Chapter 5. Governing IRWM regions: The role of network management.....	89
Overview of 19 IRWM regions	90
Decision-making processes	90
Number and types of participants	92
Network management in IRWM regions	96
Key network management activities	96
The growing role of consultants	103
Assessing degrees of investment in network management	104
Structuring network management in IRWM regions.....	105
Analysis of IRWM regional governance structures	106
Relationship between governance mode and investment in network management.....	109
Explaining the diversity of governance forms among IRWM regions	110
Lead agency regions.....	111
Network administrative organization regions.....	115
Shared governance IRWM regions	117
Conclusion	120
Overview of case study regions	123
The Kings Basin.....	125
Westside Sacramento.....	131
Learning in the Kings Basin and Westside Sacramento IRWM processes	136
Assessing learning	137
Learning in the Kings Basin	141
Learning in Westside Sacramento	146
Conclusion	151
Chapter 7. Bridging the hierarchical and collaborative divide: The role of network management in supporting learning	154
Mechanisms for bridging the hierarchical and collaborative divide	155
Setting the stage for learning: brokering across state and regional interests.....	155
Developing collaborative processes that transform requirements into learning opportunities	159
Providing stability and support for institutional learning.....	162
Conclusion	166
Chapter 8. Conclusion: Toward adaptive water governance in California.....	169
Network managers as catalysts for learning in hybrid governance arrangements	170

Defining scales of collaboration in the context of water management.....	172
The role of government in “meta-governing” networks.....	174
Building capacity for learning across scales.....	175
The future of the IRWM process.....	176
The state’s role in building capacity for network management	178
Future challenges: The drought and re-negotiating state-local relationships	180
References.....	184

List of Tables and Figures

Tables

1.1. Three types of learning.....	9
1.2. Network structures.....	12
2.1. Key study components.....	32
2.2. Interviews conducted, June 2013 – June 2014.....	35
2.3. Meetings observed, 2011-2015.....	37
2.4. Public documents analyzed.....	39
2.5. GIS data utilized for analysis of IRWM regional boundaries.....	39
4.1. Determinants of IRWM regional boundaries (19 regions).....	72
4.2. Institutional determinants of regional boundaries.....	73
4.3. Overview of case study regions.....	76
4.4. Indicators of legitimacy in three case study regions.....	76
5.1. Overview of 19 sample IRWM regions.....	91
5.2. Decision-making structures in 19 IRWM regions.....	92
5.3. Size of IRWM regions.....	93
5.4. Network participants, population, and land area.....	94
5.5. Participants in IRWM regions.....	95
5.6. Network management activities in IRWM regions.....	97
5.7. Indicators used for distinguishing network forms in IRWM regions.....	106
5.8. Governance forms and network size.....	107
5.9. Time invested in network management v. governance mode.....	109
5.10. Financial support for network management v. governance mode.....	109
5.11. Characteristics and roles of lead agencies.....	111
5.12. Characteristics and roles of network administrative organizations.....	116
5.13. Characteristics of shared governance arrangements.....	117
6.1. Overview of case study regions.....	124
6.2. Case study interviews.....	140
6.3. Cognitive and strategic learning in case study regions.....	142
6.4. Institutional learning in case study regions.....	145

Figures

2.1. Sample of 19 IRWM regions.....	33
4.1. IRWM regional boundary types.....	71
4.2. Case study regions.....	75
5.1. Network governance forms in 19 IRWM regions.....	108
6.1. Case study regions.....	123

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Introduction

Environmental problems present enormous governance challenges. Since awareness of the impacts of industrialization began to grow in the 1960s, regulation has been the primary tool used in the United States to control air and water pollution and manage threats to endangered species. While it has yielded significant improvements, regulation has been slow and costly, and has left many problems unresolved (Rosenbaum, 2014). This has prompted a search for new, more collaborative ways in which government, business, advocacy groups and citizens can interact with one another to develop solutions (Weber, 1998).

Several features make environmental problems particularly thorny. First, environmental problems result from interconnections between ecological, social, and economic processes. Understanding these linkages requires integrating multiple forms of expertise to develop collective knowledge of complex social-ecological systems (Liu et al., 2007, Norgaard & Baer, 2005). Scientists must move beyond the boundaries of their disciplines, government agencies must engage outside of their defined functional areas, and processes must be developed that enable citizens to contribute their knowledge and perspectives in defining the problems at hand (Lélé & Norgaard, 2005, Kettl, 2006, Fischer, 2000). Second, the drivers and impacts of environmental problems often stretch beyond the boundaries of political jurisdictions, complicating efforts to mobilize policy responses (Meadowcroft, 2002, Young, 2002). Finally, social-ecological systems are dynamic and complex. Management decisions must be made in the midst of uncertainty, and updated as conditions change or knowledge improves (Lee, 1993). Uncertainty is nothing new to policy-makers. However, sustainable environmental management calls for resilience, which requires managing for flexibility in light of on-going change, rather than managing for stability by seeking to control processes of change (Folke, 2006, Nelson et al., 2007).

These governance challenges are evident in efforts to adapt to climate change impacts. As global action to reduce greenhouse gas emissions has so far remained elusive, it is now increasingly clear that some of the effects of increasing temperatures and rising sea levels can no longer be avoided (IPCC, 2014). Understanding vulnerability to climate change impacts requires integrating knowledge about projected changes in the global climate system with detailed knowledge of social, economic, institutional and ecological conditions in a particular context (Füssel, 2007). Adaptation measures frequently require coordination across multiple sectors, including water management, land use, agriculture, transportation, and public health, as well as inputs from governmental and non-governmental actors at multiple scales (Adger et al., 2005, Wilbanks & Kates, 2010).

The water management community's capacity to manage the impacts of climate change has broad implications for the overall resilience of communities and ecosystems. The effects of climate change on water resources will be profound. In California, increases in air temperature are reducing snowpack in the Sierra Nevada mountains and changing the timing of runoff (DWR, 2015a). This complicates water storage efforts needed to cope with

the long dry season that is characteristic of the state's Mediterranean climate. In addition, California is likely to experience more frequent heavy precipitation events and more severe droughts (Diffenbaugh, 2015, Moser et al., 2012). These increased extremes make it even more difficult for water managers to ensure reliable water supplies and avoid serious flooding impacts.

Yet, current water governance arrangements are ill equipped for these impending changes. Responsibility for water management in the United States is fragmented across thousands of small water districts, whose narrow mandates limit their capacity to address multi-faceted problems with larger-scale effects (Mullin, 2009, Deyle, 1995). Water management organizations have long relied upon infrastructure-based strategies to deliver water and control flooding, seeking to buffer uncertainties by reducing system complexity, often at significant environmental cost (Lach et al., 2005, Palmer, 2010). Yet, preserving ecosystem functions has become even more critical in order to cope with extreme climate events. For example, the loss of wetlands in Louisiana increased its vulnerability to hurricane impacts, and this, combined with the failure of flood control infrastructure, led to tragedy in New Orleans during Hurricane Katrina in 2005 (van Heerden, 2007). Finally, historical climate records, which have long guided the activities of water managers, can no longer be relied upon as adequate indicators of future conditions (Milly et al., 2008). Overall, water management institutions need greater adaptive capacity, including the ability to support continual learning, coordinate actions with a multiple partners, and maintain flexibility to respond to changing conditions (Huntjens et al., 2012, Huitema et al., 2009).

This dissertation project was originally motivated by my interest in how water governance arrangements might need to evolve in order to cope with the risks and uncertainties presented by climate change. The state of California, where there is political will to act on both climate change and water management, was an excellent setting for exploring this. I began by conducting a study in collaboration with the Climate Change Program at the California Department of Water Resources (DWR), examining how climate change was being considered in the state's Integrated Regional Water Management (IRWM) process (Conrad, 2012). This project focused on how newly created water planning regions across the state were taking climate change projections and knowledge about anticipated impacts into account in developing their regional-scale water plans.

However, as I investigated the nature of these plans, I found that the process of developing them involved new types of collaboration among local water agencies. The IRWM process was intended to overcome fragmentation and promote dialogue and coordination among a wide range of water stakeholders. I began to reflect on how these emerging regional governance arrangements could help support learning, and provide capacity for managing the multi-scalar and evolving risks that climate change imposes. My dissertation quickly moved from a focus on the use of climate change science in water planning to an examination of whether regional-scale governance arrangements could serve as a platform for learning and new partnerships. The growing literature on collaborative and network governance provided a crucial foundation for analyzing the conditions that might best

support learning among a diverse set of water stakeholders (Ansell & Gash, 2008, Sorensen & Torfing, 2009, Hughes & Pincetl, 2014).

My study of how climate change was being considered in IRWM planning also pointed me toward a crucial tension involved in implementing network governance, which became a core theme in my research. The reason why IRWM regions were discussing climate change in their plans was that the state's guidelines required them to do so. In creating the IRWM process, state government officials sought to encourage local agencies to work together to define their own priorities at regional scales. At the same time, however, the IRWM process was intended to advance state-level priorities, many of which extend beyond the boundaries and mandates of local agencies. In addition to climate change, these included issues such as reducing dependence on water transported through the Sacramento-San Joaquin Delta, and addressing water problems in low-income communities. To advance these priorities and ensure that taxpayer dollars are spent according to legislative mandates, the state instituted a complex set of guidelines that IRWM regions must follow. The tension between this emphasis on rule compliance and the informal and often messy dynamics of collaboration was readily apparent. This reflected a growing recognition by many scholars that while emphasis on collaboration has grown in recent decades, it has not replaced hierarchy. Rather, collaboration has emerged alongside hierarchy, creating new, hybrid governance forms (Ferlie et al., 2011, Meadowcroft, 2002, Hill & Lynn, 2005).

I became intrigued with the question of how learning and other benefits of collaboration could be sustained when subject to the demands of hierarchy. This question is particularly important in the context of climate change and other environmental problems, which require the capacity to integrate across state and local needs, and bridge differences between hierarchical and collaborative forms of governance. In the chapters that follow, I explore the degree to which learning has occurred among water stakeholders through the IRWM process, and examine the role that institutional capacity at the regional level plays in reconciling the rule-based approach of the state with the need for flexibility and informal interaction among local stakeholders. The following chapter summaries provide a brief overview of the structure of this dissertation.

Chapter 1. Networks, collaboration and learning: A theoretical framework. This chapter provides the theoretical background for my research on network governance and learning in the context of water management in California. I begin by examining the emergence of network governance in the context of environmental management. I then describe two critical dimensions of the process of network governance: the development of legitimacy around new governing arrangements that extend beyond existing political jurisdictions, and the generation of learning through collaborative processes. I review literature on the nature of legitimacy in representative and collaborative governance forms, and discuss how collective learning has been defined and what conditions are needed to support it. I then discuss the tensions that emerge when networks operate within the context of hierarchy, and lay out a hypothesis that the capacity for network management plays a role in negotiating these tensions. This is followed by a discussion of the institutional context for water governance in the United States, and the emergence of

collaborative governance as a means to promote integrated approaches to water management. I conclude by summarizing some key themes and questions that frame my dissertation.

Chapter 2. The case, research questions, and methods. This chapter briefly introduces California's Integrated Regional Water Management (IRWM) program, and lays out a justification for it as a case of a hybrid governance arrangement intended to support collective learning. I describe how the IRWM process serves as both a "critical" and "revelatory" case, and discuss the relevance and timeliness of this research in the context of California water policy. I then outline my research questions, research study design, and methods. The study involves three components: 1) a state level analysis focusing on the origins and implementation of the IRWM program; 2) an analysis of the governance structures and investment in network management in a sample of 19 IRWM regions; and 3) analysis of learning and the mechanisms that support it in two case study regions. My data sources include 71 semi-structured interviews, observations of over 30 public meetings, and analysis of hundreds of public documents.

Chapter 3. The emergence of Integrated Regional Water Management in California. This chapter describes how California's IRWM program serves as a platform to bring multiple perspectives on California's water management challenges into conversation with one another. First, I briefly introduce the historical, biophysical, and institutional context for water management in California, particularly the state's long history of local control over water resources. I examine the origins and intent of the IRWM process, tracing the multiple narratives that have together shaped the structure of the IRWM program today. I then describe the implementation of IRWM program, including the role of the California Department of Water Resources (DWR) as the administrator of this process. This implementation process reveals the tensions between the ideals of regional-scale collaboration and the pressures at the state level to maintain accountability for public expenditures.

Chapter 4. Negotiating natural and institutional boundaries in the creation of IRWM regions. This chapter examines the boundaries that have emerged among California's 48 IRWM regions, which follow a combination of watershed, groundwater basin, and jurisdictional boundaries. I draw upon the experience of three regions that follow hydrologic boundaries to understand whether and how their regional governing arrangements have come to be viewed as legitimate venues for decision-making on water management issues. I focus on two key dimensions of the process of building legitimacy: 1) the development of shared interests that motivate collaboration, and 2) the creation of new norms and routines of interaction that gain a sense of "appropriateness" among participants in the process. The comparison of the experiences of these three IRWM regions suggests an important role for convening agencies in the creation of legitimate governing arrangements at hydrologic scales.

Chapter 5. Governing IRWM regions: The role of network management. This chapter analyzes the network management activities undertaken in 19 IRWM regions, and the

variety of governance structures that have evolved to support them. I begin with an overview decision-making structures and participation in the 19 regions and then examine the types of network management activities and the varied levels of investment in sustaining them. I use the typology provided by Provan and Kenis (2008) to distinguish differences in how IRWM regions are structured to support regional-scale collaboration. While some IRWM regions have chosen relatively centralized network structures by identifying a lead agency or creating a network administrative organization, others have shared the responsibilities of managing regional activities across participating agencies. I conclude by examining the types of agencies that have taken on leadership roles in centralized IRWM regions, and discussing the conditions that have led to decentralized structures in others.

Chapter 6. Learning in the IRWM process: Evidence from two case studies. This chapter focuses on two IRWM regions in California's Central Valley, the Kings Basin and Westside Sacramento. The former represents a centralized, lead agency network structure and the latter follows a shared governance arrangement. I examine the socio-economic context and history of water management issues and conflicts in each region. After reviewing the framework of cognitive, strategic and institutional learning used in my analysis, I present findings regarding learning in each region. I conclude by analyzing a range of interconnected factors that may have contributed to differences in learning outcomes, including the degree of homogeneity and the perceived severity of water management problems, the geographic size of the region, and the degree of investment in managing the collaborative process.

Chapter 7. Bridging the hierarchical and collaborative divide: The role of network management in supporting learning. This chapter explores how differences in the capacity for network management in the two case study regions have helped to shape learning outcomes. My analysis indicates that the presence of a trusted lead agency in the Kings Basin played a crucial role in mediating between the interests of the state, as expressed in IRWM program rules, and those of local stakeholders. In particular, the Kings River Conservation District helped to bridge the hierarchical and collaborative divide by: 1) brokering across regional and state-level interests; 2) developing processes that transform external requirements into learning opportunities; and 3) supporting the development of informal dynamics in addition to formal rule compliance.

Chapter 8. Conclusion – Toward adaptive water governance in California. In this final chapter, I summarize my study's key findings, and discuss how these advance our understanding how hybrid forms of governance work to manage complex environmental problems. Four key themes emerge: 1) network managers as catalysts for learning in hybrid governance arrangements; 2) scale and collaboration in the context of water management; 3) the role of government in "meta-governing" networks; and 4) building capacity for learning across scales. I conclude with an assessment of the future of the IRWM process, particularly in the context of California's current drought and the re-negotiation of the roles of state and local government that it has triggered.

Chapter 1. Networks, collaboration, and learning: A theoretical framework

In practice, it is inherently difficult to reconcile hierarchical accountability with local responsiveness. (Thomas, 1999, p. 559)

This observation, made with regard to interactions between local watershed organizations in California and the U.S. Forest Service, highlights the central tension explored in this dissertation. This chapter lays out the theoretical framework for my research on the struggle to reconcile hierarchical and collaborative governance in the context of water management in California. I begin by tracing the emergence of network and collaborative governance as an approach to addressing complex policy problems, particularly in the context of environmental management. I then describe two critical dimensions of the process of network governance: the development of legitimacy around new governing arrangements that extend beyond existing political jurisdictions, and the generation of learning through collaborative processes. I review literature on the nature of legitimacy in representative and collaborative governance forms, and discuss how collective learning has been defined and what conditions are needed to support it.

I then examine two variables that researchers have highlighted to explain learning in networks: network structure, and the “agency” of specific individuals involving in managing networks. While these two variables are often considered separately, I suggest that they are related, and together determine capacity for effective network management. I then discuss the tensions involved when networks operate within a larger, hierarchical institutional context. I lay out a hypothesis that the structure of networks and the strategies used to manage them play a role in reconciling tensions between collaborative and hierarchical governance modes. I then introduce the institutional context for water governance in the United States, and the emergence of collaborative governance as a means to promote integrated approaches to water management. I conclude by summarizing some key themes that provide the framing for my dissertation, and specific areas of theory to which this research contributes.

Networks and collaborative governance in environmental management

The challenge of managing complex problems has dominated governance literature in recent decades. Rittel and Webber (1973) characterized a set of problems that society faces as “wicked,” in that they are difficult to define, comprise multiple policy domains, engage conflicting interests, and involve high degrees of uncertainty. These problems are so intertwined with other issues that they are not ever fully solved, instead requiring on-going management (Weber & Khademian, 2008). While “wicked” problems appear in many policy arenas, the field of environmental management is rife with examples. Environmental problems are the result of interconnections between ecological, social, and economic

processes, and understanding these so-called “social-ecological systems” requires deliberation among scientists across multiple disciplines as well as the public (Norgaard & Baer, 2005, Folke, 2006, Liu et al., 2007). Understanding environmental problems also requires integrating knowledge across scales (Cash et al., 2006). For example, analysis of the impacts of climate change combines a detailed understanding of local context with knowledge about changes in global climate patterns (Füssel, 2007). Finally, social-ecological systems are dynamic and non-linear, and management strategies must account for on-going uncertainty. The emphasis in environmental management has shifted away from planning for stability, and toward building qualities of flexibility and resilience in the midst of change (Folke, 2006, Nelson et al., 2007).

The growing interdependence and non-linearity that characterize “wicked” problems have highlighted some limitations of traditional hierarchical governance approaches. Max Weber outlined the purpose of a bureaucracy as one to deal efficiently and consistently with problems by dividing them into parts, developing standardized solutions, and cultivating a rule-following culture serving to ensure compliance (Scott & Davis, 2007). Bureaucratic structures remain extremely important and valuable in confronting problems that are relatively well defined, and require consistent implementation across large scales (Innes & Booher, 2010). Furthermore, bureaucratic organizations play a crucial role in democracy by ensuring accountability to the wishes of voters, as expressed through legislative mandates (Olsen, 2008). However, when problems cut across the functional or spatial boundaries of government agencies, or when management strategies must be updated frequently as problems evolve, the patterns of vertical hierarchy and authority that underpin bureaucratic management may fail to generate the horizontal linkages that are necessary to respond (Kettl, 2006). A bureaucratic agency’s focus on rule compliance, crucial to a hierarchical approach to accountability, can become a constraint in developing innovative, tailored responses to problems in context (Lejano & Ingram, 2009, Ferlie et al., 2011).

It is in this context that literature on collaboration, public participation, adaptive management, and network governance has burgeoned in recent past decades, emphasizing the need for governance arrangements that can support learning (Holling, 1978, Lee, 1993, Karkkainen, 2002, Schusler et al., 2003, Ansell & Gash, 2008, Norgaard et al., 2009, Koontz, 2014). With regard to natural resource management, networks and collaborative forms of governance provide opportunities for integrating the diverse forms of knowledge needed to manage such complexity (Weber & Khademanian, 2008). This involves a shift away from a sole reliance on seemingly objective scientific expertise provided by “experts” – as has been characteristic of bureaucracies – and toward the inclusion of “lay” experts with experiential knowledge, and the development of opportunities for dialogue among stakeholders and scientists (Fischer, 2000, Nowotny et al., 2001). In this way, network governance can help to develop a shared understanding of a problem that provides the basis for innovative management strategies that better account for the needs and interests stakeholders (Newig et al., 2010, Innes & Booher, 2010). Networks may also offer greater resilience in the face of change, by building greater trust and providing a forum for on-going dialogue and learning (Folke et al., 2005, Armitage et al., 2010).

However, many questions still remain about how networks actually function to promote learning, and the conditions in which they can deliver such results. In particular, we still know little about how collaborative networks operate in the context of existing institutional arrangements. Networks are not created from scratch; they emerge within existing institutional structures, many of which have hierarchical characteristics (Héritier & Lehmkuhl, 2008, Agranoff, 2006). Network governance is not replacing hierarchy, but rather, new hybrid governance forms are emerging, with characteristics of both (Hill & Lynn, 2005, Ferlie et al., 2011). As governments seek to promote network-based approaches to managing complex policy problems, we need a better understanding of how these hybrid arrangements actually work. How do networks gain legitimacy as venues for decision-making within existing hierarchical governance arrangements? Do networks embedded within bureaucratic norms still lead to learning and other benefits of networks, and under what conditions? The following sections provide an overview of some of this literature and identify key areas for further research.

Defining networks

In the broadest sense, the term *network* refers to a relatively enduring set of relationships between actors who seek to address goals they could not achieve on their own (Agranoff 2006). Researchers use a variety of terms to describe networks, such as collaborations, partnerships, coalitions, or alliances (Provan, Fish, & Sydow, 2007). In examining networks in the context of public management, the literature on collaborative governance is quite closely related. Ansell and Gash (2008, p. 544) define collaborative governance as:

A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets.

According to this definition, a key feature of collaborative governance is that it involves both state and non-state actors in decision-making about resource management, following consensus-based approach. This is different from hierarchical arrangements in which public agencies may make decisions independently from one another and from non-state actors. It is also distinct from many instances in which government agencies seek public participation in their decisions, but do not accord a formal role to non-governmental actors in the decision-making process. Finally, these collaborations are not focused on a single, time-limited project, but instead are sustained partnerships that are formally acknowledged as the means of governing a program or resources over the long term. Such collaborative governance arrangements represent one type of network, and are the main focus of my research.¹

¹ When I use the term “network” in this dissertation, I am referring to networks in which governmental and non-governmental entities collaborate in decision-making. I also sometimes use

Public governance networks vary considerably in their purpose, participants, and types of activities they seek to undertake. Agranoff (2007) developed a typology that distinguishes between networks according to their purpose, and the degree of autonomy of participants. Informational networks focus primarily on exchanging information, which may inform the actions of participants but this is voluntary. Developmental networks exchange information, and also seek to increase the capacity of participants to undertake new activities. Outreach networks go a step further by seeking to change programming through exchanging information and resource opportunities, as well as expanding contacts. Finally, action networks are intended to create new courses of action that will be jointly undertaken by participants.

Another typology created by Mandell and Keast (2007) emphasizes the relationships needed to achieve a network's outcomes. A cooperative network is one in which participants seek to take one another's interests into account through the exchange of information, but without changing their own goals. In these networks, relationships between participants are relatively loose and may not involve high degrees of trust. A coordinative network involves a greater degree of joint activity, but in ways that require only limited adjustment to participants' existing goals. Relationships in these networks are slightly stronger than in cooperative ones. Finally, collaborative networks emerge in situations where participants recognize that they cannot achieve their goals independently of one another, and seek to create new and innovative ways of working together to solve a common problem. Relationships in these networks are relatively strong, and are characterized by high degrees of trust. The networks analyzed in this dissertation are intended to serve as collaborative networks, although as will become clear in later chapters, this may not always be the case in practice.

Evaluating networks: Legitimacy and learning

Understanding the different purposes of networks is helpful in evaluating their performance. In hierarchical arrangements, goals are usually defined at the outset, and these become the basis for evaluating outcomes. Networks, on the other hand – collaborative ones in particular – often have multi-faceted and evolving goals, reflecting the participation of multiple actors (Innes & Booher, 2010, Mandell & Keast, 2007). Further, a crucial function of some networks is the development of a common understanding of a problem, and the creation of goals and strategies to address it. Thus, evaluating the performance of networks typically involves not only an examination of whether or not a network's goals are met, but also of the nature of the collaborative process itself. Provan and Milward (2001) sought to combine outcome and process indicators in defining three "levels" for measuring network effectiveness: 1) the community level, in terms of a community's perceptions about improvements in the cost or quality of services provided; 2) the network level, which refers to changes over time in network characteristics such as

the term "collaboration" to describe this. I use both terms because I am drawing upon and contributing to the network literature as well as the related literature on collaborative governance.

membership growth, services provided, or the management structure; and 3) at the level of participant organizations, in terms of improvements in their operations, costs, or services. However, as Mandell and Keast (2007) point out, this framework primarily focuses on cooperative or coordinative networks, within which goals for service delivery or other outcomes are relatively clear. In collaborative networks, additional measures of effectiveness may be needed to capture changes in relationships and the creation of trust, such as whether individuals involved in the network build agreement around broader goals, and whether or not the organizations that these network members represent begin restructuring how they work with one another (Mandell & Keast, 2007, Koppenjan, 2008).

In this dissertation, I will focus on two specific elements of network effectiveness: legitimacy and learning. Legitimacy refers to the establishment of a network as an accepted venue for decision-making within a particular policy arena. The creation of legitimacy encompasses aspects of effectiveness at community and network levels in Provan and Milward (2001)'s framework: does it meet the interests of participants and the broader community it serves, and does the network develop routines of interaction that can be sustained over time? Learning, which is frequently cited as an indicator of network effectiveness (Provan, Fish, & Sydow, 2007, Newig et al., 2010), captures some of the outcomes expected from collaborative networks, such as the generation of a shared understanding of problems, changes in relationships, and the creation of trust (Mandell & Keast, 2007). Developing legitimacy and promoting learning in collaborative networks involves addressing tensions between hierarchical and collaborative modes of governance. The following section provides a brief overview of the concept of legitimacy and how it applies in the context of collaborative networks. The next section defines learning, and reviewing key theories for how learning takes place in collaborative settings. In subsequent chapters, the concepts of legitimacy and learning will be explored empirically in the context of collaborative management of water resources in California.

Legitimacy in collaborative governance

Broadly, the term legitimacy refers to the acceptance of an entity's actions by those who are affected (Bernstein, 2011). Whether such acceptance is granted depends upon the context. Suchman (1995) captures this in his definition of legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions," (p. 574). This points to two key factors underpinning the acceptance of a particular governing arrangement. First, actors may view a process as legitimate if they consider it as "desirable" – in other words, that they believe that it will advance their interests. Second, an entity's actions might be considered legitimate because they are "proper or appropriate," in that participants view them as fitting within shared norms and values. This type of legitimacy is grounded in the idea that institutional processes – the patterns of interaction between actors – are sustained when they acquire meaning within a certain cultural or social

context (March & Olsen, 1996).² According to Suchman (1995), multiple types of legitimacy may be at work simultaneously, and while legitimacy based on self-interest is often the first to develop, a grounding in “appropriateness” is usually more durable. In addition to the perceptions of actors within an affected community, the views of external actors are also important (Human & Provan, 2000).

These two dimensions of legitimacy can be found within governance arrangements based upon representative democracy. Here, legitimacy is based primarily upon public support for policies and institutions, as expressed through the electoral process (Olsen, 2008). The norms of a democratic representation, as well as values such as public participation and transparency that have become associated with democracy, have gained widespread acceptance as “appropriate” across much of the world (Bernstein, 2011, Schmidt, 2013). In terms of interests, the legitimacy of a representative democracy depends upon the performance of public agencies, equipped with technical expertise to implement legislative mandates within specific territories and functional areas (Skelcher, 2005). However, as discussed above, in the face of increasingly complex policy problems, the narrow mandates of public agencies and their limited ability to adapt to changing circumstances has constrained their ability to solve such problems, and in turn, has lessened their legitimacy in the eyes of the public (Ansell, 2011).

Collaborative governance processes have emerged as a means to work across political boundaries and bring together the diverse expertise needed to respond to complex, multi-scalar problems (Kettl, 2006, Weber & Khademanian, 2008). Although the legitimacy of these collaborations is still based on interests and “appropriateness,” they are no longer expressed through democratic representation alone. Instead, collaboration builds upon the concept of deliberative democracy, in which the legitimacy of a governing process is established through reasoned debate among interested parties (Meadowcroft, 2004, Dryzek, 1990). This process of deliberation enables all stakeholders – including state and non-state actors – to bring their knowledge and interests to bear in decision-making, and in doing so can lead to a new, shared understanding of problems and routines of interaction for joint action (Innes & Booher, 2010). In other words, the legitimacy of a collaboration depends upon participants finding value in working together, and developing a mutually agreed decision-making process (Ansell, 2011). Possible measures of legitimacy of collaborative processes include the number of entities becoming members of the collaboration, and expressions of support, either formal or informal, from external actors (Voets et al., 2008, Human & Provan, 2000).

² In his definition, Suchman (1995) seeks to combine two schools of thought on legitimacy: *strategic*, which focuses on interests, and *institutional*, which takes meaning and social context into consideration. With regard to institutional perspectives, his definition distinguishes between two types of legitimacy: moral, which derives from a sense that a course of action is “the right thing to do,” and cognitive, which refers to whether a course of action is understandable and accords with prior experience. In my analysis, I consider moral and pragmatic legitimacy together, and refer to this broadly as legitimacy based on “appropriateness.”

The process of establishing the legitimacy of such deliberative processes can sometimes conflict with established norms around representative legitimacy. When public agencies begin to work at scales beyond those of their own jurisdictions – as is the case in many collaborations around environmental problems – their role in doing so may not be readily accepted, and it may become more difficult to determine accountability for outcomes when responsibility for a problem is dispersed across multiple jurisdictions (Huiteima et al., 2009). In addition, collaboration usually involves non-governmental stakeholders, who bring knowledge that is crucial for problem solving. Although not publicly elected, in a collaborative process these non-governmental actors have a seat at the table and play a direct role in deliberation and decision-making (Innes & Booher, 2010).

Finally, the creation of legitimacy through deliberation requires resources and institutional capacity for convening diverse interests (Leach & Pelkey, 2001, Imperial, 2005). This institutional capacity includes not only the ability to undertake administrative tasks such as coordinating meetings, but also involves leadership in structuring dialogue, mediating conflicts, and building recognition among external actors (Koppenjan & Klijn, 2004, Weber & Khademian, 2008). Human and Provan (2000)'s study of legitimacy in two business networks showed that the lead organization in each played a crucial role in establishing legitimacy, both internally and externally. Provan and Milward (2001) also emphasize the importance of centralized leadership in building legitimacy, commenting that the creation of an organization dedicated to managing the network “generally indicates the network is a viable form and resources have been committed to developing the network,” (p. 419). The role of a “convening” entity in building legitimacy around a new collaborative process will be specifically explored in Chapter 4.

Learning in networks

Another central theme of this dissertation is learning in the collaborative process. This section defines learning and discusses research on how networks can support it.

What is learning?

Learning has long been recognized as playing an important role in the policy process (Sabatier, 1988, Hall, 1993). However, scholars differ in their perspectives on who learns, what is learned, and the results of learning (Bennett & Howlett, 1992). There has been considerable research on the role of learning specifically in collaborative settings in the context of resource management, in which learning may result in a new understanding of environmental problems, and changes in management practices (Pahl-Wostl, 2009, Gerlak & Heikkila, 2011, Siebenhüner, 2008). Learning is fundamental to the practice of adaptive management, a process for improving resource management through learning and adjusting goals and practice over time (Lee, 1993, Gunderson, 2001). However, as Heikkila and Gerlak (2012) argue, more research is needed to understand the actual process of learning in collaboratives, and the conditions and factors that may either support or constrain it.

Broadly, learning refers to cognitive changes – that is, changes in ideas or beliefs – that lead to behavioral change (Newig et al., 2010, Argyis, 2003, Heikkilä & Gerlak, 2013). We usually think of learning as occurring at an individual level, but in policy contexts, we often refer to learning in a collective sense. As Heikkilä and Gerlak (2013) point out, when defining collective learning it is important to understand its relationship to learning at the individual level. They define collective learning as involving two components (p. 486):

1) a collective process, which may include acquiring information through diverse actions (e.g., trial and error), assessing or translating information, and disseminating knowledge or opportunities across individuals in a collective, and 2) collective products that emerge from the process, such as new shared ideas, strategies, rules, or policies.

In other words, for collective learning to occur there needs to be some kind of interaction involving the sharing of knowledge between participants in a collective setting, and this should result in a collective outcome. This outcome might be a new, common understanding of an issue, or actual changes in rules or policies. These two components are found in most frameworks for analyzing learning, including in organizational and policy settings.

In the context of environmental management, one widely used framework is that of social learning. The psychologist Bandura (1977) first used the term to describe how individuals learn in social contexts, through observation and imitation. Social learning was extended to groups through literature on organizational learning (Argyis & Schön, 1996). Initially, learning occurs among individuals in a collaborative through their interaction with other participants. Learning at this level may occur relatively early in the process, and may result in participants adjusting their actions to reflect their new understanding of a problem. Argyis and Schön (1996) referred to this as “single-loop” learning. “Double-loop” learning occurs when learning begins to influence the assumptions and values upon which participants base their actions. The results of this learning are evident not only at the individual level, but also in the functioning of an organization or collaborative, as changes in assumptions lead to new problem-solving strategies, and even new goals (Pahl-Wostl et al., 2007). Finally, some scholars have referred to “triple-loop” learning, in which the norms and values that underpin our assumptions are themselves changing (Tosey et al., 2011, Fernandez-Gimenez et al., 2008).

The social learning framework has been widely applied to collaborations and networks, particularly in the context of environmental management (Mostert et al., 2007, Koontz, 2014). In doing so, “single,” “double” and “triple” loop learning have often been associated with particular degrees of transformation in environmental governance. For example, as evidence of these respective “levels” of learning, Pahl-Wostl et al. (2007) uses changes in how stakeholders interact with one another, changes in the structure and functioning of the collaborative process, and finally, changes in the overall governance structure within which the collaborative operates. Yet, some authors have warned against assuming that social learning will always result in such transformations of governance arrangements (Reed et al., 2010). Not all actions or policy changes can be attributed to learning; political conflict,

Table 1.1. Three types of learning

Type of learning	Description	Indicators of learning within a network
Cognitive	Improved understanding of problems, their causes, and solutions	Change in understanding shared by multiple participants ("joint image building") Identification of shared goals ("goal intertwinement")
Strategic	Improved understanding of the interests of other stakeholders and mutual dependencies	Increase in knowledge about the needs and interests of other participants Participants seek out cooperative strategies rather than blocking the process
Institutional	Development of rules, norms and practices that increase the predictability of interactions and build trust	Creation of new organizational arrangements Emergence of informal norms of interaction based on personal relationships

Adapted from Koppenjan & Klijn, 2004

resource access, and many other issues can also play a role (Huiteima et al., 2010). Reed et al. (2010) argue that in order to identify social learning, we must be able to demonstrate linkages between individual learning, a social process, and changes observed at the network level.

An alternative framework for understanding learning has emerged within the network literature that does not measure learning in terms of policy change. Koppenjan and Klijn (2004) identify three components of learning in networks: cognitive, strategic, and institutional, summarized in Table 1.1. *Cognitive learning* refers to an improved understanding of a problem, its causes, and solutions. *Strategic learning* involves developing a greater understanding of each other's interests and mutual dependencies. Finally, *institutional learning* relates to the development of rules, norms and practices that increase the predictability of interactions and build trust.

Koppenjan and Klijn (2004) identify key criteria for assessing whether these three types of learning have occurred in a given collaborative process. Cognitive learning is evidenced by whether or not participants have developed a shared understanding of a problem (referred to as "joint image building"), and have mutually agreed upon goals that account for the different perspectives and interests of participants (referred to as "goal intertwinement"). To assess strategic learning, Koppenjan and Klijn (2004) point to evidence that participants have become familiar with one another and choose cooperative strategies rather than blocking the collaborative process. Drawing upon Huiteima et al. (2010)'s discussion of the very similar concept of "relational learning," these criteria might be complemented by evidence from interviews with participants about whether they have learned more about the interests of other participants, whether or not they agree with their positions. Finally, Koppenjan and Klijn (2004) suggest that institutional learning can be assessed by observing the development of increasingly durable arrangements that facilitate interaction between stakeholders. These might include formal elements, such as new organizational

structures, as well as informal ones, such as increased trust. A key aspect of institutional learning is the increased durability of the process, such that it might withstand changing circumstances or the entrance and exit of certain participants. This is similar in some ways to Newig et al. (2010)'s definition of "resilience" as a component of learning.

As these assessment criteria make clear, cognitive, strategic and institutional learning are defined and measured in terms of changes observed within the collaborative process, rather than in terms of collaborative outcomes. In this way, cognitive, strategic, and institutional learning differ from how many authors have operationalized single and double-loop learning. In their criteria for assessing the effectiveness of networks, Torfing et al. (2012) include these three types of learning as an indicator of whether or not a network has generated "favorable conditions for future cooperation," (p. 172). This view accords with broader research on the conditions for collaboration. For example, the generation of shared ideas (cognitive learning) and a greater understanding of mutual interdependence (strategic learning) have both been identified as critical conditions for enabling collaboration (Ansell & Gash, 2008).

How does learning occur in networks?

In order to understand what characteristics of networks are important for supporting learning, we must first know a bit more about how learning takes place. Heikkila and Gerlak (2012) identify three phases of the learning process in collaborative settings: 1) acquisition of knowledge, which may occur both through practical engagement, interaction among stakeholders, or through access to external information sources; 2) translation of knowledge, which involves creating a shared understanding among participants, often through dialogue as well as action; and 3) dissemination, in which new ideas are shared across the broader collaborative. Similarly, Newig et al. (2010) identify two processes that are critical for learning: 1) information transmission, in which participants share knowledge with one another; and 2) deliberation, in which participants reason and reflect together. There appears to be broad agreement that in-person dialogue between participants is crucial in all phases of learning (Ansell & Gash, 2008, Huntjens et al., 2011).

Pragmatism, a branch of philosophical thought initiated by the work of John Dewey, Charles Peirce and Jane Addams at the turn of the 20th century, provides insight into the kinds of dialogue and interaction needed to enable learning. These thinkers believed that knowledge does not emerge through logical analysis but instead through a social process, informed by interactions with others and critical inquiry into problems (Healey, 2009). They argued that learning takes place through a "community of inquiry," in which a group of people seek to solve a problem together by drawing upon their own experience, seeking out facts and testing ideas in practice (Ansell, 2011, Innes & Booher, 2010). Drawing upon Dewey and Peirce's work, Shields (2003) identifies three key characteristics of a community of inquiry: 1) a focus on a problem, 2) participants with a "scientific attitude," and 3) community as a participatory democracy. A focus on a particular problem provides a practical context within which participants can apply their thinking, and learn in practice. A "scientific attitude" refers to maintaining openness to new ideas, and a willingness to explore alternatives. Finally, as a participatory democracy, participants in a community of

inquiry commit to engaging with one another in their capacity as citizens, sharing their experiences with mutual respect. This perspective on democracy opens the possibility for an alternative to hierarchical accountability. This “deliberative” form of accountability relies upon meaningful and active participation in decision-making to ensure that the activities of public agencies are guided by the views of citizens. A number of scholars have argued that this would allow for the development of much more nuanced and flexible responses to complex problems, as compared with a hierarchical approach that emphasizes rule compliance (Dryzek, 1990, Innes & Booher, 2010, Ansell, 2011, Sabel & Zeitlin, 2012).

Pragmatism has had a strong influence on recent thinking about the process of collaboration, and its importance as a means to address increasingly multi-faceted and dynamic problems (Ansell, 2011, Healey, 2009). It suggests that networks and collaborations that are successful in developing the deliberative characteristics of a “community of inquiry” are most likely to support learning. In the next section, I review research about how networks can best be structured and managed to support deliberation, and therefore learning.

Governing networks for learning: “Structure” or “agency”?

In assessing factors that affect learning in networks, scholars tend to focus on two types of explanatory variables. First, there is a considerable body of work examining how a network’s structure may support or constrain learning or other measures of effectiveness, depending upon different conditions. For example, Newig et al. (2010) analyze how different aspects of network structure, such as size, density or centralization may affect a network’s capacity to enable information sharing and deliberation, and therefore learning. The importance of network structure has also been emphasized by a broad range of organizational theorists (Provan & Milward, 1995, Provan, Fish & Sydow, 2007, Agranoff & McGuire, 2001). Second, there has been a growing emphasis on the role of network management in determining network performance (Klijn, Steijn & Edelenbos, 2010). These scholars tend to focus on the type and extent of management strategies used, and whether or not individuals serving as network managers need to possess specific skills and competencies, such as strategic thinking, mediation, and team building (Goldsmith & Eggers, 2004, Klijn & Koppenjan, 2012). Some researchers have asserted that the type of network management strategies used, and the skills and capacities of those serving as network managers, matters more for outcomes than does the organizational structure of a network (Kort & Klijn, 2011, Klijn, Steijn & Edelenbos, 2010, Williams, 2002). In other words, these researchers argue that the “agency” of network managers is more important than “structure.” This section reviews recent research on the respective roles of “structure” and “agency,” and then identifies how structure and agency may be related.

Network structure

Provan and Kenis (2008) have developed a framework for analyzing the types of network structures that are likely to be most effective in different contexts. They posit that the structure of networks depends upon a combination of factors internal and external to the network, which determine a network’s coordination requirements. These factors include:

Table 1.2. Network structures

Network type	Responsibility for coordination tasks	Number of network members	Predictors of effectiveness		
			Goal consensus	Trust	Joint task complexity
Shared governance	Shared across all or a subset of network participants	Small	High	High density	Low
Lead agency	Assigned to a single network member	Moderate	Moderately low	Low density	Moderate
Network administrative organization	A new organization is formed to manage the network	Moderate to many	Moderately high	Moderate	High

Adapted from Provan & Kenis, 2008, Table 1, p. 237

1) the number of network participants; 2) the degree of diversity in their goals; 3) the degree of trust between participants; and 4) the complexity of the activities to be undertaken as a network. Depending upon these factors, one of three different governance “modes” may be appropriate: 1) shared governance, in which network participants share the tasks of sustaining the network; 2) a “lead agency,” in which a single agency participating in the network takes on these activities; and 3) a “network administrative organization,” in which network management is undertaken by a new entity formed for that specific purpose. Table 1.2 summarizes the characteristics of each, and Provan and Kenis’ hypotheses regarding the conditions in which these are likely to be effective. They suggest that “shared” governance performs well only in small, relatively homogenous settings with significant levels of trust. In the “lead agency” and “network administrative organization” modes, a single entity serves as network manager, and these arrangements are likely to offer greater capacity for coordination, brokering, and information sharing among participants.

With respect to learning, Provan and Kenis’ work seems to suggest that a centralized structure has value. If learning requires involvement from participants with diverse viewpoints who may initially have low degrees of mutual trust (Innes & Booher, 2010), then a central entity may be needed to invest in information sharing and coordinating joint action. This perspective is supported by some researchers investigating learning in collaborative networks. For example, Heikkila and Gerlak (2012) note that a central actor may play an important role in information sharing. Further, scholars investigating governance arrangements in environmental management have highlighted the importance of a “bridging” organization, whose role is to connect across a wide range of actors and forms of knowledge to support a strategic process (Crona & Parker, 2012). This central entity helps to develop a common vision and brokering across different forms of knowledge, and building a common language among participants, thereby reducing transaction costs for collaboration (Berkes, 2009, Olsson, 2007, Hahn et al., 2006).

Other authors have noted that a centralized network structure may also present some challenges for learning. Newig et al. (2010) points out that while centralization often facilitates information transmission, deliberation may become more difficult, particularly if the central actor exercises more power than others in the process. Mandell and Keast

(2007) also argue that in collaborative networks, equal participation in decision-making process is crucial in order for participants to develop new relationships and a shared understanding of problems and goals. They suggest that in such cases, a shared governance approach may be preferred over a more centralized form, particularly in the formative stages.

Provan and Kenis (2008) seem aware of such potential challenges. They identify three critical tensions that must be managed in a network of any structure: efficiency versus inclusiveness, internal versus external legitimacy, and flexibility versus stability. For example, while a lead agency model is more efficient in terms of accomplishing many of the tasks involved in running a network, if this agency plays too strong of a role, participants may feel excluded and may reduce their commitment to the process. Similarly, when faced with significant demands from the external environment, a lead organization or NAO model is likely to be more effective at responding to these demands and maintaining legitimacy externally. However, an external emphasis may mean less time spent cultivating relationships internal to the network, ultimately undermining network effectiveness.

Provan and Kenis (2008) argue that network management is the key ingredient required to manage these tensions – in other words, the strategies and skills employed by individuals who actually manage the network make a difference in its effectiveness. The following section reviews current literature on the “agency” of those involved in managing networks.

“Agency”: The role of network managers

Network management typically refers to a set of activities intended to “steer” interactions between participants in order to enable the coordination of goals and interests (Klijn, Steijn & Edelenbos, 2010, Gage & Mandell, 1990, Agranoff & McGuire, 2001). These activities may be undertaken by individuals serving in a designated management role, or may be distributed across multiple participants in the process. In contrast to hierarchical management in which a single entity determines goals and courses of action, network management ideally enables participants to jointly identify their goals and act upon them (Agranoff, 2007, Klijn and Koppenjan 2012). Analyses of network management tend to consider the types of strategies used to enable interaction, the skills that network managers require to be effective in their roles, or a combination of the two. A brief overview of literature is presented here.

Network management strategies have been described in multiple ways, but the following four categories outlined by Klijn, Steijn and Edelenbos (2010) capture the key dimensions: 1) exploring content (i.e., supporting research, identifying stakeholder perspectives); 2) structuring interactions, such as through the creation of committees or workgroups; 3) developing process rules, such as routines for meeting and procedures to join or leave the network; and 4) connecting actors, including engaging new members, coalition building, and mediation. While research is still underway with regard to how these strategies contribute to network outcomes, a few general findings have emerged. First, several studies have documented that the greater the number of network management strategies used, the better the network results, with effectiveness usually measured in terms of the

perceptions of network participants (Kort & Klijn, 2011, Klijn, Steijn & Edelenbos, 2010). Furthermore, several studies have demonstrated the particular importance of strategies that focus on connecting actors with one another. Meier and O'Toole (2001, 2007) found that making connections was one of the most important activities undertaken by managers. Klijn, Steijn and Edelenbos (2010) find that "connecting" management activities were more frequently associated with positive network outcomes than other types of management strategies.

An important aspect of these "connecting" strategies appears to be how they help to define and negotiate the boundary between actors inside and outside of the network. This has been emphasized in the boundary spanning literature, which focuses on the actors and processes involved in negotiating the relationship of a network with its larger environment (Tushman & Scanlan, 1981). Edelenbos et al. (2013) build upon this literature, distinguishing between "project" and "process" management styles. A "process" management style is one in which a manager is engaging extensively with the external environment, allowing the focus and participation of the network to evolve with changes in the larger environment. A "project" management style, on the other hand, is relative stable and focused, with management that draws clear boundaries around the scope of network efforts in order to reduce complexity. Edelenbos et al. (2013) examined management styles in eight regional development projects in the Netherlands, and found that "process" management was associated with more positive outcomes, as measured by levels of satisfaction reported by participants. This success is attributed to the fact that participants involved with the core of the network as well as those on the periphery felt connected to the goals of the network, as a result of more open and engaged approach on the part of network managers.

Much of the boundary spanning literature moves beyond the discussion of management strategies to include an exploration of competencies and skills that boundary spanners need to possess. A core competency of boundary spanners is their ability to draw upon extensive contacts both internal and external to a network, enabling them to link a network with its environment, and help network participants with different perceptions of a problem communicate and learn from one another (van Meerkerk et al., 2014, Wagenaar, 2007). Williams (2002) argues that boundary spanners bring particular skills and capacities that are crucial for enabling networks and partnerships to function, particularly in addressing complex policy problems. For example, building lasting relationships is essential for establishing a context for knowledge exchange and discovering interdependency. Boundary spanners need communication skills, experience with conflict resolution, personality traits such as honesty and openness, and a trustworthy reputation. In order to manage through influence rather than top-down authority, boundary spanners need skills in persuasion, negotiation, and brokering. Finally, boundary spanners need the capacity to operate across diverse types of knowledge and organizational settings, as well as to manage multiple and sometimes conflicting forms of accountabilities (Williams, 2002, p. 115-20).

Some authors have particularly emphasized leadership qualities as crucial to supporting learning and other outcomes. Views of leadership have been evolving from an emphasis on charismatic individuals with top-down authority toward a greater recognition of the importance of facilitating partnerships and empowering others (Sullivan et al., 2012, Innes & Booher, 2010). Weber and Khademian (2008) apply Philip Selznick's ideas about leadership in defining "collaborative capacity builders," whose role is similar to that of a boundary spanner. In his book *Leadership in Administration* (1957), Selznick emphasizes the role of leaders in establishing a common set of values and a broader purpose that motivates and participants to work together. Weber and Khademian (2008) argue that this type of leadership is crucial if networks are to truly facilitate the transmission and integration of knowledge – in other words, to support learning. They describe a "mind-set" of collaborative capacity builders, which helps shape a collaboration's overall approach to problem solving, and the interactions of participants, both inside and outside of the network. This "mind-set" includes commitments to the process of collaboration, to finding creative solutions while still operating within existing rules, and to open engagement with a broad range of potential partners, even in the face of disagreements (2008, p. 342-4). Weber and Khademian argue that by infusing a collaborative process with these commitments, a collaborative capacity builder plays a central role in enabling a network to learn and respond to complex problems.

Another important quality of network managers appears to be the capacity to build trust. There has been considerable research to suggest that trust plays an important role in effective collaborations or networks (Ansell & Gash, 2008, Innes & Booher, 2010, Edelenbos & Klijn, 2007). Klijn, Edelenbos and Steijn (2010) used surveys of managers and participants in environmental projects in the Netherlands to assess the importance of trust, and the role of network management in generating it. They found that the greater the number of network management strategies employed, the greater the trust. Literature on boundary spanning has yielded similar findings. Van Meerkkerk and Edelenbos (2014) demonstrate that individuals with boundary spanning skills roles – connecting across organizational boundaries – play an important role in developing trust, and that this plays a positive role in network outcomes. Finally, there appears to be broad agreement that to be effective, network management activities must be carried out in a neutral manner, such that participants with differing interests are all equally engaged (Koppenjan & Klijn, 2004, Innes & Booher, 2010, Mandell & Keast, 2007, Leach & Sabatier, 2003).

Linking structure and agency

These two streams of literature have suggested somewhat different explanations of the effectiveness of networks. Some scholars argue that network structure is an important determinant, while others assert that the choice of specific management strategies, and the particular skills or leadership qualities of individuals involved, have more explanatory power. There has been only limited investigation of how structure and agency interact. However, as outlined below, an examination of organizational theory and the collective action literature suggests that they are related.

First, embedded in Provan and Kenis (2008)'s typology of network structures is the assumption that more centralized network structures will tend to enable greater investment of staff time in network management, as well as specialization in appropriate skills when compared with a shared governance arrangement. Provan and Kenis state, "...shared governance will be less likely to be an effective form of governance when interdependent task requirements are high, since demands will be placed on individual network members for skills they may not possess, like grant writing, quality monitoring, or even conflict resolution. Conversely, it is precisely these task conditions that favor lead organization or NAO models, which are more able to develop specialty skills related to network-level needs," (2008, p. 241).

In establishing this relationship between organizational structure and the development of specialized skills in network management, Provan and Kenis are building upon core tenets of organizational theory, suggesting that organizational structure is strongly influenced by the degree and type of interdependence of tasks needed to accomplish the organization's goals. In his seminal work *Organizations in Action* (1967), Thompson argues that organizations tend to structure themselves so as to minimize coordination costs by grouping together roles that are highly interdependent (p. 57-58). Although in this context he was referring to the structure of individual organizations, Thompson also points out that the stronger the degree of interdependence between organizations, the more likely it is that they will seek to develop close relationships with others, so as to minimize uncertainties in the external environment (p. 34-36). Together, these propositions suggest that when organizations are highly interdependent with one another, and achieving their joint goals involves complex coordination tasks, the appropriate organizational structure is one that allows for specialization in carrying out these coordination tasks.

Second, collective action literature has revealed some of the challenges involved in generating sufficient investment in resources from which participants could not easily derive exclusive benefit – in other words, public goods. In his work *Logic of Collective Action* (1965), Mancur Olson describes activities related to the coordination of actors to achieve a common purpose as a public good. It takes effort and time to coordinate a group process, but regardless of how much any one member invests, all members benefit. He argues that because of this, even when they all agree upon their common interest, a large group of actors will not tend to form a collaborative effort unless another incentive exists to do so. Small groups may form, but even these will tend to under-invest in coordination, because each participant would only be willing to incur costs less than or equal to their individual benefits, rather than the collective benefits. Ostrom (1990) builds upon the work of Olson and others to identify other factors that may play a role in enabling collective action, such as expected benefits from future interactions, and the role of trust in reducing the costs of coordination. She notes that one of the biggest hurdles is to create a collaboration in the first place, which requires a significant up-front investment. She argues that new institutions are typically developed incrementally, so that these costs of creation are less of a barrier. Overall, we can conclude that in most contexts, there are a number of incentive problems to overcome in creating and sustaining a network with the capacity to support network management. This is particularly true if network management is to be

carried out in an impartial manner and engages a broad set of interests, as seems to be necessary in order to enable learning.

In addition to these incentive problems, there is also debate over the degree of formality needed in the coordinating structures that emerge. Chisholm (1989) makes a strong argument for paying close attention to informal structures in his study of patterns of coordination between agencies managing public transportation in the Bay Area. He found that despite the lack of a formal, regional organization tasked with managing transportation, coordination nonetheless occurred through informal interactions between individuals who worked for many different agencies. However, Chisholm also found that despite assumptions that complex, multi-lateral interdependences existed in the Bay Area transit system, in practice interdependencies were largely bilateral (p. 63). His research on this system demonstrated that informal mechanisms were quite effective at achieving coordination under conditions of bilateral interdependence, even when the total number of participants in the network is large. However, Chisholm acknowledges that these findings may not hold true in cases of multilateral interdependence (p. 193). Further, in the case of Bay Area transportation most agencies had similar goals, and staff had similar professional backgrounds, which may also have facilitated informal coordination. Chisholm asserts that informal coordination may occur even when agencies with very different goals work with one another, but his study does not provide evidence of this. While Chisholm's work and the findings of other researchers who have emphasized the importance of informality in collaboration (Innes et al., 2007) suggest a strong role for informal dynamics in collaboration, further study is needed on whether informal coordinative structures are adequate in situations of multilateral interdependence between agencies with very different goals and knowledge bases.

In summary, theory suggests that when interdependence between actors is high and joint tasks are complex, significant investment in coordination may be needed, potentially requiring formal organizational structures. This structure may help to enable staff to specialize and build appropriate skills and relationships for managing a network, improving its performance. In this way, network structure and the agency of network managers are connected. While a few individuals may initially recognize the need for a network and take the lead in forming it, organizational capacity must exist, or must be developed, to enable an on-going investment in network management.

Several studies have found that organizational context matters in shaping the style of network management, particularly the degree to which certain organizations can serve as relatively impartial network managers. In their investigation of the roles of "process" and "project" management styles, Edelenbos et al. (2013) found that network managers working within government agencies were less likely to employ a "process"-oriented approach involving a broad range of participants than were external consultants hired as managers. They attributed this difference to a tendency for government staff members to focus on their own agency's interests, while external consultants could behave more impartially. In their examination of the effect of boundary spanners on the creation of trust in urban governance networks in the Netherlands, van Meerkerk and Edelenbos (2014)

also found that most boundary spanners worked for private and non-profit organizations rather than government agencies. Finally, Bidwell and Ryan (2006) examined the performance of 29 watershed councils in Oregon, of which some were led by pre-existing agencies and others had formed new, independent organizations. They found that those affiliated with existing agencies were less likely to involve a broad base of stakeholders than were councils that operated independently.

The pre-existing institutional setting in which networks are formed may play a significant role in their structure and performance. To enable effective lead agency network governance, an agency within the network must already exist, or one must be formed, which is both willing and able to dedicate staff time to managing the network in an impartial manner. The narrow mandates of some public agencies may limit their ability to invest in managing a network that extends beyond their geographic or functional scope. In addition, as governments seek to promote collaborative processes, they often face pressure to demonstrate accountability to legislative mandates, leading them to establish rules and norms within which must networks operate. As discussed in the following section, these too may influence network effectiveness, particularly in terms of learning.

Meta-governance: Managing tensions between collaboration and hierarchy

While network management typically refers to the steering of day-to-day interactions between network participants, the term *meta-governance* is often used to describe how certain actors, usually government agencies, create and implement a set of rules and norms that guide the functioning of networks.³ Sorensen and Torfing (2009, p. 246) define meta-governance as “a reflexive higher order governance” with three key components:

- (1) the production and dissemination of hegemonic norms and ideas about how to govern and be governed; (2) political, normative, and context-dependent choices among different mechanisms of governance or among different combinations of governance mechanisms; and (3) the strategic development of particular institutional forms of governance in order to prevent dysfunctions and advance particular political goals.

Sorensen and Torfing (2009) have identified four broad tools that meta-governors may use: 1) network design, or shaping the goals, participants, and procedures in networks; 2) network framing, which involves shaping the storyline of networks and their political, fiscal and legal basis; 3) network management, which here refers to provision of resources to empower networks to resolve conflicts; and 4) network participation, in which a meta-governor seeks to shape the decision-making process of networks.

³ In some network literature, the term meta-governance has been used to describe the management of networks by entities who are directly involved in these networks. However, in most cases, including in this dissertation, the term meta-governance refers to activities by government or other entities that are not direct participants in the networks, but instead create conditions for networks to operate within a particular policy arena.

Most network scholars emphasize that to be effective, meta-governors must employ the above strategies in a manner that supports the flexible, deliberative character of networks. As Sorensen and Torfing put it (2009, p. 246), meta-governors must “avoid regulating governance networks in ways that eliminate their capacity for self-regulation.” Although it has been recognized that the threat of top-down decision-making by a government agency may be a motivator for collaboration in some instances (Héritier & Lehmkuhl, 2008, Karkkainen, 2002), research generally suggests that the actual imposition of rules may constrain collaboration and learning (Gerlak & Heikkilä, 2011, Lejano & Ingram, 2009, Currie & Suhomlinova, 2006). Instead, meta-governance literature emphasizes the need for “soft” rather than “hard” steering, in which public agencies refrain from imposing too many requirements and instead providing financial and technical support (Martin & Guarneros-Meza, 2013, Sabel & Zeitlin, 2012).

Accountability and the persistence of hierarchy

Public agencies serving as meta-governors face a core tension between providing support to self-governing networks, and maintaining accountability to legislative mandates. Despite calls for public agencies to shift away from hierarchical, rule-based approaches to decision-making, hierarchy has persisted (Olsen, 2008, Agranoff, 2006, Thomas, 2003). The need for accountability is one reason for its persistence. In democratic systems, an elected legislature sets policy mandates, and public agencies typically establish rules and standards for assessing compliance, and assuring accountability (Bovens, 2007). As societies confront increasingly dynamic and interconnected problems, the limitations of this hierarchical form of accountability have become apparent; it is difficult for a public agency to create rules that adequately respond to the complexities of diverse settings. Despite considerable effort and time spent on compliance, problems persist and public discontent has grown with the performance of public agencies, and in turn, pressure for accountability further increases (Ansell, 2011).

Nonetheless, hierarchy is still deeply embedded within current institutional structures, and as many authors have observed, today’s governance structures are hybrids, in which hierarchy, collaboration and markets co-exist (Hill & Lynn, 2005, Pahl-Wostl, 2009, Ferlie et al., 2011). Even as public agencies recognize the need for more decentralized, collaborative approaches to problem solving, they often respond to accountability pressures by imposing formal rules or standards for collaborative outcomes, often limiting learning and innovation. For example, Lejano and Ingram (2009) discuss how a water use efficiency program in California sought to incentivize collaboration, but constrained creativity by restricting the types of agencies who could lead collaborative projects, and requiring that funded projects follow a set of standard best practices. Currie and Suhomlinova (2006) describe a similar tension in efforts to promote knowledge sharing across the National Health Service in the United Kingdom. The NHS sought to shift away from a combination of bureaucratic rules and market-based approaches introduced during the Thatcher era, and promote greater collaboration across the organization. Yet, Currie and Suhomlinova suggest that the continued use of certain performance indicators and inspection and audit regimes that follow narrow definitions of accountability have limited

learning across professional boundaries. They note that “vertical ‘control and command’ structures may be difficult to supplant with partnership, networking and lateral modes of organizing,” (2006, p. 22).

Mediating between hierarchy and collaboration: a role for network managers?

Beyond identifying the constraints that hierarchical structures may impose upon networks, there has been limited research to understand how hybrid governance arrangements function in practice. In part, this is because research on networks often focuses solely on internal network dynamics, with limited attention to the broader institutional context within which they operate. Yet, as previous sections have suggested, networks can vary considerably in their structure and management, and these two factors may shape how a network interfaces with its external environment. Network structure, the style of network management, or both may affect whether a network is able to promote collaboration while still interfacing effectively with an accountability-driven, hierarchical environment.

So far, relatively few scholars have examined this aspect of the role of network management. There has been some attention to the role that network managers play in interfacing with the external environment. As discussed earlier, Provan and Kenis (2008) indicate that networks face a tension when they are subject to significant external demands, such as funding requirements, arguing that excessive attention to external demands may detract from efforts to cultivate a sense of value in the process among participants. They suggest that it is the role of network managers to resolve this tension. Other scholars note that by interacting beyond their boundaries, network managers may be able to buffer the network against external shocks (Rethemeyer & Hatmaker, 2007, Turrini et al., 2010). Weber and Khademian (2008) come the closest to identifying a role for network managers in balancing collaboration and hierarchy. Collaborative capacity builders, they suggest, maintain “recognition of democratically defined rules that place necessary boundaries on permissible actions, combined with an openness to new ideas expressed within the network that can help build new competencies for the long-term management of wicked problems,” (p. 342).

Finally, the resilience literature suggests that bridging organizations play a role in building vertical connections as well as horizontal ones. Hahn et al. (2006) describe the case of the Ecomuseum Kristianstads Vattenrike (EKV), an organization that is part of the municipal administration that works collaboratively with landowners on conservation projects. Hahn et al. point to the dual role that the EKV plays in negotiating the larger institutional environment to obtain support for projects, while at the same time building informal, trusting relationships with individual project participants, who were otherwise suspicious of the municipal government. Others have also pointed to the importance of bridging organizations in creating solutions that balance tensions between top-down and bottom-up approaches (Cash et al., 2006, Folke et al., 2005).

Overall, empirical examinations of the specific role that network structure and management strategies play in mediating across scales and governance forms have been limited. This research effort aims to contribute to empirical research on this topic, in the

context of networks focused on water management in California. The next section provides an overview of the specific set of challenges involved in water governance, and the institutional context for water management in the United States.

Network governance in the context of water management

Over the past several decades, growing human needs for water and an increasing awareness of environmental priorities have amplified pressures for more efficient and sustainable water management (Pahl-Wostl, 2007). As appreciation has grown for how water systems are embedded within larger ecological and social processes, there have been broad calls to promote “integrated water resources management” (IWRM), in the United States and globally (Mukhtarov, 2008, AWRA, 2012). The Global Water Partnership, an international forum established in the wake of the 1992 United Nations Conference on Sustainable Development, defines IWRM as “a process which promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems,” (GWP, 2014). This definition of IWRM, like many others, is quite broad, allowing for multiple interpretations of what “integration” really means (Biswas, 2004). The American Water Resources Association (AWRA) drew upon the GWP’s definition in crafting its own policy statement in 2011, recommending that policymakers follow an IWRM approach in undertaking water planning and management (AWRA, 2011). Its statement exemplifies most IWRM-inspired efforts in that it is based upon a new understanding of the interconnectedness of specific elements of water management, and how these relate to broader resource management challenges. As AWRA’s policy statement explains:

Today, we understand that water quality cannot be managed separately from water quantity, and that water management cannot be divorced from our stewardship of the land. We realize we cannot protect or restore ecosystems or enjoy the services they provide if we do not safeguard the flow regimes and quality of water on which these systems depend. We know we cannot improve quality of life or ensure sustainability of communities if we ignore the water resources on which they rely. In short, we recognize that water resources cannot be managed sustainably without active and purposeful recognition of their many linkages and varied interconnections. This recognition, in fact, requires a holistic approach to water and the practice of integrated water resources management.

This description is an example of the new awareness of the complex nature of environmental problems that has motivated calls for new collaborative and adaptive approaches to governing natural resources (Armitage et al., 2010). However, current water governance arrangements in the United States, and elsewhere, were established under starkly different assumptions. Van de Meene and Brown (2009) describe the traditional regime for managing urban water supplies as largely emphasizing engineering and infrastructure-based solutions as the means to provide reliable water supplies with adequate protection for human health. Water management organizations have been

focused on specific aspects of water delivery – supply, sewage, and drainage – and have operated within a largely hierarchical, command-and-control administrative environment (Deyle, 1995, Sabatier et al., 2005, Lach et al., 2005). At the same time, in the United States there has been an accompanying trend toward decentralization of water management responsibilities. Mullin (2009) documents a growing reliance on special districts for managing water resources. These special-purpose public entities are typically managed by a publicly elected board of directors, and operate independently of city or county agencies. They usually have relatively narrow mandates, often focusing on a single aspect of water management. In the United States, the number of water-related special districts has almost tripled since the 1960s (Mullin, 2009). In California, there are well over 1,000 such special districts with responsibilities related to water (Hundley, 2001).⁴

Such decentralization comes with some advantages. Mullin (2009) notes that as it has become more and more difficult to meet new water needs in the United States through new large-scale infrastructure projects, efforts to improve efficiency and reduce water demand have required more localized strategies. Special districts are able to focus on the local context, and this may make it easier to hold them accountable for results. However, as understanding has increased of how various aspects of water management are interconnected, the narrow focus of many special districts may present a barrier to developing effective responses. Mullin (2009) suggests that the highly fragmented institutional structure for water management in the United States raises the transaction costs for developing integrated solutions. Lach et al. (2005) highlight the significant change in organizational culture that many water agencies face in approaching water management more holistically. Building and managing water infrastructure lends itself to standardized practice and top-down management, while the creation of new and more efficient ways to manage natural and physical aspects of a water system usually requires involvement of a broad range of stakeholders. As Lach et al. put it, “instead of managing physical structures and organized routines, water resource organizations are managing ambiguous relationships with partners who have conflicting demands and needs,” (2005, p. 2052).

Over the past several decades, efforts to promote collaboration and adaptive management of water resources have become widespread in the United States, Europe, Australia and elsewhere (Sabatier et al., 2005, Gerlak, 2008). In the United States, watershed partnerships have formed in a number of states, providing a forum for stakeholders to engage, with varying degrees of formality, in the development of plans and projects to restore and manage a given watershed (Leach & Pelkey, 2001, Imperial, 2005). Most watershed partnerships are relatively small in scale, but some large-scale collaborations have also emerged, with significant support from state and federal government agencies.

⁴ Because there are so many types of special districts with varying types of mandates, it is difficult to determine the exact number of special districts involved in water management. In addition, there are many more agencies involved in water management that may not be classified as special districts. For example, Nelson (2012) finds a total of 2,300 “independent local water agencies” involved in groundwater management in California, including “general agencies” as well as special districts.

Examples include the CALFED process focused on California's Sacramento-San Joaquin Delta, the Columbia River Basin, the Chesapeake Bay, and the Florida Everglades (Gerlak & Heikkila, 2006). In 2000, the European Union Water Framework Directive established a process for managing water resources at a river basin scale across Europe, with timelines to meet certain targets for water quality and ecological health (Chave, 2001, Moss, 2006). In Australia, regional approaches to water planning were initiated during the country's extended drought in the 2000s, and these arrangements have continued (Saravanan et al., 2009).

The expansion of collaboration in the context of water management has offered important opportunities for research on how collaborative governance works in practice. First, research on watershed partnerships confirms the findings of broader network literature that investments in network management activities are crucial to success. In their review of 37 empirical studies of watershed partnerships, Leach and Pelkey (2001) concluded that "one of the most important steps a partnership can take is to hire a skilled facilitator and/or coordinator," (p. 383). They noted that when technical staff members were asked to manage partnerships in addition to other job responsibilities, they often lacked the necessary time, skills, and impartiality to be effective in this role. Leach and Pelkey also indicated that numerous studies identified the presence of a neutral facilitator as playing an important role in developing trust. This accords with the findings of the network management and boundary spanning literature reviewed earlier in this chapter.

Research on larger-scale collaborations, such as the CALFED collaborative process to improve management of California's Sacramento-San Joaquin Delta and collaboration to manage the Florida Everglades, has emphasized that the engagement of diverse stakeholders focused on a common problem is critical to supporting learning (Innes & Booher, 2010, Norgaard et al., 2009, Heikkila & Gerlak, 2011). Scholars have also emphasized the important role of informal interactions in generating learning in these collaborations, but that such informality often does not mesh well with the formal, bureaucratic structures within which collaborations often operate (Innes et al., 2007). In general, literature on collaboration in water management contexts largely confirms the importance of network management skills such as leadership, communication, and conflict resolution, and emphasizes the need for adequate resources to support the management of collaborative processes (Wondolleck & Yafee, 2000, Leach & Pelkey, 2001, Imperial, 2005).

Efforts to promote collaboration at watershed scales have raised new questions regarding the appropriate scale for collaboration. At the 1992 UN Conference on Sustainable Development in Rio, Brazil, the call to create watershed-scale institutions is reflected in Agenda 21, which states that "integrated water resources management...should be carried out at the level of the catchment basin or sub-basin," (Agenda 21, Chapter 18.9). This ecosystem "logic" is now embedded in the thinking of many in the water management community (Moss, 2006). Yet, there are several limitations to this logic. Given the degree to which human intervention has transformed waterscapes, particularly in much of the United States, watershed boundaries are in fact difficult to define on a purely ecological basis (Blomquist & Schlager, 2005). Furthermore, even watersheds that are relatively intact in

ecological terms can be defined at various scales. For example, a large hydrologic region encompassing multiple interconnected river systems and the drainage area of a relatively small tributary might both be described as a “watersheds” (NRC, 1999). The choice of which watershed scale is used for governance is likely to be influenced by a range of social, economic or institutional factors (Blomquist & Schlager, 2005). In many ways, the watershed is less of a “natural” geographic unit than it is a socially and politically constructed concept (Molle, 2009).

Experience with watershed-scale management also raises a second set of questions regarding the appropriate types of governance structures. Establishing watershed-scale governance involves confronting the legitimacy challenges described earlier in this chapter. Political and administrative jurisdictions rarely match those of watersheds, yet these remain a defining feature of social and political identity (Meadowcroft, 2002, Lundqvist, 2004). Studies of efforts to establish new river basin management organizations reveal that indeed, it is often challenging for these new entities to acquire adequate authority to implement new management strategies (Conca et al., 2006, Mostert, 2009). For example, most river basin commissions created in the United States, particularly those created by Congress through the Water Resources Planning Act of 1965, have struggled to gain the support of states involved (Ingram, 1973, NRC, 1999). This represents an example of what Young (2002) refers to as the tension between “fit” and “interplay.” While following ecological boundaries might help ensure that an institution “fits” the environmental problem in question, this may disrupt the “interplay” between existing institutions along functional, political, horizontal or vertical lines.

A number of environmental governance scholars have pointed to polycentric governance as a way to achieve a balance between multiple forms of interdependence. Rather than creating a new organization with authority for watershed management, existing entities, which may overlap with one another in spatial or functional terms, cooperate across their jurisdictions. As different problems arise, they create multiple alliances, enabling both vertical and horizontal coordination (Dietz et al., 2003). Scholars have pointed to a number of benefits of polycentric systems, as compared to management by a single organization. These include greater opportunities for learning across a large number of entities, the ability to draw upon local knowledge to define and respond to problems, and greater resilience due to the redundancy offered by the overlapping jurisdictions (Huitema, 2009, Folke et al., 2005, Karkkainen, 2002). Yet, while polycentric governance seems to offer a way to manage the tension between “fit” and “interplay,” some scholars have also noted its limitations. First, as jurisdictions seek to develop multiple agreements with overlapping entities along various dimensions, transaction costs may be quite high (Huitema et al. 2009). Second, maintaining accountability for the results of multiple partnerships and collaborations may be challenging. This is in part because these collaborations, which often do not correspond in scale to political jurisdictions, may lack procedural transparency (Skelcher 2005).

The challenges involved in promoting such collaborative modes of governance within the context of hierarchical accountability are highlighted in the experience of managing

California's Sacramento-San Joaquin Delta, which has been at the center of much conflict over managing the state's water resources. For a number of years, management of the Delta followed a collaborative process called CALFED, within which a number of researchers have found evidence of learning, trust-building, and new partnerships (Lejano & Ingram, 2009, Norgaard et al., 2009, Innes & Booher, 2010, Kallis et al., 2009). However, from the perspective of state and federal agencies, CALFED was producing little in the way of concrete outputs. In 2009, the state legislature sought to improve accountability by replacing CALFED with a new organization, the Delta Stewardship Council (DSC), whose members are appointed by the Governor. The DSC serves to coordinate the interaction of numerous agencies with authority over various aspects of managing the Sacramento and San Joaquin River Delta, and is accountable to the Governor for producing a consolidated Delta Plan. While the DSC has the ability to review the activities of these agencies to ensure compliance with the plan, it does not hold authority to implement the plan on its own (DSC, 2013).

The DSC seems to fit Provan and Kenis (2008)'s description of a network administrative organization in that its purpose is to coordinate and support a collaborative process. At the same time, however, it is accountable to state mandates to produce and oversee a Delta Plan that meets certain criteria defined by the state. The 2013 Delta Plan itself describes the DSC as a "hybrid approach – both regulatory and collaborative," (DSC, 2013, p. 13). The DSC faces considerable challenges in implementing this approach. On the one hand, the formation of new collaborative organizations may increase capacity to build trust, support learning, and provide a stable organizational base for future collaboration (Imperial, 2005). On the other hand, if collaborative organizations are operating within a largely hierarchical institutional context, they may be responsible for implementing rigid requirements that decrease their flexibility. The tensions involved in balancing the demands of hierarchy and collaboration, and the role of entities such as the DSC in managing these tensions, are the key focus of this dissertation.

Conclusion

This chapter has laid out the theoretical framework for this dissertation. In particular, I have highlighted several themes that are critical to the framing of this study, and represent key areas of research to which this study seeks to contribute. These include:

- As collaborative and network governance have emerged in response to increasingly complex policy problems, hierarchical forms of governance have persisted, particularly given that systems of public accountability depend upon hierarchical arrangements. This has yielded hybrid governance forms, such that collaborative networks tend to operate within a largely hierarchical institutional context. While these hybrid forms have begun to be recognized in the literature, so far there has been limited empirical exploration of how they function, and whether the benefits of network governance are evident in these contexts.
- Building legitimacy around collaborative processes often presents tensions with existing hierarchical arrangements. Deliberative processes that bring together all

affected parties provide the primary basis for the legitimacy of collaboration, while most public agencies derive legitimacy from the fact that they represent the public interest, as expressed through the electoral process. To become sustainable, collaborative processes must negotiate these tensions.

- One of the crucial benefits of network governance in responding to complex problems is their capacity to support learning across diverse interests and forms of knowledge, generating more innovative solutions with greater buy-in from participants, as compared with hierarchical approaches. However, research is still needed with regard to how learning occurs, particularly within hybrid governance forms that blend network and hierarchical characteristics.
- Research on learning in networks tends to focus either on the role of network structure, or upon the agency of specific actors – particularly network managers – in establishing the conditions for learning. The linkage between structure and agency has not yet been explored explicitly. However, research on networks and the process of collective action suggests that certain network structures are more likely to provide the support for actors that bring the particular skills needed for effective network management.
- Network management activities, including exploring content, structuring interactions, developing process rules, and connecting actors (Klijn, Steijn & Edelenbos, 2010) have been shown to have an important role in shaping learning. However, the potential role of network management in mediating tensions between collaborative and hierarchical modes of governance has yet to be empirically explored.
- In the context of water management, collaboration is increasingly viewed as an avenue for building more integrated approaches to managing water systems, particularly at watershed scales. However, evidence of the success of collaborative processes has been mixed, and more research is needed to understand how collaborative governance works within the highly fragmented institutional setting for water management in the United States. Further, questions remain about how institutional factors affect the appropriate scale for collaboration, and what role government agencies have in encouraging collaborative approaches.

Chapter 2. The case, research questions, and methods

Drawing upon the theoretical framework presented in Chapter 1, this dissertation explores the dynamics of learning within the context of hybrid forms of governance through the case the Integrated Regional Water Management (IRWM) program in California. This study, therefore, follows a case study research design (Yin, 2003). In social science research, case studies may be justified through both analytical and substantive means (Walton, 1992). A substantive justification implies a “case like other cases” that can be observed in the world, and an analytical justification rests upon “a strategic argument,” drawing upon theory to identify critical aspects of a case that relate it to the set of phenomena about which claims will be made (Walton, 1992, p. 125). In this chapter, I first lay out the analytical and substantive justifications for the IRWM program as a case. With regard to theories of collective learning in collaborative governance, I highlight how the program serves as both a “critical” and “revelatory” case (Yin, 2003). In addition, I describe the relevance and timeliness of this research in the context of California water policy. I then outline the research questions that guide this study, and provide an overview of methods used. Subsequent chapters provide more detailed background about IRWM program and the specific regional case studies, as well as further discussion of methods as relevant to specific chapters.

Integrated Regional Water Management in California

In California, water management has historically been a local responsibility, dispersed across well over a thousand special districts, cities, and county agencies (Hundley, 2001). The IRWM process is a statewide program intended to overcome this fragmentation and encourage local water stakeholders to collaborate in managing water resources at regional scales. The 2002 Integrated Regional Water Management (IRWM) Planning Act, accompanied by several voted-approved bond measures, provided financial incentives for local agencies to form regions, develop plans for integrated water management, and undertake projects to implement those plans. By 2011, 48 IRWM regions had formed across the state, operating at varied geographic scales and following different governance structures. To date, approximately \$1 billion in planning and project funds has been disbursed to these regions (DWR, 2015c).

The IRWM program was created in the spirit of a movement toward integrated water resources management, with a goal of promoting a more holistic understanding of water systems and their embeddedness within ecosystems. It was not intended to simply to fund projects, but to overcome the silos within which water agencies have been operating, and build relationships between them. The IRWM process is not a regulatory one, and does not directly seek to alter water rights or allocation. Rather, participation in IRWM planning is voluntary, incentivized by the availability of grant funds. This means that in order for the program to lead to changes in water management practice, IRWM regions must enable learning among participating water stakeholders, such that they build a new, shared

understanding of their problems at a regional scale, as well as capacity for undertaking joint action to address them. Below, I describe the importance of this case along theoretical and policy dimensions.

Analytical and substantive justifications for IRWM as a case

Learning is a central element of the IRWM program's goals, and a crucial indicator of its success. There is an extensive literature, reviewed in Chapter 1, that explores collaborative governance and the benefits it can generate in terms of learning (Heikkila & Gerlak, 2013, Innes & Booher, 2010, Ansell & Gash, 2008). In an analytical sense, California's IRWM process represents a case of an institutional arrangement intended to support collaboration and learning. By delineating my case in this manner, I am seeking to generalize to the "conceptual class" (Abbott, 1992) of collaborative processes that may promote learning in coping with social, institutional and ecological complexities. Findings from my case may inform or extend theoretical work in this area.

This case also offers the opportunity to explore the tensions between collaborative governance and hierarchical accountability (Ansell, 2011). The IRWM process is administered by the California Department of Water Resources (DWR), a large state agency that until recently had focused primarily on building and managing major infrastructure projects for the transport and delivery of water across the state. DWR's management of the IRWM process marked a significant shift away from top-down, infrastructure-based strategies and toward a role of supporting and enabling local agencies to identify their own needs and develop and implement their own solutions. At the same time, DWR serves as the administrator of a major grant program, amounting to over \$1.5 billion since 2002. Under pressure to demonstrate accountability for public expenditures, DWR developed stringent grant proposal and reporting requirements that all IRWM regions must follow in order to receive funding. State and local perspectives diverge widely on the appropriateness of these requirements. IRWM participants find compliance with these rules extremely time-consuming and constraining, while DWR staff responsible for the IRWM program view them as essential to ensure accountability for public spending, and for protection against potential audits. While the hybrid nature of governance in many settings is recognized in the literature (see Ferlie et al., 2011), so far most studies of collaborative processes have not examined the role of the larger institutional context within which they operate, particularly with regard to its effects on learning (Hughes & Pincetl, 2014). The IRWM process offers an important opportunity to do so.

In terms of its substantive justification, the IRWM process is one example of a growing number of local, state and national-level policies designed to encourage integrated water resources management, in the United States and globally (Lenton & Muller, 2009). In this sense, the IRWM process is a "case like other cases" (Abbott, 1992). For example, in 2000 – shortly before the IRWM process began in California – the European Union launched its Water Framework Directive, which required state, regional and local entities to collaborate at river basin scales on plans to ensure good water quality status in rivers and coastal areas across Europe (Chave, 2001). A similar effort has been undertaken in Brazil, leading to the formation of river basin committees (Abers & Keck, 2013). California's experience can offer

insight into how this increasingly common emphasis on integrated water management, particularly through collaborative means, plays out in practice.

The IRWM process as a “critical” and “revelatory” case

In certain respects, the IRWM process represents a “critical case” of learning about integrated management through collaboration. According to Yin (2003), a “critical case” occurs when “theory has specified a clear set of propositions as well as the circumstances within which the propositions are believed to be true...the single case can then be used to determine whether a theory’s propositions are correct or whether some alternative set of explanations might be more relevant,” (p. 40). As already noted, considerable research has demonstrated the potential for collaboration to yield collective learning, pointing to factors such as face-to-face interaction between diverse stakeholders and a focus on practical problems as crucial to stimulating learning (Heikkila & Gerlak, 2013, Ansell, 2011). Since the IRWM process is specifically intended to generate learning in the context of integrated approaches to water management, we might expect that if current theory is correct, it should hold in this case.

At the same time, I am framing IRWM as a case of collaboration within a broader governance context, embedded within a hierarchical governance arrangement implemented through bureaucratic practices. We do not yet have much theoretical grounding for suggesting how such hierarchical structures affect the potential for collective learning in collaborative processes, and only limited studies that have examined how regional and local collaboratives interact with larger-scale bureaucratic agencies (Innes & Booher, 2010). In this respect, the IRWM process might be described as a “revelatory” case (Yin, 2003, p. 42), in that it presents an opportunity to explore the dynamics between collaborative and hierarchical governance modes, which so far have received little empirical study. Much research on collaboration has been conducted through case studies of individual collaborative process, or through comparison of multiple case studies that emerged in different policy settings. The IRWM process presents a unique opportunity to examine multiple collaborations operating under the same statewide policy, but which differ in their socio-economic, geographic and institutional settings. The fact that each of these collaborations is subject to the same state requirements enables exploration of how different network-level characteristics affect learning within the context of hierarchical governance. In this way, my research may be able to extend or refine existing theory regarding network governance and learning.

Policy relevance of research on the IRWM process

An investigation of the functioning of the IRWM process is also highly relevant and timely with regard to the future of California water policy. The IRWM program has become the centerpiece of the state’s efforts to promote greater sustainability and efficiency in water management. The most recent update of the California Water Plan (DWR, 2014a) provides a strong endorsement of the performance of the IRWM process and its future role in tackling California’s water problems. In November 2014, voters approved an additional

\$510 million for projects undertaken through the IRWM process.⁵ In addition, the extreme drought conditions that have gripped the state since 2012 have only increased calls for local agencies to break out of their silos and find ways to work together (CNRA et al., 2014). Given the significant investments being made and the high expectations of state policymakers, understanding the functioning and effectiveness of the IRWM program is critical.

However, so far only limited research has been undertaken with regard to the IRWM process. Lubell and Lippert (2011) found that IRWM planning in the Bay Area had not yielded significant increases in collaboration among water agencies and other stakeholders in the region. Hughes and Pincetl (2014) analyzed whether patterns of interaction among water agencies had changed through the creation of six IRWM regions in southern California. They found that the degree of change varied significantly across regions, but that it is too early to tell whether what these changes will lead to in terms of improved water management. While these two studies appear to raise questions about the effectiveness of the IRWM process, they focus on urban regions, and their findings may not be generalizable to other more rural parts of the state. Thompson (2012) and Hanak et al. (2011) also express doubts about the effectiveness of the IRWM process, but do not explore its functioning. Hanak et al. (2011) suggest that regional planning should be occurring at larger and more watershed-oriented scales than that of most IRWM regions, but this assertion appears to be based largely upon the assumption that hydrologic scales offer the best opportunities for integrated management (Molle, 2009), rather than upon an assessment of the actual performance of existing IRWM regions.

As investment in the IRWM process continues, this study seeks to provide an improved understanding of how this process functions at both state and regional levels, and explore the diversity of governance arrangements that have emerged across the state. It also addresses questions about the scale of IRWM regions, contributing to broader research on the role of natural and institutional factors in determining the appropriate scale for regional water planning. Most importantly, this study analyzes the dynamics of learning within IRWM regions, and the role of network managers in enabling this learning. In addition to contributing to the broader network literature on this subject, this research builds upon the findings of the limited set of studies already conducted on IRWM planning. Hughes and Pincetl (2014) suggest a potential role for boundary organizations to promote learning within IRWM regions, but do not explore this dimension in their study. A recent study by Balazs and Lubell (2014) examines social learning outcomes in the Kings Basin, a region that also serves as a case study in this dissertation. My research builds upon this work, and focuses specifically on how learning occurs within IRWM regions, given that they operate within a set of hierarchical rules established by the state.

⁵ This funding was part of Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act of 2014, which authorized \$7.5 billion in general obligation bonds to support water projects.

Research questions

The overarching question examined in this dissertation is: *under what conditions can learning occur within the context of hybrid governance forms that combine characteristics of network and hierarchical governance?* More specifically, this research effort is guided by the following sub-questions, each of which is explored in the subsequent chapters:

- How do tensions between hierarchical and collaborative governance modes play out in practice in the IRWM process? This question is explored in Chapter 3, by examining the context in which the IRWM process emerged, and the tensions that are inherent within it as a program that explicitly promotes collaboration, while being managed by a state government agency facing accountability pressures.
- How do collaborative processes establish themselves as legitimate venues for decision-making when crossing jurisdictional boundaries? Chapter 4 takes up this question, exploring the process through which IRWM regional boundaries were determined, and drawing upon the experiences of three IRWM regions that follow hydrologic boundaries.
- Given its importance for learning, how is network management conducted within IRWM regions, and do centralized network structures provide greater support for such activities? Drawing upon evidence from a sample of 19 out of the 48 IRWM regions, Chapter 5 examines the practice of network management, the network governance forms chosen by IRWM regions, and the relationship between network structure and investment in network management.
- What kinds of learning are occurring in IRWM regions, and what factors play a role in shaping this learning? Based upon two case study regions that represent centralized and decentralized network forms, Chapter 6 presents findings regarding levels of cognitive, strategic and institutional learning among stakeholders within these two regions, and discusses how biophysical, socio-economic and institutional features may shape these learning outcomes.
- What role do network managers play in supporting learning at a regional scale? Through a comparison of the two case study regions, Chapter 7 identifies three mechanisms through which network managers, operating within a centralized network structure, have negotiated between the state's hierarchical approach to governance, embodied in IRWM requirements, and the dynamics of collaborative governance at the regional scale.

Methods

To explore the above questions, I follow what Yin (2003) refers to as an “embedded case study design,” (2003, p. 42-3), involving attention to subunits of the whole case. The IRWM process is composed of 48 regional collaborations, each of which is subject to the same guidelines developed by DWR. Thus, to analyze the IRWM process as a whole, I examine a specific set of regional-level collaborations and their interactions with state government. I selected regions to include in my study so as to enable generalization in the context of theory about learning in collaborative processes, as well as to contribute to a better

Table 2.1. Key Study Components

Unit of analysis	Key research questions	Data gathered
Statewide IRWM program	1. Why was the IRWM process created? 2. What was the original purpose of the IRWM process? 3. How did its purpose evolve over time? 4. How has state government implemented the IRWM process? 5. How were the boundaries of the 48 IRWM regions determined?	Interviews Meeting observations Participatory observation of DWR work Analysis of public documents GIS analysis
19 sample IRWM regions	1. What decision-making processes are used in IRWM regions? 2. Who participates in these decision-making processes? 3. What network management activities are conducted within IRWM regions? 4. What levels of investment are made in order to carry out these activities? 5. How are IRWM regions structured in order to support these activities?	Interviews Analysis of public documents
Two case study regions	1. What learning has occurred within IRWM regions? 2. What factors play a role in shaping this learning? 3. What is the specific role of network managers in supporting this learning?	Interviews Meeting observations Analysis of public documents

understanding of the overall effectiveness of the IRWM process in promoting learning. Specifically, my study included three components, involving analysis at three distinct scales. Table 2.1 summarizes these components according to their units of analysis, key questions, and the data sources for each.

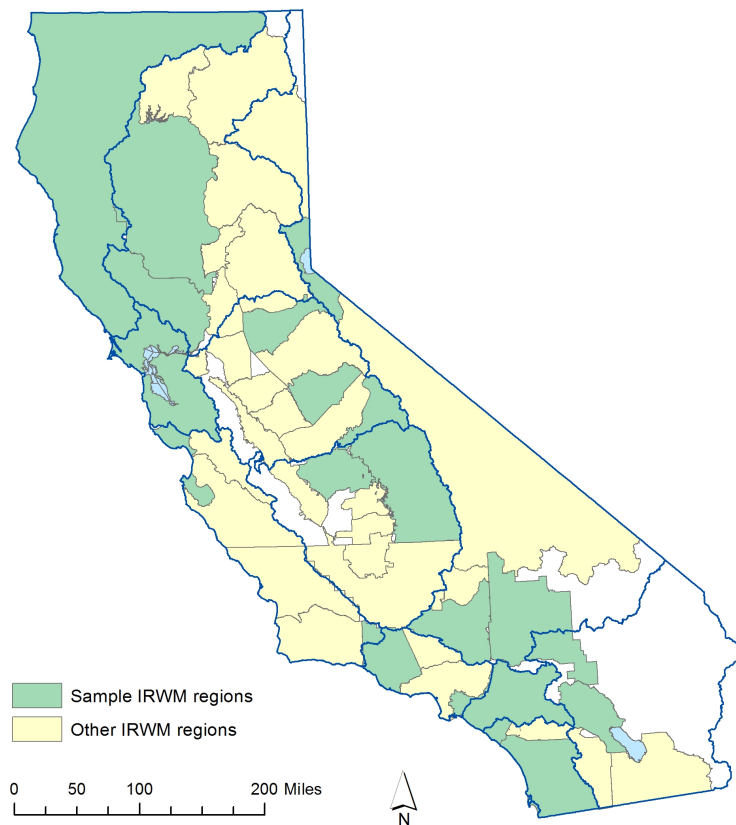
1. State level: The origins of the IRWM program and its implementation. Through this analysis, I sought to understand the context within which the IRWM program emerged, and the original intentions of those who helped to establish it. I also explored and documented the program's implementation at the state level, in particular with regard to the role of DWR. I utilized a combination of semi-structured interviews (12 in total), observations at approximately 20 meetings and conferences, and analysis of public documents. In addition, I gained understanding of the functioning of DWR and how the IRWM process is managed through a collaboration with DWR's Climate Change Program, as described below. Finally, as part of this statewide analysis, I collected and analyzed GIS data regarding IRWM regional boundaries and the degree to which they match county, watershed or groundwater basin boundaries.

2. Multi-region level: analysis of network governance structures. In order to understand the diversity of ways in which the IRWM process has unfolded at a regional level, I studied a sample of IRWM regions. In an effort to make this sample as representative as possible of the 48 IRWM regions across the state, I randomly selected two regions from each of the 11 Funding Areas within which IRWM regions are organized.⁶ In three of these Funding Areas, there is only one IRWM region, and these three regions were included in the study. This resulted in a total sample size of 19 regions, shown in Figure 2.1.⁷ Data were gathered

⁶ These Funding Areas represent 11 hydrologic regions in the state, each of which has been allocated a certain amount of IRWM grant funds (see Chapter 3 for details).

⁷ Random selection was performed by entering the names of each of the 48 regions, grouped by Funding Area, into an Excel spreadsheet. The regions in each Funding Area were numbered, and

Figure 2.1. Sample of 19 IRWM regions.



about the governance structures and network management activities of each of these regions, through a combination of interviews and document analysis. At least one semi-structured interview was conducted with a staff member involved in coordinating each of the regions. In addition to these 19 regions, I conducted interviews with representatives of eight additional IRWM regions. These regions are not analyzed in this study but the perspectives offered through these interviews have informed the overall analysis.

3. Case study level: analysis of learning and the role of network management. In order to understand the dynamics of learning and the role of network managers in promoting learning in the context of IRWM program requirements, two out of the 19 regions were identified as in-depth case studies. These two regions, Kings Basin and Westside Sacramento, were selected so as to compare how learning occurs under different governance arrangements and different levels of investment in network management. These case studies also represent the two most common governance arrangements found among the 19-region sample, making findings relevant not only for theory but also for understanding the effectiveness of the IRWM process. To minimize other differences, the two regions selected have a similar set of stakeholders and are located in the Central

Excel's random number generator was used to select two regions from each Funding Area. The three regions that encompassed an entire Funding Area were automatically included.

Valley, in areas with significant agricultural activity as well as urban populations. Semi-structured interviews were conducted with stakeholders in both regions regarding the kinds of learning they had experienced, using the framework of cognitive, strategic and institutional learning discussed in the previous chapter (Koppenjan & Klijn, 2004). A total of 28 interviews were conducted, four meetings were observed, and extensive document analysis was conducted for both regions.

Study scoping

I began the scoping process for this study during the summer of 2011. Initial ideas for this project emerged during a collaboration with the Climate Change Program at DWR, involving an analysis of how climate change was being considered in the development of Integrated Regional Water Management plans. This initial exposure to the IRWM process revealed the potential for a larger study of the IRWM process as a case of collaborative networks established in the context of state-imposed requirements. It also brought me into regular contact with DWR staff within the Division of Integrated Regional Water Management, and provided me with an initial set of contacts with which to begin my research on the IRWM process. During the period of 2012 – 2013, I conducted several scoping interviews with key DWR staff and IRWM regional participants, and attended public meetings related to the development of the 2013 California Water Plan. This helped me to build an understanding of the overall functioning of the IRWM process and develop research questions. I completed my research design and received approval for my study protocol from the Institutional Review Board at UC Berkeley in April 2013.

Data sources

I relied upon five main sources of data for this study: interviews, meeting observations, document analysis, GIS data, and participant observation of DWR activities. Each is described below.

Interviews

During the period of June 2013 and June 2014, I conducted a total of 71 semi-structured interviews, summarized in Table 2.2. Of these, 49 were conducted by phone, and 22 were held in person. While some personal connection and context was lost by conducting interviews by phone, many of my interviewees had very busy schedules and were located all across the state. Providing the option to talk by phone enabled me to speak with some respondents that I otherwise would not have been able to reach. In addition, I had previously met many of these individuals at IRWM conferences or workshops. The majority of interviews I conducted for my case study regions (17 out of 28) were held in person during visits to each region. My interviews ranged from a half hour to one and a half hours in length. For phone interviews, I transcribed the interview as the respondent spoke. For in person interviews, when respondents gave permission I recorded and later transcribed the interview. In some cases where respondents were not comfortable with recording or conditions did not permit it, I took handwritten notes during the interview and transcribed them immediately afterwards.

Table 2.2. Interviews Conducted (June 2013 - June 2014)

Unit of analysis	Type of interview	Number	I
State level	Origins of IRWM process and its implementation	12	
Multi-region level	Regional network structure and network management		
	Representatives of 19 IRWM regions	23	
	Representatives of 6 additional regions	7	
Regional level	Case study regions		
	Kings Basin	18	
	Westside Sacramento	11	
Total		71	

interviewed three main types of informants, and tailored my interview questions for each. Below I describe each of these interview types, and explain how I selected individuals to interview within each category. When individuals fell into more than one category, my interviews covered both sets of questions.

1. *Individuals familiar with history of the IRWM process and/or its implementation.* My questions for these informants focused on understanding the original purpose of the IRWM program, the chain of events that led to its creation, and their perspectives of its current functioning and the degree to which its goals are being achieved. Through my scoping efforts for this study, I identified several individuals who played a role in designing the IRWM process, and who have been involved in its implementation. I began by interviewing these individuals, who were current and former state officials, lobbyists in Sacramento, and independent consultants. I then used a snowball method (i.e., asking these individuals to identify others who would have relevant knowledge on this topic) to identify additional people to interview. I interviewed a total of 12 people under this category.
2. *Individuals involved in coordinating IRWM regional planning processes.* These interviews focused on understanding the history, governance arrangements, and level of investment in network management activities in each of the 19 randomly selected sample regions in my study. I interviewed at least one person involved in managing the regional process in each of these regions. For each region, I identified a staff member or consultant who was closely involved in the process. In some cases, I met the appropriate person at an IRWM-related conference or workshop. In other cases, I contacted the person listed as the key contact on the region's website. In a few cases, participants in other IRWM regions put me in touch with the coordinator in another region. In three of the 19 regions, I interviewed more than one person involved in managing the region, and/or a stakeholder in the IRWM process. In addition, I interviewed representatives of eight additional regions that were not included among the 19-region sample. This was often at the suggestion of another IRWM coordinator or as a follow-up to an in-person conversation at a conference. These additional interviews offered additional insights into how the IRWM process is implemented at the regional scale. Most coordinators of the 19 randomly selected IRWM regions were willing to be interviewed. In one case, a coordinator did not reply to my request for an interview, so I randomly selected

another region from that Funding Area to include in the study. In total, 30 individuals were interviewed to understand IRWM regional governance arrangements and levels of investment in network management.⁸

3. *Participants involved in the two case study regions.* As discussed above, two out of the 19 regions were selected as case studies. These regions were selected to represent the two most common governance structures identified through the analysis of the 19 sample regions. Other criteria for case study selection included having similar types of stakeholders involved, a scale that is based on hydrologic boundaries and that crosses political jurisdictions, and the overall willingness of participants to be interviewed. Further discussion of case study selection can be found in Chapter 6.

My interviews of participants in these case study regions were focused on: 1) understanding the degree of learning that occurred in the region during the IRWM process; and 2) the role that network management played in shaping that learning, along with other factors. To this end, for both regions I interviewed: 1) public agency staff and consultants involved in managing the regional process; 2) a representative of DWR who was assigned to work with that IRWM region; and 3) stakeholders participating in the IRWM process who represent four key groups: agricultural, urban, disadvantaged communities, and environmental stewardship. I identified these individuals through several methods. First, I attended public meetings during which I learned about the people involved and their various roles. Second, I asked the coordinators or participants to identify representatives of the four stakeholder groups. Third, I reviewed meeting notes from the region to identify individuals who had attended meetings and had represented specific stakeholder interests, and contacted these individuals. In total, I interviewed 17 people involved in the Kings Basin IRWM region, and 11 people involved in Westside Sacramento, which had a much smaller overall number of participating agencies and stakeholders. I conducted many of these interviews in person during visits to these regions.

My questions for individuals involved in managing or coordinating the region included details about the history of the region, the emergence of the IRWM process in the region, how the IRWM process is governed and managed on a day-to-day basis, and their observations of how the IRWM process has changed over time. My questions for stakeholders in the regional process focused on learning they experienced, or perceived that others experienced. I defined learning in terms of cognitive, strategic and institutional learning (Koppenjan & Klijn, 2004). Interviews played a particularly important role in measuring cognitive and strategic learning. Although it would have been ideal to conduct interviews before the IRWM process and then afterwards to assess learning, this was not possible because these IRWM processes began in 2004. Instead, I asked stakeholders first to assess their

⁸ This figure does not include the coordinators for the two case study regions, who are included among case study interviews.

Table 2.3. Meetings Observed, 2011 - 2015

Meeting focus	Meeting title	Location	Dates
Purpose and implementation of IRWM process	<u>IRWM Strategic Planning Workshops</u>		
	IRWM Vision and Goals Workshop	Clovis	April 10, 2013
	IRWM Vision and Goals Workshop	Burbank	May 1, 2013
	IRWM Workshop on Goals, Objectives and Strategies	Clovis	October 17, 2013
	IRWM Workshop on Goals, Objectives and Strategies	Stockton	November 14, 2013
	<u>IRWM Public meetings</u>		
	Round 2 Process Improvement Workshop	Sacramento, CA	Dec. 20, 2011
	Implementation Grant Round 2 Funding Recommendations Public Comment	Sacramento, CA (via webcast)	Oct. 7, 2013
	2014 IRWM Drought Grants Public Comment	Sacramento, CA (via webcast)	May 12, 2014
	<u>IRWM Conferences</u>		
	2011 IRWM Conference	Sacramento, CA	May, 2011
	2013 IRWM Conference: Transforming the Water Management Culture	Sacramento, CA	April 4-5, 2013
	Integrated Regional Water Management 2.0: The Next Generation	San Deigo, CA	May 21-22, 2015
	<u>Sierra Water Working Group Meetings</u>		
	2012 Sierra Water Workgroup Summit	Kings Beach, CA	July 17-18, 2012
	2013 Sierra Water Workgroup Summit	Kings Beach, CA	June 11-13, 2013
	<u>Roundtable of Regions</u>		
	Annual meeting of the Roundtable of Regions	Sacramento, CA	Sept. 18, 2013
Statewide water planning	<u>Water Plan Meetings</u>		
	California Water Plan Plenary	Sacramento, CA	Oct. 29-30, 2013
	Delta Regional Forum	Stockton, CA	Sept. 19, 2013
	San Joaquin River Regional Forum	Merced, CA	Sept. 20, 2013
Implementation of IRWM process at the regional scale	<u>IRWM Meetings - case studies</u>		
	Kings Basin Advisory Committee Meeting	Fresno, CA	June 19, 2013
	Kings Basin Board Meeting	Fresno, CA	Oct. 16, 2013
	DAC Final Meeting	Selma, CA	Nov. 5, 2013
	WRA of Yolo County	Woodland, CA	June 5, 2014
	Tulare Basin Regional IRWM meeting	Visalia (via teleconference)	Sept. 9, 2013
	<u>Other regional IRWM meetings</u>		
	Central Southern California: IRWM Planning and Climate Change	Ventura, CA	March 12, 2012
	Bay Area IRWM Coordinating Committee (3)	Oakland, CA	Aug. 22, 2011
			May 11, 2012
			June 3, 2013

understanding of regional water management issues before the IRWM process, and second to assess their current understanding and the role that the IRWM process played in it. I also asked them to share their perceptions of whether others in the IRWM process have also experienced learning. Chapter 6 provides a detailed discussion of how learning was measured, and how interviews were used to assess cognitive and strategic learning.

Meeting Observations

During the period of 2011 to 2015, I observed approximately 30 public meetings related to the IRWM process. Table 2.3 provides details about these meetings. They fall into three broad types:

- *Meetings related to the overall goals and statewide implementation of the IRWM process.* These included a series of public meetings held by DWR as part of the development of a strategic plan for the future of the IRWM process, public meetings held by DWR to gather public input on specific aspects of IRWM requirements, three IRWM conferences, two conferences involving IRWM regions in the Sierras, and one meeting of the “Roundtable of Regions,” an informal statewide network of IRWM regions.
- *Meetings regarding statewide water planning.* The California Water Planning process, undertaken every five years, is a crucial venue for interaction among water management agencies and stakeholders across the state. The IRWM process is featured in many of the discussions at these meetings.
- *IRWM regional meetings.* I attended meetings in my two case study regions (three in the Kings Basin, one in Westside Sacramento), three meetings of the Bay Area IRWM region’s Coordinating Committee, and one meeting of the Watersheds Coalition of Ventura County. These meetings provided crucial insights into the actual functioning of the IRWM process at the regional level. The meeting observations in the case study regions helped to confirm findings regarding institutional learning.

Public Documents

A third data source was the wealth of public documents available about the IRWM process. All IRWM requirements and strategic planning documents are publicly available on DWR’s website. Many documents related to specific IRWM regions are also available from DWR. These include grant applications and DWR’s reviews of those applications, as well as Regional Acceptance Process applications for most regions. Each IRWM region also has its own website, which contains critical documentation of the IRWM process. Documents include IRWM plans, governing documents such as memoranda of understanding (MOUs), meeting notes and agendas, project reports, and lists of participants. In a few cases, interviewees provided updated documents that were not available on these websites. Table 2.4 provides a list of the types of documents consulted, the kinds of data gathered from each.

GIS Data

As part of the statewide analysis of the IRWM process, IRWM boundaries were analyzed in ArcGIS. Shapefiles containing geospatially-referenced data on IRWM boundaries were obtained from DWR, and datasets for the boundaries of watersheds, groundwater basins, and counties were obtained from USGS, DWR, and CalAtlas, respectively. Table 2.5 summarizes the data and its sources.

Participant Observation in DWR activities

During the period of 2011-2014, I worked closely with DWR’s Climate Change Program, conducting a total of three studies focused on how climate change has been considered in the IRWM process, and other local and regional water planning processes (Conrad 2012, 2013, 2014). A key responsibility of the Climate Change Program is to provide support to IRWM regions in understanding and addressing the risks of climate change, and

Table 2.4. Public documents analyzed

Level of analysis	Document type	Data gathered
State	IRWM Program Guidelines (2004, 2010, 2012)	Standards for writing IRWM plans, statewide priorities for grant funding
	IRWM Regional Acceptance Process guidelines (2009)	Standards for establishing new IRWM regions
	IRWM grant proposal requirements (multiple years)	Statewide priorities for IRWM grant funding
	IRWM Strategic Planning documents (2013, 2014)	Vision and goals of IRWM process
IRWM regions	IRWM Plans (various years)	Participants in IRWM regions, goals and objectives, governance arrangements, funding sources
	Regional Acceptance Process applications (2009, 2011)	Rationale for IRWM regional boundaries
	IRWM grant applications (multiple years)	Grants submitted and received
	Meeting notes and agendas (multiple dates)	Focus of discussion and attendance at IRWM meetings
	Project reports (where available)	Project outcomes
	Governing documents for IRWM regions (MOUs, other agreements)	Formal decision-making procedures, financial commitments to the process

Table 2.5. GIS data utilized for analysis of IRWM regional boundaries

Dataset	Source, Date	Description	Native Projection	Scale
IRWM Regional Boundaries	1) DWR, 2012 2) DWR, 2011	1) Single shapefile containing polygons of 48 IRWM regions in California 2) Individual shapefiles for each of the 48 IRWM regions	UTM Zone 10, NAD 1927, Meters	Unknown (may vary by region)
Watershed and sub-basin boundaries	Watershed Boundary Dataset, USGS, 2004	1) Shapefile containing polygons of sub-basin boundaries for the California region (HU8) 2) Shapefile containing of watershed boundaries for the California region (HU10)	GCS, NAD 1983	1:24,000
Groundwater basins	DWR, 2012	Polygons of groundwater basins and sub-basins in California	GCS, NAD 1983	1:250,000
County boundaries	CalAtlas, 2009	Polygons of county boundaries for California	CA Teale Albers, NAD 1983	1:24,000
Documentation of IRWM regional boundaries	IRWM regions, 2009, 2011	Regional Acceptance Process applications submitted to DWR	N/A	N/A

incorporating climate change into their IRWM plans. Between 2012-2014, I participated regularly in the group's bi-weekly staff meetings (held via conference call because climate change staff are located throughout the state), and attended meetings in person in Sacramento approximately every other month. Because I was contributing to DWR's work, I was able to participate in meetings that I would not have been open to me as an observer. This collaboration initially provided me with an opportunity to learn about the IRWM process and scope out my dissertation research. Over time, my continued participation in

DWR's work provided me with important insights into how DWR functions as a public agency, and how the IRWM process fits into their mandate and operations.

Analysis

To address my research questions, I used several types of analysis at the statewide, multi-region, and case study levels.

State level. I combined interviews with document analysis to develop an understanding of the origins and functioning of the IRWM process. I used a manual coding process to identify themes that emerged in interviews focused on the creation of the IRWM process. By interviewing multiple people from different perspectives who were involved at the time the IRWM process was developed, I was able to triangulate information to confirm my understanding of the process. Extensive meeting observations, combined with an analysis of DWR's requirements for IRWM plans and grant proposals, offered insight into current perspectives on the purpose and functioning of the IRWM process. This analysis led to the identification of several key themes that capture the multiple purposes of the IRWM process. These themes were used to guide the coding of interviews conducted in case study regions, as described below. Finally, I conducted an analysis of the boundaries of all 48 IRWM regions using ArcGIS to match IRWM boundaries with those of watersheds, groundwater basins, and counties. The results of the state-level analysis are discussed in Chapters 3 and 4.

Multi-region level. In order to identify the different governance structures of IRWM regions and their levels of investment in network management, I compiled data about the 19 randomly selected sample IRWM regions from interviews and public documents, and examined this data for trends. Because only 19 regions were involved, and data about participation and governance structures were not always comparable across regions, statistical analysis was not appropriate. Instead, data gathered about IRWM regional governance were used to categorize IRWM regions according to the typology of governance arrangements provided by Provan and Kenis (2008). By using this typology, I was able to explore whether key differences in governance arrangements are associated with greater or lesser investment in network management. This analysis is described in Chapter 5.

Case study level. In order to assess and compare learning in the two case study regions, I manually coded my interviews for instances of cognitive, strategic and institutional learning. For cognitive and strategic learning, I focused on learning regarding three key themes related to the purpose of the IRWM process, which had emerged from my state-level analysis. These included: 1) creating a regional vision for water management; 2) promoting environmental stewardship; and 3) addressing the needs of disadvantaged communities. I triangulated the perspectives of stakeholders representing different interests in each region (agriculture, urban, disadvantaged communities, and the environment), in order to confirm the emergence of a collective learning around these topics. Interview results were combined with data gathered about participation in the IRWM process and emerging partnerships to provide an overall understanding of cognitive and strategic learning in the two regions. Institutional learning was assessed through

several indicators related to the predictability of interactions between stakeholders, based on data gathered through interviews, meeting observations, and public documents. The analysis of learning and my findings are discussed in Chapter 6.

In order to understand the role of network structure and the level of investment in network management in shaping learning, I used process tracing (George & Bennett, 2005) to establish a chain of events in each case study regarding the learning process. I drew upon interview data, meeting observations and public documents to understand the events and factors that contributed to learning, including other variables in addition to network management. This analysis is discussed in detail in Chapter 7.

Chapter 3. The emergence of Integrated Regional Water Management in California

Integrated regional management is just part of this continuum of getting people to think in ways that are in their self interest, but are not always easy to see.

—Former state government official involved in establishing the IRWM process

You have to build it into the culture. Changing peoples' relationships is the most difficult thing to do, but it has lasting results.

—IRWM planning consultant and former staff member at the Santa Ana Watershed Project Authority

In the United States and internationally, practitioners and scholars alike emphasize that integrated water management (IWM) is crucial to ensuring that human and environmental needs for water are met in a sustainable manner (Lenton & Muller, 2009, AWRA, 2012). The concept of IWM emerged out of a growing awareness that various elements of a water system are intimately connected as part of larger ecological and social processes, and that as demands increase, natural systems need to be accounted for in planning (Mukhtarov, 2008). However, IWM is very broadly interpreted, and has multiple meanings depending upon the context. It may refer to coordination among upstream and downstream water users, or among multiple water suppliers, or of multiple aspects of water management. This vagueness has been critiqued in that it is difficult to identify instances in which IWM is actually being applied, and to evaluate outcomes (Biswas, 2004).

However, the concept's flexibility also means that it can engage multiple interests and create a common space for dialogue. Ansell (2011) defines a "meta-concept," as generalized ideal that can have localized meanings, while also evoking a larger shared purpose.⁹ As an example, Ansell suggests that the concept of "sustainable development" brings voices for economic development and environmental protection into dialogue with one another, providing platform for work toward common goals. Although it is difficult to measure progress toward sustainable development, the concept has served the purpose of bringing together actors with different, and often competing concerns. Similarly, the concept of integrated water management, although vague, has brought together multiple interests and perspectives in the water management community to work toward common ends. Such "meta-concepts" are important because they have the potential to re-frame policy debates, and stimulate large-scale institutional change.

This chapter examines the multiple interests that have helped to shape California's approach to IWM, embodied in the Integrated Regional Water Management (IRWM)

⁹ In describing a meta-concept, Ansell (2011) builds on the idea of a "boundary object," defined by Star and Griesemer (1989, p. 393) as "objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites."

program. Reflecting California's unique water management challenges and institutional context, IRWM has become a "meta-concept" for managing the state's water problems in the face of increasing water demands, and growing risks of climate change. Yet, IRWM holds different meanings for the various interests and communities who are engaged in it. Its initial formulation reflected an intent to improve water supply reliability by bringing together water supply interests at a regional scale and encouraging regional self-sufficiency. However, conservation advocates and others who played an important role in developing the program saw it as an opportunity to integrate multiple aspects of water management, and to include environmental stewardship in water planning. This perspective was buttressed by a growing concern for the risks presented by climate change, which could be better addressed through multi-benefit approaches to water management. Finally, environmental justice advocates have successfully framed the IRWM program as an opportunity to promote greater equity in access to decision-making about water management, and to begin to overcome long-standing barriers to the participation of marginalized communities in the management of California's water. As a meta-concept, IRWM brings all of these perspectives into conversation with one another.

Overall, the creators of the IRWM process intended to launch a radical shift in perspective and in the practice of water management in the state. Instead of local agencies acting on their own to advance their individual mandates, the IRWM process was intended to encourage the development of regional visions for managing water resources, providing the basis for local agencies to work together to define and advance their priorities. In other words, the IRWM process was created to stimulate learning among different water management stakeholders, such that each region would be able to pursue solutions that are meaningful for them, while still building a common language and platform for working together at a state level. However, the implementation of the program has been influenced by pressure to demonstrate accountability for the expenditure of large amounts of grant funds, leading to a series of rules and grant guidelines that have lent a bureaucratic character to the program. This stands in tension with its original intent to stimulate learning and innovation.

This chapter draws upon an analysis of policy documents and 12 interviews with individuals involved in establishing or implementing the IRWM process, conducted during the period of June 2013 to February 2014. In addition, this research is informed by observations of meetings, workshops, and conferences involving stakeholders involved in the IRWM process during the period of 2011 to 2014. First, I briefly introduce the historical, biophysical, and institutional context for water management in California, particularly the state's long history of local control over water resources. In the next section, I examine the origins and intent of the IRWM process, tracing the multiple narratives that have together shaped the structure of the IRWM program today. I then describe the implementation of the IRWM program, including the role of DWR as the administrator of this process, the formation of IRWM regions, and the distribution of project funding in IRWM regions. This implementation process reveals the tensions between the ideals of collaboration and pressures within DWR to maintain accountability for public expenditures.

California's water resources: High variability, high demand

Water in California is a highly variable and contested resource, managed through a complex, interconnected system integrating natural and constructed components. The state's Mediterranean climate, with high variability in rainfall across seasons and between years, poses considerable challenges in meeting the needs of its 38 million people, and a massive agricultural sector, and the state's diverse and unique ecosystems. While California's water sources are plentiful relative to much of the western United States, they are not evenly distributed across the state. About three-quarters of the state's water supply originates north of Sacramento, while three-quarters of water demand lies south of it (Carle, 2009). In order to cope with this variability in rainfall across space and time, California has relied upon snowpack in the Sierra Nevada to store approximately one-third of the state's water for use during the dry season. Numerous reservoirs provide additional storage during dry months and years. Equally important has been an extensive network of aqueducts, pumping stations and reservoirs built and operated by federal, state and local agencies to send water from the wet north to farms and cities in dry southern California and the Central Valley. Finally, in addition to surface water, groundwater provides a crucial source of supply, accounting for almost one third of water use in the state, and even more during drought years (DWR, 2015b).

Over the past several decades, pressures have been growing on California's water resources in at least three ways. First, continual population growth in the state ensures that urban water demand will at least remain constant, as it has over the past 20 years, and may even grow unless conservation efforts are continually expanded (Weiser & Reese, 2015, PPIC, 2014). While agriculture remains the largest use of water in the state, accounting for approximately 80% of water use, urban demand is harder to curtail during shortages (Tarlock, 2000). Second, as awareness of environmental needs has grown, so has the demand for environmental water. Over the past several decades, water quality has been become more strictly regulated under the federal Clean Water Act, often requiring significant investments on the part of local agencies (Sabatier et al., 2005). Court decisions related to the Endangered Species Act have led to reductions in water deliveries to southern California and the San Joaquin Valley in order to protect endangered fish populations in the Sacramento-San Joaquin Delta (Hanak et al., 2011). As water users have faced more constraints on surface water sources, they have relied more heavily on groundwater resources, which are now severely overdrafted in some parts of the state (DWR, 2015b). Finally, climate change presents a new set of risks to California's water system, exacerbating these problems and adding even greater uncertainty to the already wildly variable conditions with water managers must cope (Andrew, 2015). As temperatures increase, snowpack in the Sierra Nevada is shrinking, making it more difficult to store rainy season water for later in the year (Moser et al., 2012). Climate change is also expected to lead to more extreme drought periods, placing even greater pressure on groundwater supplies (Diffenbaugh et al., 2015, Langridge et al., 2012). More extreme precipitation events are expected, worsening the already significant flood risks in many parts of the state, particularly in the Delta (DWR, 2008).

It is becoming increasingly clear that building more large-scale infrastructure will not resolve California's growing water crisis. The debate over the future of the Sacramento-San Joaquin River Delta illustrates this. A large proportion of the water exported to southern California flows through the State Water Project's pumping facilities in the Delta. This has caused serious impacts on the Delta's ecosystem, and the periodic curtailment of water exports to protect endangered fish species has meant that water contractors who depend upon these exports face increasing uncertainty about their supplies (Hanak et al., 2011). The construction of two massive new tunnels has been proposed in order to improve the reliability of water exports while also reducing impacts on the Delta ecosystem. However, the project would cost over \$17 billion, and there is still considerable uncertainty about the ecosystem benefits it would generate (PPIC, 2015). While the controversy surrounding the proposed Delta tunnels receives significant attention, most in the water management community recognize that the project would by no means resolve California's water problems. Instead, water suppliers around the state need to reduce their reliance on water exported through the Delta, which will require a combination of local and regional efforts to promote more efficient water use, reduced demand, and water recycling, and conjunctive groundwater management (Hanak et al., 2011). Such integrated water management strategies have now replaced the State Water Project as the primary focus of California's statewide water planning process, and will play a central role in California's increasingly constrained water future (DWR, 2014).

Institutional context: A tradition of local control

Rights to water in California have long been locally determined, as well as highly contested (Hundley, 2001). A complex blend of appropriative and riparian water rights emerged as white settlers claimed water rights and land for farming and gold mining during the second half of the 1800s and the early 1900s. Appropriative rights are "first in time, first in right," in which the oldest claims are fulfilled first, and junior rights are curtailed in times of scarcity. Landowners adjacent to waterways have riparian rights, under which they can make "reasonable" use of water flowing by their property. Groundwater use is also attached to ownership of land, with every landowner having the right to extract the groundwater beneath them (Hanak et al., 2011). The water rights of Native Americans, whose usage long pre-dates that of what settlers, have largely gone unrecognized. The water rights system favors landowners and others who had the resources to exercise early claims to water. Inequities in access to land and resources – especially in areas where non-whites were prohibited from land ownership - have been perpetuated in patterns of water access today (EJCW, 2005, Pannu, 2012).

Beginning in the 1800s, it became clear that the need for infrastructure such as irrigation systems and levees exceeded the capacity of individual landowners. In 1861, legislation enabled the creation of a new form of local government, called a "district," for the purposes of reclaiming land for agriculture (Kelley, 1989, p. 48). This was followed by the Wright Act of 1887, which authorized the formation of irrigation districts with powers to raise funds with through bonds or property taxes to build water projects (Hanak et al., 2011, p. 30). Subsequently, water districts were formed to meet urban water needs, and to provide a

wide range of other services. Today, these “special districts” exist in a variety of forms enabled by 60 different statutes, and have become a key mechanism for providing water and other public services such as fire protection, sanitation, lighting, and parks (Little Hoover Commission, 2000). In California, there are between 3,000 – 4,000 special districts, depending upon how they are classified, of which over 1,000 are responsible for some aspect of water management (Little Hoover Commission, 2000, Hundley, 2001, Mizany & Manatt, 2002).¹⁰

Special districts vary in their governance structures, with the majority operating under an independent board, which is usually locally elected. Special districts may be funded through property taxes, fees for services, or a combination thereof. California’s 58 counties and 474 cities are also involved in water management, but special districts are distinct in that they focus on providing specific services – often only one service – within their boundaries (Mizany & Manatt, 2002). Local government entities – cities, counties and special districts – account for the vast majority of spending on water management in California. In the late 2000s, local agencies spent over \$30 billion annually, compared to \$3 billion and \$500 million spent by state and federal agencies respectively (Hanak et al., 2014, p. 4).

Within this framework, the California state government has historically exercised relatively limited authority over how local agencies use and manage water. The two primary state water agencies in California are the State Water Resources Control Board (SWRCB) and the Department of Water Resources (DWR). SWRCB is responsible for regulating the use and quality of water, but it is constrained in several ways. First, appropriative rights dated prior to 1914 are not subject to the agency’s permit system, and neither are the riparian rights of landowners adjacent to waterways (Tarlock et al., 2009, p. 301-2). This means that in effect, the SWRCB regulates less than half of urban and agricultural water rights in the state through its permitting system (Hanak et al., 2011, p. 38). Further, in many parts of the state, the face value of water permits far exceeds the amount of water actual available (Hanemann et al., 2012). SWRCB is also charged with ensuring that all water use, permitted or not, is both “reasonable” and “beneficial,” and with protecting public trust uses of water, including for ecological value, navigation and fisheries (Tarlock et al., 2009, Hanak et al., 2011). However, the agency often has difficulty in implementing restrictions under these principles, either due to political constraints or a lack of data on actual water use (Hanemann & Dyckman, 2009, Hanemann et al., 2012).¹¹ Finally, groundwater has been exclusively under local control, until the passage of the Sustainable Groundwater Management Act of 2014. However, even under this new law, agreed to amidst severe

¹⁰ It is likely that there are considerably more than 1,000 involved in water management. For example, Nelson (2012) estimates that there are 2,300 “independent local water agencies” involved in groundwater management, although not all of these may be classified as special districts.

¹¹ SWRCB has been more aggressive in asserting its authority during the current drought. For example, in July 2015, the State Board took steps to fine the Byron Bethany Irrigation District \$1.5 million for illegal water diversions, following orders for pre-1914 water rights holders to stop taking water (Stevens, 2015a).

drought conditions, the state can only step in if and when local agencies fail to develop their own plans for sustainable management of a groundwater basin (Moran & Cravens, 2015).

The Department of Water Resources (DWR) is a largely non-regulatory agency whose primary focus has historically been on managing state-owned water supply and flood management infrastructure and providing technical assistance and grants to local agencies. One of its key responsibilities is the development of the California Water Plan, updated every five years, which details the state's water needs and recommends strategies for meeting them. Until the early 1990s, the Water Plan focused on analysis to ensure adequate water supplies, primarily through the State Water Project. As DWR has become increasingly aware of the limitations of infrastructure-based solutions, the Water Plan has been transformed into a large, multi-stakeholder effort with significant participation from local agencies (Ambruster, 2008). However, it remains an advisory document, with no regulatory authority. As one DWR official put it, the Water plan provides "spiritual guidance" for water managers. DWR's primary leverage over the water management activities of local agencies has been through grant funding requirements. Since the 1980s, DWR has managed a series of grant programs, supporting activities such as water recycling, conservation, groundwater recharge and storage, and urban watershed restoration (Spanos, 2014, DWR, 2013a). These grants have typically been funded by bonds, and often at significant levels. During the 2000s, voters approved \$25 billion in water bonds (Hanak et al. 2014, p. 20).¹²

Whatever influence the state has had over how local agencies has reinforced a siloed approach to water management. For example, SWRCB's regulation of water quality has typically focused on setting standards for specific types of water pollution, with which individual agencies must comply. However, effectively reducing water pollution is a complex endeavor requiring action on the part of multiple local agencies. Regulating each individual agency has been slow and cumbersome, and often ineffective in the case of non-point pollution sources (Scholz & Wang, 2006, Sabatier et al., 2005). DWR's single-purpose grant programs have had a similar effect. Local agencies tended to submit individual proposals, often without consulting one another (Spanos, 2014). Further, DWR staff observed during interviews that in order to obtain grants, local agencies would try to fit their projects into the priorities of a statewide grant program, even when these did not address the most critical needs in their area.

The decentralized approach to water management in California does have some advantages. Local control over water resources can help ensure that solutions are tailored to the diverse hydrologic, ecological socio-economic and cultural contexts across the state.

¹² There is growing recognition in the water management community that bonds are more appropriate for funding one-time projects rather than on-going programs. However, alternative funding sources are difficult to find. Most water agencies oppose the creation of a state surcharge on water, and provisions in California's constitution have made it difficult for local agencies to increase their fees. See Chapter 8 for further discussion.

Special districts, originally created to address local needs that were not otherwise being addressed, should in theory increase accountability by focusing on specific services and holding local elections and open meetings (Little Hoover Commission, 2000, Mizany & Manatt, 2002, Mullin, 2009). However, recent experience in seeking to advance more integrated approaches to water management in California has highlighted the considerable drawbacks of such extreme decentralization. Given their large numbers, varying governance structures, and overlapping mandates, it is difficult to track the activities of special districts, and identify who is responsible for solving problems that fall into the purview of multiple agencies. State and federal agencies also experience similar problems, with overlapping or sometimes conflicting mandates. This lack of coordination often results in duplicative or conflicting efforts (Spanos, 2014, Little Hoover Commission, 2000). One policy advocate described the situation prior to the IRWM program as follows: “We had government agencies working at cross purposes all of the time. Literally, we had the Army Corps of Engineers putting in rip-rap on one side of the river, and the Department of Fish and Wildlife ripping it out on the other side. It was that insane...We have all of these single purpose entities, and most of them just do their job, not talking to anyone else.”

Finally, this complex system of special district governance often presents barriers for communities and groups who have historically been marginalized in decision-making about water resources. For example, certain water districts that were authorized under the Water District Act of 1913 follow “property-weighted voting,” in which landowners, who may not even live on their land, have voting rights in proportion to the value of their land holdings. Those who do not own land, or whose holdings have lower value, have limited or no voice in decisions (EJCW, 2005, Pannu, 2012). In addition, when communities face severe problems, such as drinking water supplies contaminated with nitrates, special districts or cities representing low-income communities cannot raise sufficient funds to invest in new infrastructure (Moore & Matalon, 2011). Such communities face considerable challenges accessing state funding and technical expertise to design projects and write complex grant proposals. It is often difficult for neighboring districts to provide assistance to communities that lie beyond their geographic or functional boundaries. In short, highly localized responsibility for water management has resulted in inequitable access to decision-making and resources for resolving water problems.

Increasing pressures on water resources, combined with highly fragmented and often inequitable governance arrangements, formed the backdrop for the emergence of the IRWM program. It was intended to bring about a fundamental change in the institutional landscape, stimulating greater communication and coordination among local agencies, enabling them to address problems in a more holistic manner. The following section describes the multiple perspectives and interests that the creators of the IRWM program sought to reconcile.

Origin and intent of the Integrated Regional Water Management program

The IRWM process was established in 2002 through the passage of the Integrated Regional Water Management Planning Act. Also in 2002, voters approved Proposition 50, which allocated \$500 million in bond funds for the program. The IRWM program was revised with the passage of Propositions 84 and 1E in 2006, which allocated a combined total of \$1.3 billion for IRWM projects, and the Legislature updated the IRWM Planning Act in 2008.¹³ These acts were shaped by multiple voices and interests, each of whom had different hopes for the IRWM program. The initial phase was largely guided by the intent to integrate the efforts of water suppliers so as to improve coordination as well as diversify across multiple water sources, improving resilience to drought. Revisions to the program in 2008 added a new narrative encouraging “integration” across multiple aspects of water management. This perspective suggests that to effectively manage California’s complex and interconnected water system, water agencies need to design their strategies so as to address water supply, water quality, flood management and environmental stewardship goals. Underpinning this is the notion that multi-benefit approaches will increase the ability to adapt to a changing climate, which will have varying effects across California’s diverse communities and ecosystems. Finally, the IRWM program has also come to be viewed as a crucial means to achieve more equal participation in water management decisions, particularly for low-income communities who lack the resources to resolve their water management problems alone.

In its current form, the IRWM program serves to bring together stakeholders from all of these perspectives into a common conversation about the future of water management in their region, and in the state. Its creators intended for the program to do more than simply fund water projects. Rather, it was aimed at transforming how local agencies view water management and creating new working relationships.

Experiments in regional collaboration

In the 1990s, there were several efforts in California to resolve water management problems through regional-scale collaboration. Beginning in 1993, the Sacramento Area Water Forum process brought together a range of water stakeholders, including local, state and federal agencies, to agree upon how to manage the water resources and ecological health of the lower American River. The California Center for Public Dispute Resolution at California State University Sacramento (now re-named the Center for Collaborative Policy) played a crucial role in facilitating this multi-year process, which led to the Water Forum

¹³ The IRWM Planning Act (SB 1672, Costa) was signed into law in September 2002. Proposition 50, entitled the Water Quality, Supply and Safe Drinking Water Projects Act, was approved by voters in November 2002, and included \$500 million for IRWM planning and projects. Voters approved Proposition 84, the Safe Drinking Water, Water Quality, and Supply, Flood Control, River and Coastal Protection Bond Act, in November 2006, allocating an additional \$1 billion. Also approved in 2006 was Proposition 1E, Disaster Preparedness and Flood Prevention Bond Act, which included an additional \$300 million for flood management projects undertaken through IRWM regions. The legislative update to the IRWM Planning Act (SBx2-1, Perata) was enacted in September 2008.

Agreement that guides water use in the lower American River (Innes & Booher, 2010). In addition, a major collaborative effort known as CALFED emerged in 1994, seeking to resolve long-standing conflicts over the management of the Sacramento-San Joaquin River Delta (the Delta). This collaborative process brought together key water interests, including state and federal agencies responsible for managing water infrastructure in the Delta as well as water agencies depending on Delta water, and agencies, scientists and environmental advocates concerned about the environmental impacts of water exports. While CALFED did not resolve all conflicts over the Delta and was replaced in 2009 with a new state agency under direct control of the Governor, CALFED is credited with building a common understanding among previously warring parties of the need to address both water supply needs and environmental interests in any solutions (Innes & Booher, 2010, Norgaard et al., 2009). In addition, several workgroups within CALFED were able to devise creative solutions to specific aspects of Delta water management, such as the Environmental Water Account (Lejano & Ingram, 2009). CALFED also appears to have built a greater awareness in the water community within California of the potential – and also the pitfalls – of collaboration as an approach to managing the state’s water resources (Ambruster, 2008).

While these two experiences in regional collaboration influenced the thinking of those involved in developing the IRWM program, the specific design of the program was more directly based on a regional planning effort that began decades earlier in southern California. Founded in 1968, the Santa Ana Watershed Project Authority (SAWPA) is a watershed-scale, regional planning effort encompassing parts of Riverside, Orange, and San Bernardino counties. In the wake of a lawsuit filed by Orange County Water District (OCWD) over water pollution by upstream users, SAWPA was first established to bring upstream and downstream users together to study water pollution problems and possible solutions. However, participants soon recognized that resolving these problems and complying with new requirements under the Clean Water Act would require major infrastructure projects that they could not undertake their own (OCWD 2003). In 1975, SAWPA was re-formed as a Joint Powers Authority in order to build and manage that infrastructure on behalf of five water districts. Over the years, SAWPA has continued to promote a watershed-scale vision – dubbed “One Water One Watershed” (OWOW) – and undertake joint projects with the involvement of hundreds of stakeholders (SAWPA, 2014). In 2000, the state-level Proposition 13 provided \$232 million for restoring the Santa Ana Watershed. Instead of local agencies competing for these funds, they were awarded to SAWPA to implement a suite of projects that stakeholders had worked together to prioritize.

SAWPA’s success in bringing together water agencies that had formerly fought one another in court began to draw attention in other parts of the state. As a former director of SAWPA described it, “We were able to get these incredibly conservative counties to do things together like conservation, restoration, and groundwater clean up. [Others said,] oh wow, if you can get this part of the state, which is so conservative, to come together and agree then that is how everybody should be.” Jim Costa, then a state senator from the Fresno area, believed that SAWPA’s model would be helpful in the Central Valley, where irrigation

districts, cities and counties have long fought over water rights, while a growing groundwater overdraft problem remains unsolved. At the same time, conservation lobbyists in Sacramento looked at SAWPA as a model for how to overcome the fragmentation of water management that has led agencies to work at cross-purposes while neglecting environmental priorities.

Staff members at SAWPA were closely involved in developing the legislation that established the IRWM program. They sought to create a state program that could spark the transformation in relationships that participants in SAWPA had experienced. According to a former director of SAWPA, “A big part of this is changing a culture, and how we look at me and my neighbors and my region, and how to solve problems...Fundamentally, it’s about how to get people to change how they interact with one another.” In the view of SAWPA staff, the process of developing and implementing projects provided a practical way for stakeholders to engage with one another. One former staff member commented, “It is out of making decisions about specific projects that people learn to work together and trust each other...Planning has to be about accomplishing something...Even if you just have a project with one benefit, but ten people are involved who didn’t use to work together, that is integration. They will work together the next time.” In other words, IRWM projects were important not only for the physical outcomes they produce, but also for the relationships they generate.

The 2002 IRWM Planning Act: Integrating water supply interests

Sponsored by then state senator Jim Costa, the Integrated Regional Water Management Planning Act was enacted in 2002. Its passage was relatively uncontroversial, mainly because the law contained minimal requirements and explicit language that water rights would not be altered. It enabled local agencies to create a “regional water management group” (RWMG), authorized to develop an “integrated regional water management plan” (IRWMP) to guide water resources management in the region. Once a RWMG created such a plan, it would be eligible to apply for certain grant funds from the state. Proposition 50, approved by voters in 2002, authorized \$500 million in bond funds for the IRWM program, providing a financial incentive for RWMGs to form.

The primary focus of the 2002 act was on improving coordination between water supply interests. As described in the Act, “it is the intent of the Legislature to encourage local agencies to work cooperatively to manage their available local and imported water supplies to improve the quality, quantity, and reliability of those supplies.” (§10531(a)). The emphasis on regional planning between water supply agencies is also evident in a bill analysis prepared for the Senate Agriculture and Water Resources Committee:

Water agencies are typically separate entities with clearly defined service areas within which they have exclusive authority to deliver water. However, most water agencies receive their water supplies from a source that is shared with other water agencies...Existing water law does not provide a mechanism to facilitate regional planning among water agencies to reduce these potential conflicts. (Senate Agriculture and Water Resources Committee Bill Analysis, May 7, 2002).

In addition to SAWPA, the drafters of the IRWM Planning Act were drawing upon other water supply-oriented experiences with regional planning. In the 1990s, spurred by the 1987-1992 drought, several water supply agencies began developing “integrated resource plans.” Integrated resources planning emerged in the electricity sector in response to growing demands combined with increasing pressures on supply in the 1970s and 1980s, and involves assembling a portfolio of supply sources and demand management strategies to assure supplies will meet long and short-term demands (TVA, 1995). The basic idea is that pooling a variety of resources across multiple organizations allows for better hedging against risks; when one supply source is low, another can be substituted for it, and demand reduction efforts can be targeted so as to minimize costs (Hirst & Goldman, 1991). This approach was adopted by the Metropolitan Water District of Southern California (MWD), which serves 19 million people through wholesale water contracts with its 26 retail agency members (MWD, 2010). MWD’s integrated resources plan coordinates planning among its 26 member agencies, combining demand and supply management options to meet future needs (MWD, 2010, p. 1-4).

This “portfolio” approach forms a crucial part of one narrative about the IRWM program, emphasizing the need to improve water supply reliability and regional self-sufficiency across the state. For example, DWR’s 2010 brochure describes the IRWM program as inspired by integrated resources planning in the electricity sector, and states, “A main focus of IRWM planning is diversification of a region’s water portfolio so that multiple resource management strategies are employed in meeting future water and water quality needs of all sectors,” (DWR, 2010a). Although SAWPA staff and conservation advocates who helped design the IRWM program did not use the electricity sector as a model, it appears to have had an influence on thinking at DWR.

This water supply focus was reflected in the implementation of the first phase of the IRWM program. Although the language for Proposition 50, which provided funding for IRWM projects, was largely drafted by environmental advocates, the loose requirements for creating a RWMG allowed water agencies to form regions based upon previous relationships, primarily in the water supply and water quality arena. Conservation advocates believed that environmental priorities were not being given adequate consideration. The IRWM regions and projects that were emerging also did not meet expectations at DWR and SWRCB.¹⁴ According to a DWR staff member, “We thought when we started that there would be eight or nine regions coming together to apply for the funds. Instead, there were 54 regions, including some that were just individual cities. We really missed the boat on that one.” After an initial review of the first round of proposals submitted in 2005, which vastly exceeded the amount of funding available, DWR and SWRCB urged applicants to consolidate their regions and proposals. Some did so, and in the

¹⁴ Proposition 50 divided the responsibility for managing IRWM grant funding between DWR and SWRCB. The two agencies coordinated with one another but ran separate grant programs. Under Proposition 84 and the IRWM Planning Act of 2008, full responsibility for managing the IRWM process was assigned to DWR.

end, DWR and SWRCB awarded approximately \$384 million to 26 regions in several grant rounds (DWR, 2015c). Further, DWR staff found that the projects being submitted did not represent meaningful integration across multiple aspects of water management. Rather than conducting a thorough examination of regional needs and jointly prioritizing projects, many regions were simply compiling existing projects into a single plan. As one former high-level DWR official commented sarcastically, “The first tool of integration back in those days was the stapler.” As preparations began for a new water bond in 2006 that would include additional funds for the IRWM program, DWR as well as conservation advocates set out to make revisions that would encourage more systematic regional planning.

Proposition 84 and the 2008 update to the IRWM Planning Act: Multiple benefits, adaptation, and equity

In 2006, voters approved Proposition 84, a new bond act that contained \$1 billion in additional funds for the IRWM program. In 2008, the legislature passed a revision to the IRWM Planning Act. The changes made to the IRWM program through these measures reflected several new narratives, emphasizing the importance of multi-benefit approaches to water management, preparation for risks posed by climate change, and a need to include marginalized groups more effectively in the decision-making process.

During this time, under the leadership of a new director, DWR was undergoing a shift in its thinking toward including a broader range of interests in water management. DWR’s approach to developing the California Water Plan was transitioning from a technical, water supply-oriented document authored by DWR staff to a participatory process led by professional facilitators addressing a broad range of “resource management strategies” for improved management of the state’s water (Ambruster 2008). The IRWM process was identified as an integral step toward this new, multi-benefit approach to water management. In his message introducing the 2005 plan, DWR’s then director Lester Snow wrote, “California’s regions cannot meet all of their objectives with a single water strategy...While statewide management systems such as the State Water Project will continue to be essential to California’s economy, integrated regional water management enables regions to implement actions with multiple benefits and helps them become more self-sufficient,” (DWR, 2005, p. 1).

Accordingly, the 2008 revision to the IRWM Planning Act emphasizes the need to integrate across multiple aspects of water management. Its stated purpose was to “improve water supply reliability, water quality, and environmental stewardship to meet current and future needs,” (CWC §10531(d)), a broader vision than that of 2002 version of the act, which focused on “maximizing the quality and quantity of water available to meet the state’s water needs,” (CWC §10531(c), 2002). The 2008 revision also required that plans prepared by IRWM regions follow “an integrated, collaborative, multibenefit approach to selection an design of projects and programs,” (CWC §10541(e)(5)). Further, all IRWM projects funded through Proposition 84 must yield multiple benefits (PRC §75026(a)).

The IRWM process also came to be viewed by state-level policymakers as a crucial avenue for improving the state’s resilience to increasing climate change risks (Spanos, 2014).

Developing effective adaptation strategies heightens the need to understand the interconnections between human and ecological systems, and for coordinated action on the part of a wide range of stakeholders, at multiple scales (Folke et al., 2010, Adger et al., 2005). In addition, the expression of climate change impacts is likely to vary considerably depending upon the socio-economic and ecological context, making planning at regional and local scales important for the development of adaptation strategies tailored to specific settings (EPA & DWR, 2011, Andrew, 2015). Thus, the need to prepare for the impacts of climate change reinforced arguments for a multi-benefit approach. In 2005, climate change adaptation became a high priority for many state agencies in response to an executive order by the governor to develop a statewide adaptation strategy, and DWR played a lead role in developing aspects of the strategy related to water management. The first Adaptation Strategy published in 2009 highlights the importance of regional planning through the IRWM program, stating, “Because of the large role of local and regional water management, central to these adaptation efforts will be the full implementation of Integrated Regional Water Management Plans,” (CNRA, 2009, p. 85). Further, the 2008 update to the IRWM Planning Act requires that IRWM regions consider climate change adaptation in their plans (§10541(e)(10)).

The 2008 legislative update and the 2006 bond act also reflected a new emphasis on equity in the IRWM process. This was largely the result of advocacy by environmental justice groups, including the Environmental Justice Coalition for Water (EJCW), who were concerned about the exclusion of low-income and other marginalized communities from water decision-making processes (EJCW, 2005). While many factors contribute to a community’s marginalization, the focus of this advocacy has been around “disadvantaged communities,” which are defined in the California Water Code as communities in which the average annual household income is less than 80% of the statewide average.¹⁵ Although this definition includes urban and rural communities, it was initially intended to focus attention on the needs small, rural communities that lack access to clean drinking water or lack adequate resources to update or maintain their water supply infrastructure. In particular, environmental justice groups sought to draw attention to the plight of hundreds of communities in the Central Valley and the Central Coast regions of California, where the water supply is no longer drinkable due to high concentrations of nitrates and other contaminants (Harter et al., 2012).

This advocacy led to several specific provisions requiring attention to the needs of disadvantaged communities in the IRWM process. Proposition 50 was revised in 2003 to add a preference for funding projects that support “safe drinking water and water quality projects that serve disadvantaged communities,” (AB 1747, Section 1(b)). In Proposition 84 and the 2008 legislative update, this preference was strengthened considerably by the

¹⁵ Other elements of California law define a disadvantaged community differently. For example, under AB 32 (the Global Warming Act), a disadvantaged community is defined in terms of a combination of income, air pollution, and other indicators. Over the past several years, there has been considerable debate within the IRWM community about the appropriateness of defining disadvantage only in terms of income.

requirement that DWR allocate at least 10% of all funds to help meet “critical water supply and quality needs” of DACs (§83002(b)(3)(C)). In addition, projects that addressed these needs would not have to provide 25% in matching funds, as required for other projects. Requirements were also added to ensure that DAC interests were included in the planning process. For example, the 2008 legislative update also required IRWM plans include “identification and consideration of the water-related needs of disadvantaged communities in the area within the boundaries of the plan,” (§10540(c)(7)), and that “disadvantaged community members and representatives, including environmental justice organizations, neighborhood councils, and social justice organizations” be consulted in the process (§10541(g)(12)).

By 2008, the IRWM process had come to be viewed not just as a way to improve water supply reliability, but also as an avenue to advance multi-benefit approaches to water management, promote adaptation to climate change, and improve equity in the water management process. Accomplishing this would demand engagement on the part of a diverse range of actors, including public agencies as well as non-governmental actors. The 2008 IRWM Planning Act specifically required that RWMGs reach out to thirteen types of water stakeholders, including water supply, treatment, and flood control stakeholders, conservation organizations, community-based groups, disadvantaged communities, tribes, and state and federal agencies (§10541(g)). It further required that RWMGs make public its decision-making process, and how these thirteen stakeholder groups have been involved (§10541(h)).

The vision of IRWM as a multi-purpose, inclusive process is not only embedded in formal requirements, but also in descriptions of the program and the expectations of participants. DWR’s website describes the IRWM program as a “collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions (DWR, 2015d). The comments of regional participants during IRWM strategic planning workshops held across the state in 2013 revealed a broad range of expectations from the IRWM process, ranging from more reliable water supplies to improved equity and social justice (DWR, 2013c, 2014).

Operationalizing the IRWM program: Reconciling accountability with collaboration

The IRWM program was founded upon a vision for fundamental reform of California’s water governance. How has the IRWM program been operationalized to achieve these ends? This section describes how DWR has implemented the requirements of Proposition 84 and the 2008 IRWM Planning Act, particularly in disbursing \$1.5 billion for IRWM plans and projects. Management of the IRWM program represents somewhat of a departure from DWR’s history as a primarily engineering-driven, technical agency focused on water supply infrastructure. While DWR has adapted to its new role of supporting IRWM regions in

developing their regional visions for water management, its efforts to ensure accountability for the expenditure of grant funds have been in tension with the collaborative ideals that the IRWM program espouses.

The changing role of DWR

Under Proposition 84 and the 2008 legislative update, DWR was assigned full responsibility for managing the IRWM program.¹⁶ DWR's leadership saw the IRWM program as integral to its own efforts to align its mission and activities to better promote integrated approaches to water management. In 2009, shortly after DWR took on its new responsibilities of managing the new \$1 billion IRWM program funding, DWR underwent a significant re-organization. A new Division of Integrated Regional Water Management was created, which would house the Regional Planning Branch, tasked with managing interactions with IRWM regions across the state, and the Financial Assistance Branch, which would manage IRWM grant programs. The Regional Planning Branch carries out its work primarily through DWR's four "regional offices," covering northern, north central, south central and southern portions of the state. Previously referred to as "districts," these offices had largely focused on providing technical assistance to local water agencies. In 2009, they were re-named "Regional" offices, and a new staff role was created within each, called a "Regional Service Representative" (RSR). Managed by the Regional Planning Branch, RSRs are responsible for interfacing with IRWM regions and other local planning processes. Their role is to become familiar with the needs of IRWM regions, ensure that regions understand the program's purpose and guidelines, help them access technical assistance, and manage any grants they receive. In addition, signaling the importance of the IRWM program in preparing for the impacts of climate change, DWR created a new staff position in each regional office, responsible for providing support to IRWM regions in their efforts to address climate change. These four staff members are part of the Climate Change Program, which works to ensure that climate change is considered and addressed in all of DWR's activities.

These changes confirm the intention of DWR's leadership to make managing the IRWM program an integral part of the agency's mission. This represented a significant change in DWR's relationship with local agencies. Instead of taking a direct role in defining and solving water management problems through single-purpose grant programs and technical assistance, DWR now saw its role as more of a facilitator, enabling IRWM regions to identify their own needs and priorities. The IRWM was a new sort of grant program that allowed local agencies to prioritize the water management strategies would be most appropriate in their region, and determine how they would implement them. One high-level DWR official described the shift as follows:

Before, the relationship with locals was more like peer-to-peer technical assistance: I'm

¹⁶ Under Proposition 50, DWR and SWRCB each disbursed a portion of the IRWM funding through separate grant programs. Interview evidence suggests that consolidating management of the program at DWR was intended to simplify administration, and to accommodate the preference of local agencies to work with a non-regulatory agency, such as DWR.

an engineer, you're an engineer, and I'm from the state government and I really am here to help. They carried a lot of credibility in the field. It was more like, there's a problem, and let's work together to fix it. Then, when the funding came, we became less of a problem-solver, and more of a banker. We would give money, and then locals would solve their own problems. That was a big change.

This more hands-off approach was intended to be empowering for local entities, who could now determine for themselves which projects to pursue in their own region. DWR would focus on establishing a framework and process that would help regions to discover innovative new approaches to solving problems. However, in practice, both DWR and local agencies faced constraints in implementing this vision. First, some new IRWM regions, particularly those in rural parts of the state, had limited technical and financial capacity to undertake their own planning efforts. The IRWM process calls for the development of comprehensive plans and detailed project proposals, requiring significant up-front investment in analysis and project design. Yet, DWR's increased reliance on bond funds to support the IRWM program has meant that the agency has less capacity than before to provide technical assistance to help in planning and project design. Staff positions funded by bonds are often tied to specific activities and outcomes, such that DWR staff typically cannot dedicate significant time to respond to emerging local needs. Bond funding that is intended for technical assistance has often been contracted out to a consulting firm, because this enables DWR to demonstrate that funds have been spent within the required time period. As a result, DWR staff members have become less substantively engaged in local and regional issues, and less able to support IRWM regions with limited capacity.

Second, DWR now had responsibility for disbursing over \$1 billion for IRWM planning and projects, and the agency has faced pressure to ensure accountability for spending these funds. In the wake of a severe budget crisis in the late 2000s and several well-publicized scandals about the use of public funds, new bond accountability requirements were created in 2007 through executive order S-02-07. A Bond Accountability Office within the Department of Finance now conducts routine audits of projects funded through bonds, and state agencies are subject to stringent reporting requirements. This is reflected in the way DWR has implemented the IRWM program. The provisions of Proposition 84 and the 2008 IRWM Planning Act have been translated into a set of complex guidelines, referred to as "standards," for the development of IRWM plans, and detailed requirements for proposals submitted to DWR. From the perspective of IRWM regions, these rules are quite burdensome, more so than they have experienced in dealing with other state agencies. One IRWM participant described DWR's requirements as "by far the most laborious, difficult, and labyrinthine...exponentially more time consuming than any other funding source." However, DWR staff view them as necessary to ensure that public funds are spent as intended.

Thus, DWR's approach to implementing the IRWM program is nuanced in several ways. DWR staff members tend to be deeply committed to the goals and values underlying the IRWM program, including the multiple perspectives discussed in this chapter. According to one DWR staff member, "IRWM is not just a grant program. It's a way of life." Interviews

with DWR staff indicated that they are quite aware that the IRWM program is intended to encourage the development of regional visions for water management, without DWR interference. Several DWR staff reported that in order not to be perceived as seeking to control the discussion, they try not to attend too many IRWM meetings, or when they do attend, they speak only in response to questions. However, DWR staff members are equally earnest in their commitment to maintaining accountability for expenditures. As one RSR put it, “My directive is, audits do happen, and we’re giving out a billion dollars. So if invoices are sloppy, that doesn’t reflect well.” The tensions between DWR’s emerging, facilitating role in water management and the pressure it faces to maintain accountability for public expenditures are evident in the process of creating IRWM regions and disbursing project funds, as will be discussed below.

The formation of IRWM regions

One of DWR’s first tasks as it assumed its new responsibility for the IRWM program was to establish a process for approving IRWM regions. In its implementation of the “Regional Acceptance Process” (RAP), DWR largely played a facilitative role, allowing regions to define their own boundaries and visions for “integration.”

The 2008 IRWM Planning Act provided a broad definition of an IRWM region, stating, “At a minimum, a region shall be a contiguous geographic area encompassing the service areas of multiple local agencies, and shall be defined to *maximize opportunities for integration of water management activities*,” (§10541(f), emphasis added). In interpreting this, DWR did not require regions to adhere to a specific definition of “integration of water management activities,” such integration within a watershed, but instead allowed for multiple meanings. DWR’s guidelines for the Regional Acceptance Process state: “An IRWM region is not based solely on geographic considerations or characteristics. It is also defined by water management issues, its stakeholders, and water-related conflicts. An IRWM region must be designed or configured to diversify and strengthen the regional water management portfolio,” (DWR, 2009, p. 2). This multi-faceted perspective can be traced to early input offered by SAWPA staff in designing the program. Initially, SAWPA staff had drafted language recommending that regions be formed along watershed boundaries, as SAWPA is. However, after consulting with other agencies, they found that given the interconnections between watersheds across the state, adopting watershed boundaries would not always make sense. According to one SAWPA staff member, “The people who were really doing things that resembled integrated planning would have been disenfranchised by it, and then the whole program would have died.”

In 2006, Proposition 84’s \$1 billion in grant funds were allocated so as to encourage regions to form at the scale of 11 “Funding Areas” that roughly match the state’s “hydrologic” regions, which correspond to the major drainage basins in the state. The California Water Plan organizes its analysis of the state’s water issues according to these regions, which also have regulatory significance since they are used by the state’s Regional

Water Quality Control Boards, which set water quality requirements.¹⁷ For each of the 11 Funding Areas designated in Proposition 84, a specific amount of grant funding was allocated based on a formula that accounts for population and land area. Originally, DWR anticipated that IRWM regions would form at this scale. Regions that did so would have a relatively strong assurance of receiving grant funds that they applied for, because no other IRWM regions would be competing for them. However, in the Regional Acceptance Process there was no requirement that regions establish boundaries at these scales.

Under the Regional Acceptance Process, each region was required to submit an application to DWR providing details about its composition and a rationale for how its boundaries help integrate across the various dimensions of water management in the region. In addition, the region had to describe its outreach process to diverse water stakeholders, and the governance structure it had adopted. After reviewing each application, DWR would hold an “interview” in which DWR staff and regional representatives would meet in person to discuss regional boundaries and the region’s proposed functioning. This would provide an opportunity for regional representatives to respond to DWR concerns. DWR would then decide whether to accept the region and allow it to apply for funds, “conditionally” accept it pending some adjustments, or reject it altogether.

In most cases, DWR accepted regional boundaries as proposed by the regions. In 2009, DWR received applications from 46 regions, and approved all but ten of them. The others received “conditional” approval, meaning that these regions could only apply for planning grants and not for project funds until DWR’s concerns were addressed. In its documentation of these conditional approvals, DWR cited concerns about overlaps with neighboring regions, and encourages regions to discuss with their neighbors to either eliminate the overlap or to agree upon how they will jointly manage the shared area. In some cases, DWR expressed concern about gaps between IRWM regions, and urged regions to consider incorporating these areas into their planning processes. Some IRWM regions changed their boundaries in response to DWR’s recommendations, while others held discussions with their neighbors but ultimately decided not to make adjustments. DWR appears to have regarded this as sufficient, and all of these IRWM regions were fully approved by DWR as IRWM regions through the 2011 round of the RAP process.

Interview evidence suggests that while DWR staff did prefer that regions follow watershed boundaries whenever possible, in most cases, they yielded when regions were reluctant to do this. In at least one case, however, DWR strongly encouraged several IRWM regions that followed county boundaries to consolidate and form a new, larger region following

¹⁷ There are 10 hydrologic regions identified in the California Water Plan. There are nine Regional Water Quality Control Boards, which are the same as those in the Water Plan except that the three hydrologic regions in the Central Valley are combined into a single Central Valley Region (which has three sub-regions), the South and North Lohantan regions are combined (but remain as sub-regions), and the South Coast region is divided into three separate regional boards (Los Angeles, Santa Ana, and San Diego). The 11 Funding Areas in Proposition 84 are the same as the Regional Boards except that the hydrologic regions in the Central Valley are considered as separate Funding Areas.

watershed boundaries. Viewing this as the only way they would be eligible to receive IRWM funding, these county-based IRWM regions formed a new, consolidated IRWM region called Westside Sacramento. This is one of the case studies analyzed in this study. The implications of DWR's insistence on watershed boundaries in this region are explored in the coming chapters.

The Regional Acceptance Process has resulted in a highly varied pattern of regional formation, which still largely reflects local interests and meanings of "integration." By 2012, 48 IRWM regions had been established, covering 87% of the state and encompassing 99% of the population (WEF, 2013).¹⁸ Only three IRWM regions – San Francisco Bay Area, the North Coast, and Santa Ana Watershed – formed at the scale of their Funding Areas. Instead, most Funding Areas contain at least three regions, and up to 12 in the case of the San Joaquin Funding Area. Regions vary in size from 300 to over 19,000 square miles, and boundaries follow a hybrid of biophysical and jurisdictional lines. Half of all IRWM regions have boundaries that overlap with at least one neighboring region, and some regions also cross Funding Area boundaries. The factors that shaped the formation of IRWM regions are discussed in Chapter 4.

IRWM plans and projects

To be eligible for IRWM grant funding, each region must develop an IRWM plan, and that plan must include a set of proposed projects that would help to achieve the plan's goals. When DWR issues a request for grant proposals, which has occurred about once per year since 2011, regions select certain projects from their plan for which to request funding. In contrast to the facilitative approach that DWR took to guiding the formation of IRWM regions, the process of developing plans and applying for project funds has been far more rules-based. Although DWR's guidelines allow regions to identify their own water management priorities, they also lay out detailed, time-consuming rules that regions must comply with to be eligible for funding. Driven by DWR's need to demonstrate accountability for the expenditure of bond funds, the complexity of these requirements has presented challenges in meeting the multiple purposes of the program.

IRWM Plans

The 2008 IRWM Planning Act states that at a minimum, an IRWM plan:

[D]escribes the major water-related objectives and conflicts within a region, considers a broad variety of water management strategies, identifies the appropriate mix of water demand and supply management alternatives, water quality protections, and environmental stewardship actions to provide long-term, reliable, and high-quality water supply and protect the environment, and identifies disadvantaged communities in the region and takes the water-related needs of those communities into consideration. (§10534)

¹⁸ Areas not included in the IRWM program are most of the Mojave Desert where almost no one lives, and a few areas in the Central Valley where local agencies did not organize an IRWM region or join a neighboring region.

This definition of an IRWM plan combines the multiple purposes of the IRWM program, including promoting a multi-benefit approach to planning, improving water supply reliability, and prioritizing the needs of disadvantaged communities. The Act also provides a list of specific elements that plans must discuss, which have been translated by DWR into a set of 16 “standards” that IRWM plans must meet in order for the region to be eligible to receive funding (DWR, 2012). In most cases, these standards represent specific sections that must be included in an IRWM plan, such a discussion of the region’s water resources, or of the region’s governance structure. Embedded in the Stakeholder Involvement standard is the requirement that IRWM regions consult a list of thirteen types of stakeholder groups, with particular efforts directed toward disadvantaged communities and tribes. Another standard requires that each plan contain a “project review process,” defining the criteria the region’s governing body will use to prioritize projects for funding. For example, DWR requires that regions include certain factors as criteria, such as the degree to which a project addresses disadvantaged community needs or responds to climate change.

Developing an IRWM plan that complies with the 16 standards is an extremely demanding and time-consuming process. DWR’s guidelines are over 80 pages long, and have been updated three times since the IRWM process began. Plans are typically hundreds of pages in length, and take several years to complete, involving numerous public meetings. This level of effort is beyond the capacity of staff in many local agencies, so the vast majority of IRWM regions hire a consulting team to write their IRWM plans. Of the 45 plans completed and adopted as of December 2014, all but a few have been written at least partially by a consulting team (DWR, 2015c). Most regions have received funding from DWR to partially cover the costs of developing the plans. Under Propositions 50 and 84, IRWM regions could apply for Planning grants of up to \$500,000 and \$1 million respectively. However, putting together the Planning grant application is also a relatively involved process, and many regions also employed consultants to write these proposals. A survey of IRWM regions conducted by the Roundtable of Regions revealed that the average cost of preparing a Planning Grant proposal under Proposition 84 was \$46,700, of which approximately 60% went toward hiring consultants (RoR, 2011, p. 5).¹⁹ To cover these costs, in some regions a single lead agency contribute the funds, while in others, members of the RWMG share the cost.

IRWM Projects

The primary incentive for local agencies to participate in the development of an IRWM plan is to be eligible for funding through the IRWM grant program. IRWM funding can be used for many different types of projects, ranging from the development of new water supplies to the restoration of ecosystems, with the only requirement being that they “yield multiple benefits” (DWR, 2012, p. 16). However, the IRWM program differs from previous grant

¹⁹ The Roundtable of Regions is an informal association of IRWM regions across the state, which serves as a venue for information sharing among regions and sometimes as a collective voice of IRWM regions to DWR. See Chapter 8 for a brief discussion of its role.

programs in that local agencies cannot independently apply for project funds. First, local agencies must get their projects included in an IRWM plan, in which are they prioritized according to criteria established by the IRWM region. Then, each region must submit an Implementation grant proposal to DWR, combining multiple projects that the IRWM region's governing body selects for inclusion. By requiring IRWM regions to come to agreement on a select number of projects to include in their grant proposals, the creators of the IRWM program sought to encourage local agencies to focus on addressing the needs of the region, and begin to see their own interests as interconnected with the efforts of others.

In practice, however, the needs of the region have not been the only factors determining which projects are included in a grant proposal. Extensive documentation must be prepared for each project, including a cost-benefit analysis and a detailed work plan, and all of this must be compiled into a single, coherent proposal, which is usually hundreds of pages in length. In most cases, significant preparatory work must already be completed for a project to be included in a proposal, and the agency putting the project forward must be prepared to put in considerable time and money into the proposal process. According to the Roundtable of Regions survey, the average cost of preparing an Implementation grant proposal under Proposition 84 was almost \$115,000, which amounts to \$17,000 per project included in these proposals, about 60% of which is spent on hiring consultants (RoR, 2011, p. 11-12). In most IRWM regions, the cost of preparing an Implementation grant proposal is shared among agencies whose projects are included. Thus, an agency must have sufficient resources in order to participate. Smaller water agencies and non-governmental organizations often have difficulty putting down cash up front in order to be included. Information gathered through the Roundtable of Regions survey suggests that some regions have made provisions for this, including at least one region in which the RWMG itself, not the project proponents, covers the application costs (RoR, 2011, p. 13-14). However, in most cases, the complexity of the proposal process still acts as a barrier for organizations representing disadvantaged communities (DACs) or tribes, despite the fact that DWR is required to award 10% of project funds toward projects benefiting DACs.

The grant proposal process involves multiple steps and takes nine months to a year to complete. For each round of funding under Propositions 50 and 84, DWR has first issued a draft of the proposal guidelines, and allowed time for IRWM regions to provide feedback through workshops or written comments. Once the proposal requirements were finalized, IRWM regions would have several months to put together their applications. During this time, DWR would hold more workshops to answer questions about the process. After grant proposals were submitted, DWR would conduct a detailed review, in which a team of at least three DWR staff members assessed each proposal. Each proposal would be assigned a score based on criteria such as the degree to which it meets state priorities, the quality of documentation provided about each project, the feasibility of project work plans, and a number of other factors. DWR would then issue draft funding recommendations, and again allow time for public comment. IRWM regions whose proposals were not being funded could advocate for DWR to change its scoring. DWR would then issue final funding decisions. While this process has allowed ample opportunity for public input, the long wait for a funding decision also places constraints on which projects are included in proposals.

Agencies with limited budgets often cannot afford this.

Finally, depending upon which region they are involved in, IRWM participants may face quite different odds for their project being funded. Although DWR ranks proposals on a statewide basis, Proposition 84 sets specific limits for how much funding DWR can award in particular Funding Areas. In the three Funding Areas with only one IRWM region, participants in a grant proposal are almost sure to be funded, as long as their proposal is reasonably good. This is not the case in Funding Areas with multiple IRWM regions. For example, the San Joaquin Funding Area contains portions of 12 IRWM regions, which must compete against one another in each funding round. Only a few regions from this Funding Area whose proposals rank the highest in the statewide competition are likely to receive funding. This affects the incentives that agencies have to participate in their IRWM region. If it is costly and time-consuming to submit a proposal and competition within a Funding Area is fierce, agencies are less likely to invest in the process.

Technical assistance to IRWM regions

The above discussion has demonstrated that the IRWM process is not equally accessible to all stakeholders, in part due to its complex requirements. In its role as a facilitator of the IRWM process, DWR's resources for building capacity within IRWM regions to engage diverse stakeholders have been limited. Propositions 50 and 84 dedicated the vast majority of the total of \$1.5 billion to funding projects, with only a small amount of funds allocated for technical assistance. However, DWR has sought to support regions through the provision of facilitation services and through pilot studies to specific regions to build capacity for engaging disadvantaged communities.

DWR contracted with the Center for Collaborative Policy (CCP) at Sacramento State University to offer professional facilitation services to IRWM regions that requested it. DWR staff had come to recognize the value of professional facilitation by working with CCP and other facilitators in the context of the California Water Plan process. Because DWR hoped to build links between the IRWM process and the California Water Plan, DWR was able to use some of its Water Plan funding to enable IRWM regions to access CCP's facilitation services. Regions could submit a relatively simple application requesting that a facilitator be assigned to their region to help design and implement a stakeholder engagement process, or to facilitate discussions between the key agencies involved in an IRWM region. These facilitators usually worked in collaboration with the consulting team hired to help write the IRWM plan. Overall, DWR provided facilitation support in response to 28 requests from IRWM regions (DWR, 2013b), and additional IRWM regions hired facilitators through consulting firms. Interviews with IRWM participants and with facilitators who have been involved indicate that the presence of a neutral party to facilitate discussions has proved valuable in many IRWM regions.

Under Proposition 84, DWR was required to ensure that at least 10% of planning grant funds went to facilitate the involvement of DACs. IRWM regions usually spent this portion of their planning grant on outreach activities targeted toward DACs. However, IRWM regions found that building a meaningful dialogue and engagement required much more

than holding a few meetings during the planning process. Recognizing that many IRWM regions did not have the resources or skills to undertake these efforts, DWR was able to allocate \$2.7 million out of its Proposition 84 funding to support Disadvantaged Community Assistance Pilot Studies (DAC pilot studies) in seven IRWM regions. These studies were intended to enable greater engagement of DACs in these regions, and to document lessons learned about effective engagement strategies, which could be shared across all IRWM regions. The final reports for these projects document some of the barriers to effective DAC engagement, as well as problems with how DAC needs are reflected in IRWM requirements. For example, several of these pilot studies found that the way in which the state defines DACs – as communities with 80% or less than the average state household income – does not always capture communities that are truly disadvantaged in accessing water resources and participating in decision-making. In addition, they found that DACs face different water problems in rural and urban settings, and the current focus in Proposition 84 funding to address the “critical water supply and water quality needs” of DACs did not reflect the needs in urban communities, which are more likely to face problems with flooding and stormwater management (Antos et al., 2013, Coachella Valley RWMG, 2014, Alpert et al., 2014, KBWA, 2013).

Conclusion: Integrated Region Water Management Plans, or “I Really Want My Project”?

The IRWM program represents an ambitious effort to transform water management in California. The water management community in California has increasingly accepted that rather than the siloed, fragmented approach to water management that has persisted for the last century, integrated approaches are needed to cope with the growing pressures on the state’s water resources. The “meta-concept” of integrated water management – which the IRWM program has come to embody – offers a common language for the multiple voices that frame California’s water management challenges. Major water agencies concerned about the reliability of water supplies hope that the IRWM program will help improve coordination among water suppliers. Conservation advocates, as well as key leadership at DWR, have promoted the IRWM process as the means for creating “multi-benefit” approaches to water management, combining water supply, water quality, flood management, and environmental stewardship goals, along with adaptation to the risks of climate change. Finally, environmental justice advocates have successfully framed the IRWM program as an avenue to more equitable access to water resources for low-income communities and tribes. The IRWM program is now viewed as the key to sustainable water management in California, from all of these perspectives.

Created in the context of a highly decentralized institutional landscape in which communities are reluctant to relinquish local control, IRWM plans have no regulatory authority, and do not formally limit or change the mandates of local agencies. Participation is entirely voluntary. Instead, building upon the experience of SAWPA in southern California, the IRWM program uses the incentive of access to state grant funds to encourage local agencies to interact with one another, seeking to build mutual understanding of

regional water issues and their own interests. One former high-level official at DWR, who had also been involved in SAWPA, described the IRWM process as “getting people to think in ways that are in their self-interest, but are not always easy to see.” Thus, the design of the IRWM process is based on the idea that learning can occur through a collaborative process, and lead to new ways of thinking and working together. Its creators intended for the IRWM program to lead to changes beyond the actual water projects that it funds; instead, success could be measured in terms of the creation of new relationships, and the development of a regional perspective on managing water resources. This learning and new capacity for collaboration, they believed, would provide the foundation for more innovative solutions to water management challenges that would be more efficient and environmentally sustainable. By looking at problems at a regional scale, more resources, knowledge and interests could be combined to put together innovative solutions.

Yet, while DWR staff members seem genuinely committed to this vision of the IRWM program, its efforts to demonstrate accountability for expending \$1.5 billion in grant funds may be constraining the program’s creative, interactive character of the program, which is so essential for learning. The rules that IRWM regions must comply with have become increasingly complex, and the process for applying and receiving grant funds has become more involved and lengthy. Those who were involved in creating the program have lamented the increasingly bureaucratic nature of the program, particularly following the 2008 legislative update, which they view as constraining the development of truly innovative partnerships and projects. As one SAWPA staff member commented:

Government doesn’t get what the private sector has learned. If you want innovation, you have to be willing to fail, and you have to budget to fail. But failure in state government is the end of your career. So we have developed a program that was supposed to reduce risks for locals to do the right thing, and have turned it into a thing that is totally risk averse. Its tenets have been lost.

Concern over rules squashing innovation also emerged from interviews with DWR officials. One former high-level official at DWR commented on the increased focus on rule compliance in the IRWM program: “Sometimes it’s just check the box – for example, do they have an Urban Water Management Plan, or that sort of thing. Well, yes. But is it any good? This tends to push the program into greater bureaucracy. Of relying on the assignment of points, and the cutoff levels.” This attitude can stifle efforts to experiment with new ways of solving problems. As another former DWR executive put it, “People in state government often operate in a defensive way, trying to stop bad things from happening, rather than trying to make good things happen.”

A widespread joke among those involved in the IRWM process is that the acronym IRWMP, instead of referring to an “IRWM Plan,” actually stands for “I Really Want My Project,” or “I Really Want Money Please.” This points to a central question in evaluating the performance of the IRWM: can learning occur within IRWM regions in the context of the state’s rules, and what conditions are needed to enable this? This is the question that motivates the analysis described in the following chapters.

Chapter 4. Negotiating natural and institutional boundaries in the creation of IRWM regions

A regional organization is not created in an empty world. Instead, a web of relationships already exists among federal, state, and local agencies and interest groups. A regional organization must fit into, and if it is to have substantial impact, alter and redirect these relationships. (Ingram, 1973, p. 11)

In recent decades, there has been a growing emphasis on the need for water management decisions to be made at watershed scales (Lenton & Muller, 2009, Moss, 2006). However, watershed boundaries rarely match those of political and administrative jurisdictions, which remain a defining feature of social and political identity (Meadowcroft, 2002, Young, 2002). In order to have an impact on resource management, new organizations at watershed scales must find ways to gain legitimacy amidst previously established patterns of interaction and decision-making. While this tension has been recognized in the literature, so far there has been limited empirical exploration of how watershed scale collaborations build legitimacy in practice.

The process of creating IRWM regions offers an opportunity for insight into this critical challenge in environmental governance. In establishing the IRWM process, state government officials shared the belief that coordination at watershed scales would provide the greatest opportunities for integration, a view that has become embedded with the concept of integrated water resources management (Molle, 2009). However, in light of California's tradition of local control over water resources, local agencies were granted considerable flexibility in determining their regional boundaries. This resulted in a complex set of boundaries along hydrologic and jurisdictional lines. This chapter examines these patterns, and draws upon the experience of three regions that follow hydrologic boundaries to understand whether and how their regional governing arrangements have come to be viewed as legitimate among water stakeholders within these regions. In particular, I focus on how collaboration has been legitimized within a landscape of political jurisdictions whose democratic legitimacy has been established through the electoral process. I argue that building legitimacy for collaborations requires adequate institutional capacity in the form of a convening entity that provides leadership and support for deliberative processes. It is through such dialogue that common interests can be negotiated and new routines of interaction can be developed that are acceptable to key stakeholders.

This chapter is organized as follows. First, I briefly review the concept of legitimacy and the challenges involved in establishing legitimacy around collaborative processes at hydrologic scales. Second, I contextualize the discussion of legitimacy within the IRWM process. I then review the methods and data used for the analysis in this chapter. The following two sections present a general analysis of IRWM regional boundaries, and an in-depth exploration of the process of establishing legitimacy in three case study regions. I discuss my findings in a concluding section.

Legitimacy in collaborative watershed governance

Chapter 1 described the concept of legitimacy, and identified two factors that are particularly important in establishing a governance arrangement as legitimate. First, actors must believe that a process advances their interests, and second, they must view the process as “appropriate” within the context of established norms and values (Suchman, 1995). Most democratic institutions derive their legitimacy through representation, such that the actions of government agencies are justified based on their accountability to the public through the electoral process. The representative process seeks to account for the interests of the public, and the norms of representation have become widely accepted as “appropriate” (Bernstein, 2011, Olsen, 2008). Collaboration, on the other hand, is based on the concept of deliberative democracy, in which legitimacy is established through reasoned debate among all interested parties (Meadowcroft, 2004, Dryzek, 1990). This process of deliberation enables all affected actors to bring their knowledge and interests to bear in decision-making, which can lead to a new, shared understanding of problems and routines of interaction for joint action (Innes & Booher, 2010). In other words, the legitimacy of a collaboration depends upon participants finding value in working together (i.e., identifying their interests), and developing new, mutually agreed routines of interaction. However, this can conflict in several ways with representative legitimacy. Collaborations often exist at scales beyond the jurisdictions of public agencies, and require agencies to share responsibility for outcomes, making it more difficult to determine who is accountable (Huitema et al., 2009). In addition, in a collaborative process non-governmental actors, such as NGOs or individuals, play a direct role in decision-making due to the knowledge and experience they bring to the process (Innes & Booher, 2010).

The deliberative process that supports the legitimacy of collaborations requires resources and a certain degree of institutional capacity for convening diverse interests (Leach & Pelkey, 2001, Imperial, 2005). This institutional capacity includes not only the ability to undertake administrative tasks such as coordinating meetings, but also involves leadership in structuring dialogue, mediating conflicts, and building recognition among external actors (Koppenjan & Klijn, 2004, Weber & Khademanian, 2008). In the context of environmental management, the term “bridging organization” has been used to describe a central entity that brokers across different forms of knowledge, and builds vertical and horizontal linkages inside and outside of a collaborative (Crona & Parker, 2012, Hahn et al., 2006). In this chapter, the term “convening entity” refers to an organization that provides leadership and administrative support in initiating, defining, and sustaining a collaborative process.²⁰

In the context of watershed management, building legitimacy around a collaborative process is integrally linked with the choice of boundaries, which define who is involved, and whose interests matter (Blomquist & Schlager, 2005). As growing water demands have brought some ecosystems close to collapse, threatening the long-term viability of water

²⁰ In later chapters, the terms “lead agency” and “network administrative organization” will be introduced, distinguishing two different ways in which networks can be structured to support “convening” activities.

systems, policymakers have sought to encourage management at watershed scales, lending a greater ecological coherence to planning (Molle, 2009, Norgaard et al., 2009). Yet, existing political, cultural and jurisdictional boundaries remain important for developing legitimate, sustainable governing arrangements. The identities of communities defined by jurisdictional boundaries are real, and the idea and practices of representing their interests through the electoral process, and the implementation of mandates by public agencies, still holds considerable sway (Lundqvist, 2004).

There have been relatively few empirical studies of the process of building legitimacy within collaborative governance arrangements at watershed scales. Abers and Keck (2013) analyze how river basin committees in Brazil have developed “practical authority,” a concept closely related to legitimacy. They argue that building new institutional arrangements requires transforming three elements – ideas, resources and relationships – through processes of engagement and experimentation. Engagement involves connecting actors with one another so that ideas and resources are exchanged, and experimentation involves finding new, practical ways to employ them (p. 16-17). Norman and Bakker (2013) explore the process of the devolution of responsibility for governing watersheds that cross the United States-Canadian boundary, and argue that the inadequate capacity of local actors has limited their effectiveness in managing the watershed as a whole. Both studies suggest the importance of institutional capacity in establishing legitimacy, but further study is needed of the specific ways in which this capacity is important for negotiating between deliberative and representative forms of legitimacy, and how the choice of boundaries is intertwined in this process. Further, as collaborative approaches to resource management become more widespread, a better understanding is needed of the role of governments in supporting these arrangements (Koontz et al., 2004).

Legitimacy in the context of the IRWM process

As discussed in Chapter 3, norms of local control over water resources in California are deeply entrenched in the institutional landscape. Local agencies have tended to operate independently of one another, and the state’s siloed implementation of water quality requirements and grant programs had reinforced this approach. The IRWM process was created to help overcome this fragmentation, and to encourage local agencies to collaborate in managing water at a regional level. However, in light of the state’s strong traditions of local control, simply creating new regional agencies to manage water resources would not have been politically acceptable. So, the IRWM program was designed as a voluntary process, with the availability of grant funds providing local agencies with the incentive to participate. Similarly, they were encouraged, but not required, to form IRWM regions along watershed boundaries. The allocation of Proposition 84’s \$1 billion in grant funds for IRWM planning was designed to encourage regions to form at the scale of 11 hydrologic regions, roughly matching those of the state’s Regional Water Quality Control Boards, which set water quality requirements in the state. Each of these hydrologic regions was allocated a specific amount of funding, such that an IRWM region operating at that scale would have a relatively strong assurance of receiving those funds, since there would be no other IRWM regions competing for them.

However, once formed, IRWM regions had to comply with the state's requirements for IRWM planning in order to be eligible to receive grant funds. These requirements, particularly those related to participation and access to decision-making, were strongly informed by ideals of collaborative governance. The 2008 IRWM Planning Act required that regions make decisions collaboratively, and enable participation from a diverse range of interests. The law specified a list of 13 stakeholder groups that regions must seek to engage and demonstrate how these interests are represented in their governing arrangements. A particular emphasis was placed on including disadvantaged communities (DACs) and tribes. Thus, while regions had considerable flexibility in designing their own boundaries and governance structures, these requirements pushed local agencies beyond the sets of interests with whom they would normally sit down at a table. For example, the IRWM Planning Act specifically requires consultation with non-profit environmental and social justice organizations; yet, for many local agencies, their only previous contact with these groups had been in the courtroom. As will be seen in the case studies discussed in this chapter, many public agencies have viewed non-profit agencies as operating outside of the model of representative democracy, which holds up public agencies as legitimate entities for the implementation of public laws. The state's requirements challenge this perspective, instead viewing IRWM regions as legitimate to the degree that they engage these groups in regional-scale planning, preferably at watershed scales.

Within this context, this chapter investigates the scale at which IRWM regions have been formed, and the role that the choice of regional boundaries has played in establishing the legitimacy of regional-scale water governance. In particular, this chapter focuses on the following questions:

- 1) What factors helped shape the choice of boundaries for California's 48 IRWM regions?
- 2) How do IRWM regions negotiate the process of building legitimacy, particularly through the identification of shared interests and the creation of routines of interaction that are meaningful and accepted in a given context?
- 3) What role do convening agencies play in building this legitimacy?

Methods

In order to understand the types of boundaries chosen by IRWM regions, a two-step process was followed. First, using ArcGIS, geo-referenced data for IRWM regional boundaries was compared with datasets indicating the boundaries of watersheds, groundwater basins, and counties. This preliminary analysis was supplemented with a more detailed examination of documentation regarding the boundaries of the 19 randomly selected IRWM regions across the state (see Chapter 2 for details). For these regions, IRWM plans and Regional Acceptance Process applications were reviewed to more specifically identify the types of boundaries followed, and to gather information about the rationale for the boundaries, if any was provided. Interviews conducted with staff and consultants

involved in coordinating each of the 19 regions (see below) also helped to confirm my understanding of boundary choices.

To understand the process by which regions have established their legitimacy and to identify key factors that shaped legitimacy outcomes, a multiple case study design was used (Yin, 2003). Three case studies were selected from the sample of 19 regions, each of which primarily follows hydrologic boundaries. This enabled a focus on how planning at the watershed or groundwater basin scale has been reconciled with existing patterns of jurisdictional authority. In order to uncover how differences in institutional settings shape the process of building legitimacy, the three selected case studies represent different parts of the state, each with distinct socio-economic contexts. Finally, because the presence of a convening agency was believed to play an important role in the process of building legitimacy, two regions were chosen with relatively high levels of capacity (the North Coast and Kings Basin) and one with relatively low capacity (Westside Sacramento).

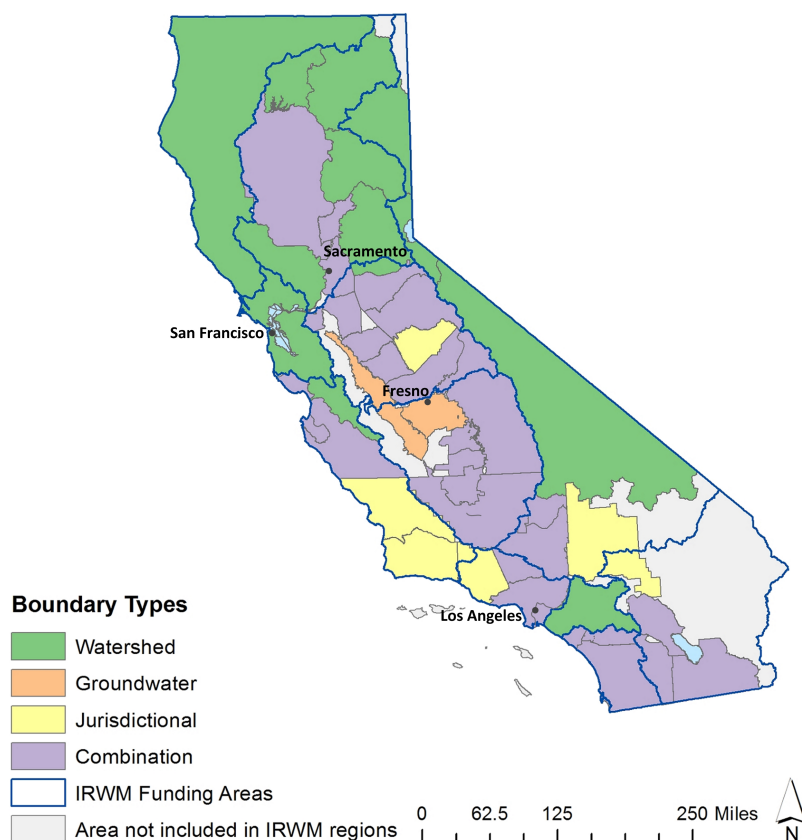
The analysis of these three case studies is based upon interviews and a review of public documents. Semi-structured interviews were conducted with key staff and consultants involved in coordinating each of the three regions during the summer of 2013. Interview questions focused on understanding the factors that led to the region's formation, the role of convening agencies, and the evolution of the region's governance arrangements. These themes also guided the coding of interviews. In addition to nine interviews with individuals involved in coordination activities in the case study regions (2-4 in each region), 18 representatives of participating agencies were interviewed in the three regions. Public documents, including IRWM plans, applications and meeting notes, were also a critical source of data about regional boundaries, governance structures, and participants in the three regions.

In order to assess relative levels of legitimacy achieved in the three case study regions, indicators were identified for the degree of recognition and acceptance of an entity's role among affected actors, drawing upon the approach used by Human and Provan (2000) in their study comparing legitimacy within two business networks. As described in the following section, these indicators included changes in the number of members of each region, the development of mutually agreed upon norms for stakeholder engagement, and commitments to a regular meeting schedule and financial contributions. To assess the process of building this legitimacy, I focused on two aspects that have been identified in the literature on legitimacy, as discussed previously: 1) the development of shared interests among participants in the process, and 2) the creation of meaningful norms and routines of interaction that are viewed as "appropriate" within a given institutional context.

IRWM regional boundaries: An overview

The analysis of California's IRWM regions reveals a complex blend of biophysical and institutional boundaries. Figure 4.1 shows a map of the 48 IRWM regions, indicating the types of boundaries followed by each. Regions in the northern portion of the state, as well as along the eastern side of the Sierra Nevada mountains, are primarily formed along

Figure 4.1. IRWM regional boundary types.



Data sources: DWR (IRWM boundaries, groundwater basin boundaries); Cal-Atlas (county boundaries); USDA, USGS and EPA (Watershed Boundary Dataset)

watershed boundaries, while regions in the central and southern portions of the state largely follow a combination of jurisdictional and watershed boundaries, with some regions relying entirely on jurisdictional boundaries. These boundary types appear to roughly follow patterns of water use in the state. Areas in which IRWM regions are formed around watershed boundaries are largely the primary water source regions for the state, particularly in the north where rainfall is high and the population is low. In contrast, the central and southern portions of California, where IRWM boundaries incorporate jurisdictional boundaries, represent the majority of water use in the state, including agricultural and municipal uses (Carle, 2009). Because these areas of the state are quite dry, they rely heavily upon water imports from the north, as well as groundwater. Thus, at one level, the hybrid nature of IRWM boundaries in these areas may be partly explained by the fact that in such highly altered water landscapes, decision-making about water management cannot be confined within the boundaries of a watershed.

Table 4.1 provides a more detailed look at the types of biophysical and institutional boundaries used in the sample of 19 IRWM regions. While watershed boundaries are

Table 4.1. Determinants of IRWM regional boundaries (19 region sample)

IRWM Region	Watershed	Groundwater basin	Other geographical features	County	City or water district	Neighboring region	Reg. Water Quality Control Board	Funding Area Boundary
North Coast	*						*	*
North Sacramento Valley				*		*		
Westside Sacramento	*					*		
San Francisco Bay Area	*						*	*
Mokelumne-Amador-Calaveras	*			*				
Yosemite-Mariposa				*				
Antelope Valley	*	*						
Tahoe-Sierra	*							
Monterey Peninsula	*	*				*		
Santa Cruz	*		*	*				
Southern Sierra	*		*	*	*	*		
Kings Basin		*	*		*			
Gateway					*			
Watersheds Coalition, Ventura Cnty				*		*		
Santa Ana Watershed	*						*	*
San Diego					*		*	
South Orange County	*			*			*	
Coachella Valley	*		*		*		*	
Mojave	*				*			

Data sources: Regional Application Process applications, IRWM plans

relatively frequent, many regions also use other biophysical features, such as groundwater basins, ridges, and water bodies. Counties are the most frequent jurisdictional type of boundary, but the boundaries of cities, water agencies, and state regulatory agencies are also used. Only two out of the 19 regions are defined by a single type of boundary (jurisdictional boundaries in both cases). Although it is not shown on the map, about half of the state's IRWM regions overlap with at least one other neighboring region, due to their differing approaches to defining boundaries. Although DWR often tried to encourage regions to resolve these overlaps, in many cases regions declined to do so, preferring instead to agree with neighboring regions on how to share management of the overlap area. Finally, only three of the 48 regions follow the larger hydrologic regional boundaries that DWR had sought to encourage. These three regions – the North Coast, San Francisco Bay Area, and the Santa Ana Watershed – do not face competition over grant funds. The remaining 45 regions are smaller than their Funding Areas, and some even cross Funding Area boundaries. These regions compete for project funding with others in their Funding Area.

Underlying the various boundary types indicated in Table 4.1 are several different forms of interdependence, some of which derive from natural features or physical infrastructure, while others stem from institutional arrangements. Reliance on a common source of water supplies was an important factor in some regions, which has often led to the use of water agency or other jurisdictional boundaries. For example, the boundaries of the Mojave IRWM region coincided with the service area of the Mojave Water Agency, which imports surface water as well as manages the region's groundwater resources within its service area. Similarly, the boundaries of the San Diego IRWM region partially match those of the San Diego County Water Authority, a wholesale water agency that imports and delivers the vast majority of this extremely dry area of the state. In some areas, water agencies operate at the scale of the county, partially explaining the use of county boundaries. Another source of interdependence within some regions is a need to comply with the same water quality requirements. Water quality regulations are determined by Regional Water Quality Control

Table 4.2. Institutional determinants of regional boundaries

	Prior collaboration	Convening entity
North Coast		•
North Sacramento Valley	•	
Westside Sacramento		
San Francisco Bay Area	•	
Mokelumne-Amador-Calaveras		•
Yosemite-Mariposa		•
Antelope Valley		•
Tahoe-Sierra	•	
Monterey Peninsula		•
Santa Cruz	•	
Southern Sierra		•
Kings Basin		•
Gateway	•	•
Watersheds Coalition, Ventura Cnty	•	•
Santa Ana Watershed	•	•
San Diego		•
South Orange County		•
Coachella Valley		•
Mojave		•
Total	7	14

Data sources: Regional Acceptance Process applications, IRWM plans, and interviews

Boards (RWQCBs), which roughly correspond to hydrologic regions. Agencies within the same RWQCB may be able to collaborate in obtaining a joint water quality permit. This factor played a significant role in the creation of the South Orange County IRWM region, which covers only the portion of Orange County that falls within the San Diego Regional Water Quality Control Board.

These types of interdependence relate to the practical aspects of implementing water management. However, institutional factors also play a role. Research on collaboration suggests that previous partnerships among key stakeholders may facilitate future cooperation (Ingram, 1973, Lubell et al., 2002). Given that the formation of IRWM regions was largely a self-organizing process, we might expect that some regions would be formed based on patterns of previous collaboration. Further, these regions might be able to establish their legitimacy more readily, since participants might already have come to view these relationships as both “desirable” and “appropriate.” However, an analysis of Regional Acceptance Process applications and interview results for the 19 sample IRWM regions indicates that, as shown in Table 4.2, that the initiation of only seven out of 19 regions was significantly informed by a previous collaboration. In 14 regions (including three that also benefited from previous collaboration), the leadership of a “convening” agency helped to shape the boundaries.²¹ Only one region – Westside Sacramento, one of the case studies

²¹ That is, the convening entity initiated the formation of the region at a particular scale that they viewed as meaningful. In some cases, convening entities formed regions at the scale of their own boundaries, or actively sought the participation of specific water agencies in order to ensure that

examined here – has boundaries that were based on the recommendation of DWR rather than either previous collaboration or a convening agency.

How did these regions with no previous history of collaboration build legitimacy as a venue for decision-making about regional water management, particularly at watershed scales? What is the role of the convening agency in this process? I examine three case study regions, described in the next section, all three of which had no significant history of collaboration at the scale of the region, and are largely formed around hydrologic boundaries.

Building legitimacy for regional governance: Three case studies

In this section, I examine how three regions have sought to reconcile planning around hydrologic boundaries with existing institutional norms and jurisdictional identities, as well as with the state's expectations. As the previous discussion of legitimacy suggested, two aspects of the collaborative process are particularly important for building legitimacy: 1) the development of shared interests among participants in the process, and 2) the creation of meaningful norms and routines of interaction that are viewed as "appropriate" within a given institutional context. Following a brief overview of the three regions, I assess whether and how these two elements developed in the three regions, and examine how the specifics of the institutional setting in each region, along with the resources and capacity of a convening agency, have influenced the creation of legitimacy in each region.

Overview of three case study regions

As shown in Figure 4.2, the three case study regions are located in the northern and central parts of the state. Table 4.3 summarizes some of their key features. They vary considerably in size and population; the North Coast is by far the largest region, but has a relatively small population, while the Kings Basin is the smallest, but has a larger population, since it encompasses the city of Fresno. All three regions span multiple counties, and their boundaries are primarily determined by natural features: watersheds in the case of the North Coast and Westside Sacramento, and a groundwater aquifer in the Kings Basin.²² The regions face a variety of water management challenges, including risks to critical salmonid habitat in the North Coast, water quality problems in the Westside Sacramento, and severe groundwater overdraft and groundwater quality problems in the Kings Basin. There are important distinctions between the governance structures in these regions, which will be explored later in this section. One critical difference highlighted in Table 4.3 is that in the North Coast and Kings Basin regions, a single "convening" agency played an important role in the formation of the region, and continued to invest over time, dedicating over 100% of a full-time equivalent staff (often distributed across several staff members) to managing the

the region covered a specific territory or set of interests. This was evaluated through a review of documentation on the formation of each IRWM region, as well as data gathered through interviews.

²² Small sections of the boundaries of the Kings Basin and Westside Sacramento regions are determined by county or water district boundaries, for reasons described in the following section. However, hydrologic boundaries provided the conceptual basis for the formation of these regions.

Table 4.2. Case study regions.



collaborative process. The Westside Sacramento, on the other hand, did not have a single convening agency, and investment in the collaborative process has been more limited.

Table 4.4 provides a general assessment of differences in the degree of legitimacy achieved in each region, based on four indicators related to the level of recognition and acceptance by stakeholders of the regional process. Overall, the table indicates that legitimacy is generally higher in the North Coast and Kings Basin than it is in Westside Sacramento.

During the period from 2009 to 2014, the number of participants in these two regions has increased, they have developed regular schedules for meetings, and have committed to supporting the process financially. On the other hand, Westside Sacramento has remained small, and has no regular schedule of meetings or financial commitments. Further, the North Coast and Kings Basin have developed mutually agreed upon routines for stakeholder engagement in the process, while in Westside Sacramento this has occurred in only one of the four counties involved. As will be discussed later in this section, the process of developing these routines of interaction involved finding ways to reconcile the established norms and values among stakeholders in that region with the state's expectations of a participatory process.

Table 4.3. Overview of case study regions

	North Coast	Kings Basin	Westside Sacramento
Land area	19,390 sq. mi	953 sq. mi	3,000 sq. mi
Population	675,845 (2010)	Approx. 1 million (2010)	Approx. 390,000 (2013)
Boundaries	Hydrologic region (includes six Water Management Areas)	Groundwater basin, adjusted in a few areas to follow jurisdictional boundaries	Two watersheds
No. of counties involved	7*	3	4**
Major water sources	Surface water (local sources)	Groundwater, surface water (mostly imported)	Surface (imported and local), and groundwater; sources vary across region
Critical water issues	Watershed restoration to protect critical habitat; aging or inadequate water infrastructure in rural communities	Groundwater overdraft; groundwater contamination, making water unsafe to drink in some rural communities	Surface water quality due to mercury, invasive species, algae blooms; inadequate supplies (parts of region); inadequate water infrastructure (parts of region)
Decision-making body	Policy Review Panel composed of elected members of each county's Board of Supervisors, and three tribal representatives	Board of Directors composed on representative of each member agency	Coordinating Committee composed of representatives from one water agency in each county
Convening agency	Sonoma County Water Agency, with support from consulting team	Kings River Conservation District	Shared leadership from four Coordinating Committee members, with administrative support from contracting agency
% full-time equivalent (FTE) staff dedicated to network management (in 2014)	Greater than 100%	Greater than 100%	Less than 50%
Funding for network management (in 2014)	Core financing provided by convening agency; in-kind support from counties	Regular membership dues	One-time payments from Coordinating Committee, negotiated each year

*Two counties with only small areas that fall within the North Coast hydrologic region have chosen not to participate in the NCRP.

** One county with only a small area in the Westside Sacramento region chose to withdraw from the process in 2013.

Table 4.4 Indicators of legitimacy in three case study regions

Change during the period 2009 - 2014	North Coast	Kings Basin	Westside Sacramento
Increase in member agencies?	Yes (rose from 68 to 101)*	Yes (rose from 38 to 56)	No (declined from 5 to 4)
Creation of mutually agreed norms for stakeholder participation?	Yes (via elected county board of supervisors)	Yes (membership open to all)	No (except in Yolo County)
Commitment to regular meeting schedule?	Yes (quarterly)	Yes (quarterly)	No (meetings scheduled as needed)
Commitment from participants to provide regular financial support?	Partial (commitment from convening agency)	Yes (membership dues)	No (one-time contributions, re-evaluated each year)

* These figures refer to the number of agencies signing a Memorandum of Understanding, indicating their support and participation in the North Coast IRWM process

Building legitimacy through identifying common interests and values

A sense of shared interests is a crucial motivator for participation in a collaborative process, and an important contributor to legitimacy. How those interests are defined is closely related to the scale of the collaboration. The experiences of the North Coast and Kings Basin show that shared interests may emerge under quite different conditions. In the North Coast, stakeholders across a very large area who do not face a single, urgent problem were nonetheless able to identify common interests through a series of dialogues hosted by a convening agency. In the Kings Basin, an increasingly urgent problem of groundwater overdraft initially motivated collaboration, but a convening agency played a crucial role in building a more nuanced understanding of that problem, which helped re-define the region's boundaries. The Westside Sacramento region's boundaries, however, were determined not by local interests but were recommended by the state. At this scale, stakeholders neither shared a common problem, nor did a convening agency with adequate resources exist to help discover areas of common interest.

The creation of the North Coast IRWM region at the scale of a large hydrologic region is largely the result of the initiative of the Sonoma County Water Agency (SCWA), a multi-purpose water agency located at the southern tip of the region, close to the San Francisco Bay Area. SCWA's board of directors was deeply engaged in state-level water policy and in the creation of the IRWM program, and shared DWR's vision for regional collaboration, particularly at the scale of hydrologic regions. They also saw this as in their agency's interest. As an SCWA staff member commented, "Regional collaboration is a good business model for us." SCWA therefore sought to create an IRWM region that included the entire North Coast hydrologic region, matching DWR's expectations. However, this was a challenging task for several reasons. There was no previous history of collaboration at this scale; instead, the counties and small communities that make up the North Coast had a history of working independently, valuing their own autonomy and seeking to limit the state. In addition to convincing them of the value of regional-scale collaboration, SCWA also had to overcome suspicions about its motivation in creating the region, and demonstrate that this was not simply a means for SCWA to gain control over the region's grant funds. Further, the North Coast covers an enormous area, and making in-person meetings a considerable challenge to organize. Finally, The 36 tribal nations in the North Coast region have long fought for recognition of their claims to water and land, resulting in on-going conflicts with local, state and federal agencies.

SCWA invested considerable time and resources in convening county officials and other stakeholders to discuss what regional-scale collaboration could offer them. To manage this process, SCWA hired a consulting team with experience working in this part of the state, which would be viewed as a neutral party. An SCWA staff member commented, "You have to have someone who did not come from one shop, and who could represent all the different partners." SCWA made a long-term commitment to supporting the process, recognizing that "there might not be an immediate return on investment." Over a period of several years, counties and other key stakeholders began to see value in a regional process. While stakeholders in this large region face a variety of water management problems, they

also viewed themselves as sharing distinct values and interests as compared with the rest of the state. The North Coast is a predominantly rural region, with 96% of its land covered by forest or rangeland, and has more limited economic opportunities than the rest of the state. Through a series of workshops and meetings, participants identified a number of common values, including a connection to the land, an interest in preserving the quality of rural life, protecting natural resources, and building economic opportunity (NCRP 2014, p. 84). These common values support working together on efforts to repair and maintain aging water infrastructure, and manage critical habitat for salmonids and other endangered fish species, and resolve conflicts between environmental and human uses of the water and landscape.

Further, cities and counties recognized that with the creation of the IRWM process, a significant portion of state funds for water management would no longer be accessible except by participating in regional planning. Working together offered some benefits, particularly for very small communities with limited resources. SCWA allocated staff time and resources to support the development of grant proposals, which began to bring funding into the region. Because the North Coast IRWM region formed at the scale of its Funding Area, no other IRWM regions could compete for this funding, providing participants with a greater certainty that they would receive the grant funds they applied for. Thus, SCWA played a crucial role in helping to build a sense of common purpose across the vast North Coast hydrologic region, which also helped achieve its own ambitions to advance a new approach to water planning in the state.

In the Kings Basin region, boundaries were largely defined around stakeholders' common interest in addressing a groundwater overdraft problem that they already viewed as impacting them significantly. The region's predominantly agricultural economy depends upon a combination of surface water, drawn from the Kings River and the Friant-Kern Canal, part of the Central Valley Water Project, as well as the Kings groundwater basin, which is recharged by surface waters from the Kings and San Joaquin Rivers. However, over the past several decades, growing agricultural and urban water use, combined with greater lower surface water deliveries in order to reserve water for environmental needs, has led to a steady decline in groundwater levels, with annual withdrawals regularly exceeding the basin's sustainable yield (DWR, 2014a, p. TL-17). Water users, represented by irrigation districts, small towns, and the city of Fresno, had begun to recognize the severity of the problem, but an organized response only began in 2001, shortly before the IRWM program was established in 2002. At that time, DWR offered support to convene a dialogue between three large irrigation districts to discuss the situation and begin to develop a groundwater model to better understand its severity. This effort was coordinated by the Kings River Conservation District (KRCDD), a multi-purpose agency whose service area covers most of the groundwater basin.

After the passage of the IRWM Planning Act and the approval of the first bond funds for IRWM regions in 2002, KRCDD and the irrigation districts saw an opportunity to seek funding to address the groundwater overdraft problem, and began to invite additional cities and water districts to join the process. By 2007, participants in the Kings Basin Water

Forum, as it was then called, established boundaries that followed a combination of the groundwater basin, the San Joaquin River, and jurisdictional boundaries of participating water districts (Kings Basin Water Forum, 2007). However, over time these boundaries expanded to more closely match those of the groundwater basin. As KRCD began to use the groundwater model to project changes in groundwater levels and compare these each year with the actual groundwater levels, participants started to gain a better sense of the severity of the overdraft problem, and how their actions affect it. In 2009, participants agreed to expand the region's boundaries to largely match those of the groundwater basin (KBWA Board of Directors Meeting Notes, Sept. 10, 2009). However, water agency boundaries remained an important factor. For example, the group also agreed in 2009 that a portion of the boundary would match that of the Kings County Water District, including lands beyond the groundwater basin but which were being irrigated with this water. In addition, KRCD's own boundaries also largely match those of the groundwater basin. Interviews with coordinators of this process indicated that this made it much easier for the agency to manage the collaborative process.

Beginning in 2010, the identity of the Kings Basin region began to evolve further, eventually re-opening dialogue about the extent of the region's boundaries. As discussed in Chapter 2, DWR's requirements for participating in the IRWM process include outreach to disadvantaged communities (DACs), and in the Kings Basin, many of these are unincorporated communities dependent on very small water systems that they manage themselves. Over the years, the groundwater supplies upon which these communities rely have been increasingly contaminated with nitrates, largely due to intensive use of fertilizers in the region (Balazs et al., 2011). These communities, with support from several non-profit organizations, began to participate in meetings of the Kings Basin region, and urging the group to address groundwater quality problems as well groundwater overdraft. In 2012, the Kings Basin region received funding to study the needs of DAC communities within its boundaries. This study identified several communities located just outside of the Kings Basin boundaries that were facing severe groundwater quality problems, and recommended that consideration be given to expanding the region's boundaries to include such communities so that they could access resources and partnerships (KBWA, 2013). The process of studying and discussing the issue of groundwater quality led the Kings Basin region to begin to revise their shared goals, and to re-negotiate the boundaries of their regional process to include the interests of disadvantaged communities.

The Westside Sacramento region differs from most other IRWM regions in that its boundaries were suggested by DWR rather than emerging in response to stakeholder interests. In 2004, water agencies in the counties of Yolo, Solano, Napa and Lake each began to develop their own IRWM plans. In Yolo and Solano counties in particular, water supply interests were already organized at the county level. In Yolo County, cities and local water districts had formed a non-profit entity in 1993 called the Water Resources Association of Yolo County, to facilitate dialogue and coordination among water supply interests. In Solano County, many cities and water districts receive their water from the Solano County Water Agency, a wholesale supplier. Cities, water districts, and county representatives serve on the board of this agency, which serves as the main forum for interaction between

water interests in the county. These two agencies each led the development of county-level IRWM plans, which were completed in 2007.

However, DWR did not view these plans as having the orientation toward watershed-scale planning that they envisioned for the IRWM program. In 2009, DWR informed representatives of the Solano and Yolo efforts, as well as those involved in planning efforts in Napa and Lake counties, that their regional boundaries were unlikely to be approved, and encouraged them to consolidate into a single region formed along watershed boundaries. DWR staff suggested that the region combine the Cache and Putah Creek watersheds, which would encompass all of Yolo County, and portions of Solano, Napa, Lake and Colusa counties. Believing that the alternative was to become ineligible for IRWM grant funds, representatives of the IRWM efforts in these counties reluctantly agreed, and created the Westside Sacramento IRWM region.

Water stakeholders within the new Westside Sacramento region had not worked together previously, and were unfamiliar with the water issues facing each county involved. Between the two watersheds, there were considerable differences in the water supplies that they relied upon. For example, Solano County has a relatively secure surface water supply through a federally funded water project as well as the State Water Project, while Yolo County has a less reliable surface water supply originating in Lake County, which is supplemented by groundwater. Lake County is predominantly rural, with little agriculture and many economically disadvantaged communities, as well as tribal communities. Yolo and Solano counties, however, have significant agriculture as well as urban populations.

Unlike the North Coast, the Westside Sacramento region had no single entity willing to convene the process of identifying common interests and managing a regional planning process beyond their own boundaries. Instead, one agency from each of the five counties, which had previously led their respective county-level IRWM processes, came together to form a Coordinating Committee, and used planning grant funded from DWR to hire a consulting team to guide the development of the region's IRWM plan. In contrast to SCWA, which provided on-going funding to sustain its consulting team even after its planning grant funds were exhausted, the consultants for Westside Sacramento were hired only to develop the region's plan, from 2012-2013. This process provided opportunities for dialogue among the five agencies, and with stakeholders who attended the public workshops organized to gather input for the plan. Several common interests were identified in this process, particularly shared water quality problems related to invasive species in the region's lakes and rivers. However, after the plan was completed and the consultants left, public participation dropped off considerably. Interviews with members of the Coordinating Committee indicated that while they saw some potential for participation in the Westside Sacramento region to benefit them, they did not view it as meeting their interests in ways that they could not otherwise. As one participant put it, "there isn't really a single cementing issue that bring us together, as of yet. But there are ways we can help each other out, so I don't think it's a wasted effort."

As the above discussion has highlighted, the identification of boundaries around which to organize a collaboration is closely linked with the process of identifying a common set of interests that participants recognize as important to them. Such common interests are not necessarily obvious from the start; instead, they require a process of dialogue and information exchange through which participants begin to understand how their interests overlap with those of others. In the case of the North Coast, leaders at the Sonoma County Water Agency, spurred by their belief in the need for regional-scale planning, took the initiative to organize such a dialogue, through which stakeholders were able to discover common needs. In the Kings Basin, the severity of groundwater overdraft in the region initially motivated participants to join, but it was through KRCD's efforts to build a groundwater model and host dialogue among a broad range of stakeholders that participants gained a concrete understanding of the dual problems of groundwater overdraft and quality, shaping a regional identity around the groundwater basin. As convening entities, SCWA and KRCD both viewed regional-scale planning as central to their missions, and invested considerably in the process. In contrast, participants in the Westside Sacramento region struggled to define their common purpose at the scale of the two watersheds that DWR suggested as regional boundaries. Unlike the North Coast and the Kings Basin, there was no single agency with adequate resources and a broad enough mandate to take on the task of convening a regional planning process at the scale of these two watersheds.

Legitimacy in governance: Reconciling representative and deliberative approaches

Establishing an IRWM region as a sustained collaboration involves more than identifying a common set of interests that participants recognize as important and meaningful. It requires developing modes of routine interaction that participants view as "appropriate" in relation to existing institutional arrangements for decision-making. In other words, the creation of governance structures that have legitimacy in the eyes of regional stakeholders involves embedding them somehow in what existed before, while also creating new routines and norms to address shared interests. As this section will illustrate, the variation in natural and institutional landscapes, as well as the scale of the collaboration in the three case study regions, have yielded quite different approaches to governance. However, each of the regions has grappled with the challenge of reconciling deeply embedded views of legitimacy based on democratic representation with the deliberative model encouraged by state requirements. Once again, capacity at the regional level to support the creation and implementation of governance structures that balance these tensions appears to be critical.

The North Coast IRWM region is explicitly organized around and bounded by watersheds (NCRP, 2014, p. 86). Yet, its governance body is structured around county and tribal jurisdictional boundaries. In this predominantly rural region in which communities tend to be small and dispersed, counties play an important role in both land and water management. In the North Coast, there are an estimated 300 local entities providing water supply, both private and public, and many are extremely small, often managed by part-time or even volunteer staff. With such limited capacity, these entities rely heavily upon counties for support. Counties also play an important role in land use management, which is a crucial element of watershed protection. Thus, in developing a governance structure for the

North Coast, it made sense to engage the counties, who could represent the interests of the hundreds of local stakeholders across such a vast area. However, tribal participation was controversial. While tribes needed access to the resources that the IRWM process could bring, participating in a regional governance arrangement alongside county and local government agencies might imply ceding their sovereign authority over tribal lands. In fact, in entering into a regional collaboration, both counties and tribes placed a high value on retaining their autonomy. This is emphasized in the North Coast IRWM plan, which states that, “the NCRP places strong emphasis on local autonomy, allowing each county, Tribal, municipal, or watershed jurisdiction to implement the NCIRWMP and other plans in a way that respects and incorporates local knowledge and preferences,” (NCRP, 2014, p. 1).

Through a series of meetings convened by the consultants hired by SCWA, a representative governance arrangement emerged at the scale of the hydrologic region. This accommodated the established role of counties and included tribes, while also recognizing each entity’s local autonomy. Each of the seven counties with significant territory within the North Coast hydrologic region nominate two elected members of their board of supervisors to serve on the Policy Review Panel (PRP), the decision-making body for the region. Tribes have three representatives on the Panel, chosen through a “Tribal Process.” Under this process, the North Coast is divided into three “districts,” and tribes within each district select a representative to serve on their behalf in the PRP. This represents a compromise between the tribes, who each wanted to represent their own interests on the Panel, and counties, who would not agree to this. In addition to the PRP, a Technical Peer Review Committee (TPRC) was also established, again composed of representatives appointed by counties and tribes, to provide technical input to the decision-making process.

This governing structure, therefore, largely relies upon established patterns of democratic representation to establish the legitimacy of its governance arrangement. The interests of stakeholders are represented by elected officials at the county level, or on tribal lands by a special representative process developed by the North Coast tribes. This differs from the deliberative model of legitimacy normally associated with a collaborative process, in which stakeholders engage in direct discussions with one another. However, the North Coast region also bears some characteristics of a deliberative approach. Since 2005, numerous workshops, conferences, training sessions, and outreach efforts have been held, in which stakeholders actively engage in dialogue about water management issues in the region. Stakeholders have signaled their willingness to participate in dialogue, and their acceptance of the governing arrangements developed for the region, by signing a Memorandum of Understanding that outlines the purpose and functioning of the North Coast Resource Partnership. As of August 2014, 101 entities, including cities, special districts, other local government agencies, and non-profit organizations, have signed the MOU (NCRP, 2014).

Developing and sustaining these governing arrangements, including on-going efforts to engage stakeholders directly in meetings in addition to coordinating the participation of members of the Policy Review Panel, has required a significant, steady investment in

coordination and management. SCWA has continued to provide core financial support to the consulting team and provide leadership in the process, investing close to \$1 million since the region's formation in 2004, according to interview evidence. The Counties, cities and other participants have also contributed staff time, particularly Humboldt County, which has served as the administrator for all grants received by the North Coast region.

The Kings Basin has taken a quite different approach. On the surface, it seems to more closely follow a deliberative model of legitimacy, in that each participant represents its own interests in the collaborative process. However, a closer examination reveals that beliefs about the representativeness of public agencies have also influenced this region's governance structure. The institutional context of the Kings Basin differs considerably from that of the North Coast in that irrigation districts and cities play significant roles in water management alongside counties. In this extremely productive agricultural region, access to water is highly valued and contested. Irrigation districts, with origins dating back to the 1800s, hold the most senior water rights in the region, giving them considerable control over water management efforts in the region. The service areas of several of these irrigation districts cross county boundaries. In addition, the Fresno and Clovis metropolitan area has a population of over one million, and their actions, along with those of the smaller cities that dot the region, have important implications for the status of the groundwater basin. The region's numerous small, unincorporated communities have largely been left out of the decision-making process, but have often borne the costs of the region's agricultural success, in the form of nitrate contamination in their water supplies (Pannu, 2012). Although counties have some responsibility for these unincorporated areas, they have lacked adequate resources to resolve these problems, and many of these local communities place a high value on their autonomy. Instead, non-governmental organizations have provided resources and support to enable community members to develop their own solutions. Thus, while counties still play an important role, neither large irrigation districts nor small, unincorporated communities were likely to view the county as an appropriate representative for their interests.

Within this institutional setting, the governing arrangement that evolved in the Kings Basin allowed each entity to participate directly in the decision-making process. Initially, the group operated under a memorandum of understanding, in which any entity that signed the agreement would have an equal voice. In 2007, the group's members included four irrigation districts, three counties, ten cities, two other special districts focused on water rights, and four non-profit environmental organizations (Kings Basin Water Forum, 2007). However, by 2009 participants had become uneasy with this relatively informal governance process, particularly with regard to the participation of non-profit organizations on equal footing with public agencies. In addition to advocating for environmental priorities, several non-profit organizations began to participate, representing the interests of unincorporated communities facing serious water quality problems. Irrigation districts worried that these non-profits would shift the agenda of the group away from the problem of groundwater overdraft, and might ultimately threaten their water rights. In addition, representatives of public agencies were uncertain whether these non-profit agencies could legitimately represent the interests of either the

environment or low-income communities. While public agencies were ultimately accountable to the public through their elected representatives, this relationship does not exist between non-profits and local communities. Instead, their understanding of issues is largely shaped by dialogue with community members, and their participation within the organization itself, and this is less visible and more difficult to track. Yet, DWR's requirements for the IRWM program clearly stated that each IRWM region must ensure that environmental concerns and the needs of disadvantaged communities are represented in their decision-making process.

As manager of the collaborative process, the Kings River Conservation District held a series of meetings to develop a new governance structure that would resolve these tensions. The new arrangement involved establishing a Joint Powers Authority (JPA), with a Board of Directors composed of a representative from each member agency. Under California law, only public agencies can hold decision-making authority in JPAs. This relieved the concerns of irrigation districts and cities about the participation of non-profits. However, another membership category was created called Interested Parties, which could include non-profits and public agencies. Interested Parties had a voice in decision-making by providing recommendations to the Board during Advisory Committee meetings, which included both members and Interested Parties. Although formally the Advisory Committee only provides recommendations to the Board, in practice this is the main venue for discussion of critical decisions, and the Board has never acted contrary to the recommendations of the Advisory Committee. This arrangement appears to have satisfied the sense of "appropriateness" among public agency staff regarding the special role of public agencies in representing public interests, while at the same time allowing non-state actors to have a meaningful voice in the process. Non-profit agencies would have preferred to have a formal vote, but agreed to the process in part because of the trust that had developed between some environmental non-profits and KRCD, the convening agency. Once again, the convening agency played a crucial role in enabling the deliberative process needed to create this compromise, holding one-on-one meetings and well as group discussions to broker agreement.

While the North Coast and Kings Basin regions have been able to develop relatively robust governance arrangements that accommodated existing patterns of interaction through deliberation and dialogue, this has not yet occurred in Westside Sacramento. As already noted, water management interests have tended to organize themselves at the county level, but there are substantial differences in how this works in each county. In Yolo County, cities and water districts organized themselves into a non-profit association, while in Solano County, the wholesale water agency that provides water to cities and water districts serves as a hub. In contrast, in Lake County, most water suppliers are very small community systems, many of which are led by volunteers. To date, they have relatively little experience working with one another, and limited trust in the county. In these settings – unlike the North Coast – the county government would not have been recognized as an appropriate representative of water interests.

Instead, the Westside Sacramento governance structure inherited the organizational structure established by each previous county-level IRWM planning process. The entities that had been leading the development of the county-level plans before DWR requested that they consolidate simply continued in their roles, and each became a member of the new Coordinating Committee. However, the committee's functioning does not fit either a representative or a deliberative style of legitimacy. The Committee is composed of one entity from each of the counties with territory in the region. These entities are supposed to represent the interests of their counties. However, except in the case of Yolo County, which is represented on the Committee by a county-wide water users association, there are no established mechanisms by which members of the Coordinating Committee are accountable to a broader set of water stakeholders in their counties. For example, in Solano County, the Solano County Water Agency interacts with cities, water districts, and county subdivisions that serve on its board, but water interests beyond these do not have an established way to express their interests. In Lake County, there was significant distrust between the county agency serving on the Committee and the numerous small-scale water purveyors in the county. Overall, it is not clear whether the members serving on the Coordinating Committee are representing the interests of the county, or just those of their own agency.

Nor has the Coordinating Committee followed a deliberative model of legitimacy. In the original design of the region's governance structure, a Stakeholder Group, open to anyone interested in the process, was envisioned as the primary venue for discussion and debate. Initial meetings of the Stakeholder Group were held during the plan development process managed by the consultants. However, following completion of the plan, outreach to these stakeholders dropped off, and public workshops for stakeholders have not been continued. Unlike the North Coast and Kings Basin, no procedures were established for interested stakeholders to either become members of the Coordinating Committee, join an advisory committee, or otherwise actively participate in the process. Coordinating Committee meetings are open to the public, but there are no established or transparent procedures for considering input received through public participation.

Conclusion

Efforts to manage water resources at watershed scales have gained broad currency in the water management community in the United States and globally. However, collaborations focused around watershed boundaries frequently face challenges in gaining legitimacy within a highly complex institutional environment involving jurisdictions operating at quite different scales. In California, due to the state's long tradition of local control over water resources, the IRWM program offered considerable flexibility to local agencies in defining the scale and boundaries of their regions. At the same time, the state encouraged the use of watershed boundaries, and has required regions to include a wide range of stakeholders in their planning processes. This setting enables an analysis of whether and how IRWM regions have established legitimate governance arrangements at watershed scales, and how this has been influenced by their particular institutional context.

The comparison of three case study regions suggests an important role for convening agencies in the creation of legitimate governing arrangements at the scale of watersheds or groundwater basins. In the North Coast, it was the convening agency, Sonoma County Water Agency, that provided the initial vision for collaboration at the scale of a large hydrologic region extending over 19,000 square miles and seven counties. Through the SCWA's investment in building relationships and fostering dialogue across this vast area, the North Coast regional planning process has gained the support and participation of a wide range of stakeholders. Despite varied interests and problems, participants have identified a shared set of values, while also accommodating a strong sense of autonomy. Further, although the region is defined along watershed boundaries, participants developed a governing arrangement that relies upon established patterns of democratic representation at the county level. A special representative process was also designed for tribal participation in the governing body. Finally, SCWA's significant investments in stakeholder outreach have also enabled the region to develop characteristics of a deliberative process, as emphasized by the state in its requirements for broad stakeholder participation.

In the Kings Basin, the scale of the collaboration was largely determined by a common interest in solving an increasingly severe groundwater overdraft problem. However, the convening agency in this region still played a crucial role. Its efforts to develop and use a new groundwater model at the scale of the groundwater basin helped participants better understand the severity of the problem. Further, their outreach to disadvantaged communities – in response to DWR's requirements – helped expand the group's focus to include groundwater quality. Both the groundwater model and the inclusion of disadvantaged communities influenced the boundaries of the region, and led to a growth in membership. Like the North Coast, the region's governing arrangements also represent a compromise between representative and collaborative modes of legitimacy, tailored to the institutional context of the Kings Basin. To account for the special status of public agencies in representing the public interest, only public agencies can serve as members of the decision-making body. Yet, a broad range of non-governmental agencies participate in advisory committee meetings, which in practice serves as the venue for discussion and decision-making. Again, as the convening agency, the Kings River Conservation District played a considerable role in negotiating agreement around this approach.

In contrast, the boundaries of the Westside Sacramento region were strongly encouraged by DWR, leading several county-based IRWM processes to consolidate into a single region defined by watersheds. It proved difficult for the agencies involved to define common interests at this scale, and to develop acceptable routines of interaction that allow for stakeholder engagement. A critical factor appears to be that an entity with adequate resources and commitment to watershed planning did not exist at the scale of the Westside Sacramento region. Dialogue among participants was limited, and the governance structure that evolved follows neither a representative nor a deliberative model of legitimacy.

This research contributes in several ways to our understanding of legitimacy and its role in the development of governance arrangements to support integrated water resources

management. First, the experiences of the three case study regions confirm the importance of deliberative processes in building legitimacy. Several other scholars have emphasized this (Schmidt, 2013, Abers & Keck, 2013, Bernstein, 2011, Innes & Booher, 2010). For example, Bernstein (2011) notes that where contestation exists, establishing legitimacy requires institutions to “not only develop democratic procedures and accountability, but build institutional capacity for learning, norm-diffusion, and processes, perhaps deliberative modes of decision-making, that lead to increased mutual understandings and ownership of decisions,” (p. 41). This chapter’s findings show that dialogue and deliberation played a crucial role in building common interests and new norms for decision-making at watershed or groundwater basin scales. In particular, the experiences of the North Coast and Kings Basin regions suggest that one of the critical outcomes of such dialogue is mutual agreement upon decision-making processes that reconcile existing modes of democratic representation with new forms of direct participation in decision-making, following a deliberative model of democracy.

Second, this analysis contributes to a better understanding of how institutional factors may affect the appropriate scale for governance arrangements to support integrated approaches to water management. Literature to date has indicated that implementing integrated water management is not simply a matter of establishing new organizations at watershed scales (Blomquist & Schlager, 2005). New organizations and collaborations must establish themselves as legitimate within an existing institutional environment that has rarely reflected natural boundaries. Abers and Keck (2013)’s analysis of the creation of legitimate governing arrangements at river basin scales in Brazil emphasizes that authority is created through a process of engagement and experimentation that transforms ideas, relationships and resources. The analysis in this chapter contributes by pointing to need for institutional capacity, particularly in the form of a convening or lead organization with adequate resources and staff to orchestrate this process. This confirms the findings of Human and Provan (2000) about the crucial role of lead organizations in building legitimacy in networks, as well as the broader literature pointing to the role of network management in determining network effectiveness (Klijn et al. 2010, Goldsmith and Eggers 2004). This has implications for the appropriate scale for watershed scale planning. As the experience of the Westside Sacramento region demonstrates, building legitimacy around a watershed-oriented collaboration may be difficult if no organizational capacity exists at that scale to serve in such a convening function.

Finally, this analysis offers insights with regard to the role of government in supporting collaborative processes to manage water resources. The paradigm of integrated water resources management suggests that governments should devolve decision-making for water management to watershed scales. This analysis suggests that for this approach to be successful, adequate institutional capacity is needed to build legitimacy at that scale. The work of Norman and Bakker (2013) supports this view. This needs to be taken into account in the design of policies and programs to support watershed-scale management. The experience of the IRWM program suggests that the appropriate role of the state depends upon the existing norms and institutional arrangements. In California, where norms for local control are already well established, the state’s flexible approach in determining

regional boundaries allowed local agencies to determine the scale and composition of regions. This may have helped encourage the creation of regions at scales where capacity existed for managing the collaborative process.

When DWR strongly encouraged several county-scale IRWM regions to alter their chosen boundaries to match watershed scales to form the Westside Sacramento region, they did not take into account the lack of capacity at this scale for coordination and management of a collaborative process. There are trade-offs, however. Without DWR's intervention, the previous county-level IRWM processes might have established legitimate governing arrangements, but opportunities might have been missed to account for ecological processes operating at the scale of watersheds. Thus, there appears to be role for the state in pushing local agencies beyond their existing routines and relationships to engage in dialogue with new actors and at new scales. In the IRWM program, DWR has sought to do this through requirements that regions involve a broad range of stakeholders. The experiences of the North Coast and the Kings Basin suggest that when adequate institutional capacity exists at the regional scale, the state's requirements have indeed helped to expand the scope of the collaborative process. However, when regions lack adequate resources to conduct meaningful outreach, this requirement may have little effect, as was the case in Westside Sacramento. In such situations, the state might also need to provide resources to support outreach and coordination. Yet, currently only limited state grant funds go toward supporting the management of regional planning processes.

Important questions remain that are not addressed here. First, this chapter has focused on three IRWM regions that followed hydrologic boundaries. As the statewide analysis of IRWM boundaries shows, there are a number of IRWM regions that largely follow county or other jurisdictional boundaries. This analysis does not assess whether these regions are addressing problems at hydrologic or ecological scales. Evidence from the 19 sample regions suggests that simply defining a region along jurisdictional lines does not necessarily exclude following a watershed approach. For example, the Watersheds Coalition of Ventura County IRWM region follows Ventura County boundaries, but its governance structure is organized around the county's three main watersheds. Each watershed has its own committee, and these committees are the primary forum for discussion and decision-making in the region. This chapter also does not assess the degree to which regions that do follow hydrologic boundaries are actually successful at developing and implementing integrated strategies for water management. The question of how to evaluate "success" in integrated water management is a much larger – and difficult – question. I have argued in Chapter 2 that in the case of the IRWM program, one important measure of success is the degree to which a regional process promotes learning among participants, since this learning can provide the basis for new, integrated water management strategies. The remaining chapters of this dissertation seek to assess this learning process, and examine the role of governance structures and network management activities in supporting learning.

Chapter 5. Governing IRWM regions: The role of network management

I think the intentions are good, but it is more complicated than DWR staff understand it to be. The interest in having all the stakeholders involved and making decisions, it's a great idea in concept, but when you try to make it work, it's pretty hard. You need educated facilitators that understand the process, and stakeholders who are willing to follow rules and realize that everyone can get better together, or you end up with stalemate.

—Coordinator of an IRWM region, 2014

Managing a collaborative process is a difficult task. As the quote above suggests, it requires skill and effort to steer a group of stakeholders with diverse interests toward identifying common goals, and acting upon them. The job becomes even more complex when the network must comply with a set of rules about who should be involved and how network activities should be carried out. Yet, as the work of network governance scholars has shown, how networks are managed has important implications for the process of learning (Koppenjan & Klijn, 2004). The capacity for network management is likely to play a critical role in the outcomes of the IRWM process.

In this chapter, I investigate how IRWM regions have organized themselves to take on these network management challenges. The regions vary dramatically in terms of socio-economic, hydrologic, and institutional context, leading to a diversity of network structures and approaches to management. This makes the IRWM process an excellent context for analyzing factors that shape how network management is carried out. I begin this chapter with an overview decision-making structures and participation in the 19 IRWM regions. I then discuss the types of network management activities observed in IRWM regions, and the levels of investment in these efforts. Next, following Provan and Kenis (2008), I examine how regions are structured to support such network management activities. Finally, I explore the kinds of organizations that have taken on the task of managing an IRWM region, and the conditions in which they do so.

My findings indicate that regions with more centralized structures (lead agency or network administrative organizational forms) allow for greater investment in network management activities than do shared network governance arrangements. Provan and Kenis hypothesize that centralized structures work best when conditions require a higher investment in coordination, for example in large networks undertaking complex tasks. However, despite the fact that most IRWM networks do involve diverse actors and undertake complex tasks, some have chosen shared governance rather than a centralized form. I explore the specific conditions within California's fragmented institutional landscape that may constrain the development of lead agency or NAO networks. In doing so, I add nuance to Provan and Kenis's hypotheses about how the level of trust between participants shapes the likelihood that shared versus centralized governance forms will emerge.

Overview of 19 IRWM regions

Table 5.1 provides basic background on the sample of 19 IRWM regions. All regions were formed during the period of 2004 – 2009, and range in geographic size from 300 to 19,000 square miles. Population size also varies considerably, ranging from approximately 18,000 to over 7 million. Sixteen out of the 19 regions are formalized through a Memorandum of Understanding (MOU), which is a written agreement between parties to undertake the planning process together. Under an MOU, agencies retain their own identities, and have the ability to withdraw from the process at any time. Three of the 19 IRWM regions operate as a Joint Powers Authority (JPA), under which participating agencies form a new, legally independent organization that carries out the joint activities of two or more public agencies.²³ This entity is governed by a board of directors involving a representative from each of the participants, all of which must be public agencies. Forming a JPA involves a more significant investment on the part of participants, since they are committing to govern and sustain a new public agency. On the other hand, forming a JPA protects participants from liabilities that may arise through the collaboration process (Cypher & Grinnell, 2007). In addition to a decision-making body formed around an MOU or JPA, some regions have also formed advisory committees to engage a broader range of stakeholders. Table 5.1 also briefly summarizes the decision-making and advisory bodies establishing in each of the regions.

Decision-making processes

The IRWM Planning Act and DWR's guidelines specify that an IRWM region must be governed by a "Regional Water Management Group" (RWMG), defined as including at least three entities, two of which must have statutory authority for some aspect of water management. The RWMG must operate under a written agreement approved by the governing bodies of each participant, but the nature or content of this agreement is left to the regions (DWR, 2012, p. 18, CWC §10539). The 2008 update to the IRWM Planning Act added requirements that IRWM regions consult with at least 13 specific stakeholder groups, and that the development of an IRWM plan be "collaborative," and provide a means for these stakeholders to engage in the process. Thus, all IRWM regions must include avenues for stakeholders to contribute to the decision-making process, but again, how this is accomplished is left up to the regions.

An analysis of governance arrangements in the 19 sample regions reveals that regional decision-making bodies are typically structured in one of two ways. In the "representative" approach, members of a decision-making body serve as representatives of the interests of a certain geographic area (usually a county), or of a specific aspect of water management (such as water supply or flood management). In the "membership" approach, entities become members of the decision-making body, either via signing an MOU or joining a JPA, and represent their own interests. As shown in Table 5.2, 15 out of 19 regions follow a

²³ Joint Powers Authorities are established under the provisions of California State Government Code §6502.

Table 5.1. Overview of 19 sample IRWM regions

Funding Area (1)	IRWM Region	Date formed	Land area (sq. mi)	Population (2010)	Agreement type	Decision-making body	Advisory body
North Coast	North Coast	2004	19,390	675,845	MOU	Policy Review Panel, composed of nominated representatives of seven counties and tribes in the region	Technical Peer Review Committee, members nominated by seven counties and three tribes
Sacramento Valley	North Sacramento Valley (NSV)	2006	9,447	604,964	MOU	NSV Board, composed of members appointed by the six counties	Technical Advisory Committee, members appointed by six counties
	Westside Sacramento	2009	3,000	390,960	MOU	Coordinating Committee, composed of one agency representing each of the four counties in the region	None
San Francisco Bay Area	San Francisco Bay Area	2006	6,862	7.2 million	MOU	Coordinating Committee includes three representatives from each of four Functional Areas	None
San Joaquin River	Mokelumne-Amador-Calaveras (MAC)	2005	1,484	~80,000	JPA	Eight-member Board of Directors	Regional Participants Committee, composed of cities, NGOs, residents and federal agencies
	Yosemite-Mariposa	2009	1,461	18,251	MOU	Five agencies representing key water interests in the county (nominal decision-making only)	Regional Water Advisory Council, including all MOU signatories
Lahontan	Antelope Valley	2005	2,400	390,000	MOU	Regional Water Management Group members, including all signatories to MOU	A seven-member advisory team of stakeholders representing key interests
	Tahoe-Sierra	2004	1,254	64,600	MOU	The Partnership, consisting of all signatories to the MOU	None
Central Coast	Monterey Peninsula, Carmel Bay, S. Monterey County	2005	350	106,400	MOU	Regional Water Management Group members, including all signatories to MOU	None
	Santa Cruz	2005	446	250,000	MOU	Regional Water Management Group members, including all signatories to MOU	None
Tulare Lake Basin	Southern Sierra	2008	6,195	34,000	MOU	Regional Water Management Group members, including all signatories to MOU	None
	Kings Basin	2004	953	~1 million	JPA	Board of Directors, including any public agencies who apply to participate and pay membership dues	Advisory Committee, including Interested Parties (including non-profits), and Board of Directors
Los Angeles - Ventura	Gateway	2007	308	~2 million	JPA	Board of Directors, including any public agencies who apply to participate and pay membership dues	None
	Watersheds Coalition of Ventura County	2006	1,843	823,000	MOU	All members, which includes any entity that participates in meetings	None
Santa Ana	Santa Ana Watershed Project Authority (SAWPA)	2004	2,800	5.9 million	JPA	Board of Directors, including five agencies participating in the JPA	Steering Committee, supported by ten "Pillar" committees focused on key water issues
San Diego	San Diego	2005	4,261	3.1 million	MOU	The RWMG members, which include the wholesaler, the city and the county	Regional Advisory Council, with seats representing key interests
	South Orange County	2004	496	550,000	MOU	Executive Committee including elected or executive level staff, supported by a Management Committee	None
Colorado River Basin	Coachella Valley	2008	1,420	416,000	MOU	Five RWMG members	Planning Partners, including all interested participants
	Mojave	2005	5,400	450,000	MOU	Five RWMG members	Stakeholder Group, including all interested participants

Data sources: IRWM Plans, RAP applications, interviews

1) The Funding Areas and regions within each are listed roughly from north to south. This order has been maintained throughout all tables, except for tables 5.4 and 5.8.

membership approach, while four regions are representative. Among membership groups, some have provisions for new members to join, and some do not. In those that do not, the initial group of agencies that formed the IRWM region continues to serve as the decision-making body. Interviews with coordinators in these regions indicated that a lack of a process through which new members could join reflects a perception that there were no other interested entities aside from those already involved who would be willing to invest the time and resources in participating as a full member.

Table 5.2. Decision-making structures in 19 IRWM regions

	Decision-making body		Advisory body?
	Representative	Membership	
North Coast	✓		✓
North Sacramento Valley	✓		✓
Westside Sacramento	✓		
San Francisco Bay Area	✓		
Mokelumne-Amador-Calaveras		✓	✓
Yosemite-Mariposa		✓+	✓
Antelope Valley		✓+	✓
Tahoe-Sierra		✓+	
Monterey Peninsula, Carmel Bay, S. Monterey County		✓+	
Santa Cruz		✓+	
Southern Sierra		✓+	
Kings Basin		✓+	✓
Gateway		✓+	
Watersheds Coalition of Ventura County		✓+	
Santa Ana Watershed		✓	✓
San Diego		✓	✓
South Orange County		✓	
Coachella Valley		✓	✓
Mojave		✓	✓
TOTAL	4	15	10

✓+ indicates that provisions exist for new members to join

In addition, many IRWM regions have formed advisory bodies, which serve as an avenue to engage a broader range of stakeholders. These advisory bodies are referred to differently depending upon the region; Technical Advisory Committee, Regional Advisory Council, and the Planning Partners are some of the terms used. These committees have specific members who meet on a routine basis (from once a month to once per quarter), and have a formal role in providing input to decision-making. In practice, some advisory committees serve as the real forum for discussion and decision-making, and approval of the decision-making body is simply a formality. Table 5.2 shows that out of the 19 sample regions, ten have an advisory body.

Number and types of participants

Differences in decision-making structures across regions make comparing the size of these regional networks somewhat challenging. The number of participants in the decision-making body may not represent the full extent of engagement, particularly in the case of regions following a representative model. Due to IRWM requirements encouraging extensive participation in the development of an IRWM plan, most regions hold public meetings and conduct outreach to a wide range of organizations, lists of which are usually found in their IRWM plans. However, these stakeholder lists may include entities that were contacted but only attended one or two meetings and have not remained engaged. Some regions have detailed records of meeting attendance, while others do not.

Table 5.3. Size of IRWM regions.

IRWM Region	RWMG Size (1)	Advisory body size (2)	Estimated network size (3)	Avg. meeting attendance, 2012-13 (4)
North Coast	10	17	101	35
North Sacramento Valley	6	15	37	11
Westside Sacramento	4	N/A	36	19
San Francisco Bay Area	14	N/A	84	23
Mokelumne-Amador-Calaveras	9	12	21	17
Yosemite-Mariposa	5	14	16	24
Antelope Valley	11	7	18	23
Tahoe-Sierra	18	N/A	30	No data
Monterey Peninsula	7	N/A	22	No data
Santa Cruz	9	N/A	35	No data
Southern Sierra	18	N/A	32	20
Kings Basin	16	41	57	27
Gateway	26	N/A	26	30
Watersheds Coalition of Ventura County	81	N/A	81	No data
Santa Ana Watershed	5	11	120	22
San Diego	3	34	34	41
South Orange County	20	N/A	44	No data
Coachella Valley	5	32	37	No data
Mojave	5	74	75	58
Average size	14	26	48	27

- 1) Number of organizational entities formally designated as RWMG members. The decision-making body may be larger if RWMG members each appoint more than one person as a representative.
- 2) The size of the advisory body represents the number of organizations or individuals represented in the committee (since some individuals do not represent organizations).
- 3) Network size includes all organizations or individuals who are formally participating in a decision-making or advisory body. If participants are themselves membership organizations then the total membership of that network is also included here. For some regions without formal advisory committees, meeting notes were used to estimate regular stakeholder involvement, which was also included in network size.
- 4) Based on records of meetings held during the two-year period of 2012-2013, except in Yosemite Mariposa (2013 only), MAC (2012 only), and Southern Sierra (2010 only). Meetings of the governing body and advisory bodies were included. All meeting attendees were counted, including members of the public or others who may not routinely participate.

To the extent that it was available, data on participation in each of the 19 regions was collected and analyzed to develop an estimate of the number of regular participants in each. This included all formal participants in decision-making bodies and advisory groups, but depending upon each region's governing style, additional entities were sometimes included. When membership organizations serving on a region's governing body were clearly representing the interests of a specific set of agencies, all of those agencies were included in the estimate of network size. In addition, in some regions without formal advisory committees, a certain stakeholders have routinely participated in public meetings, and could be considered as part of the network. In these cases, meeting notes were used to estimate how many entities were involved in this way. In addition, in regions for which meeting notes were available, the average meeting attendance was calculated as another indicator of the extent of regular involvement in these regions.

Tables 5.3 and 5.4 summarize the results of this analysis. Table 5.3 shows that the average size of the RWMG (the formal decision-making body) is 14, and ranges from 3 to 81

Table 5.4. Network participants, population, and land area.

IRWM Region	Network size	Population (2010)	Participants per 10,000 people	Land area (sq. mi)	Participants per 100 sq. mi
Yosemite-Mariposa	16	18,251	8.77	1,461	1.09
Antelope Valley	18	390,000	0.46	2,400	0.75
Mokelumne-Amador-Calaveras	21	80,000	2.63	1,484	1.41
Monterey Peninsula	22	106,400	2.07	350	6.29
Gateway	26	2,000,000	0.13	308	8.43
Tahoe-Sierra	30	64,600	4.64	1,254	2.39
Southern Sierra	32	34,000	9.41	6,195	0.52
San Diego	34	3,100,000	0.11	4,261	0.80
Santa Cruz	35	250,000	1.40	446	7.84
Westside Sacramento	36	390,960	0.92	3,000	1.20
North Sacramento Valley	37	604,964	0.61	9,447	0.39
Coachella Valley	37	416,000	0.89	1,420	2.61
South Orange County	44	550,000	0.80	496	8.87
Kings Basin	57	1,000,000	0.57	953	5.98
Mojave	75	450,000	1.67	5,400	1.39
Watersheds Coalition, Ventura Cnty.	81	823,000	0.98	1,843	4.40
San Francisco Bay Area	84	7,200,000	0.12	6,862	1.22
North Coast	101	675,845	1.49	19,390	0.52
Santa Ana Watershed	120	5,900,000	0.20	2,800	4.29
Average	48	1,266,001	1.99	3,672	3.18

members.²⁴ The average network size is considerably larger (48), and ranges from 16 regular participants in the Yosemite-Mariposa region to 120 in the Santa Ana Watershed region. Table 5.4 analyzes how the number of network participants relates to the size of the region in terms of land area and population. When compared to the region's small population, the number of participants in Yosemite-Mariposa appears quite large relative to other regions. Overall, the data highlight the fact that urban and rural IRWM regions face quite different challenges. Urban regions such as Santa Ana Watershed, San Francisco Bay Area, and San Diego have very low ratios of participants to population, and must find ways to meaningfully engage a large number of groups representing diverse interests. In contrast, rural regions such as North Sacramento Valley, Southern Sierra, and the North Coast have smaller populations, but a large land area to manage. Their challenge is to engage a smaller number of stakeholders, spread across a large area.

Table 5.5 summarizes the types of participants in each IRWM region. Cities and counties are by far the most frequent participants, and are included in almost every IRWM region. Special districts are categorized according to their focus on specific aspects of water management, such as water supply or wastewater management. This is a vast simplification of the diversity in the types of special districts; the water supply category alone includes water districts, county water agencies that operate independently from

²⁴ The region with the 81-member RWMG is Watersheds Coalition of Ventura County. This region has maintained a uniquely informal governance style in which the general membership serves as the decision-making body, and every entity participating in the region's general meetings is considered to be a member. However, information obtained in May 2015 suggests that the region may be evolving toward a more formal governance approach.

Table 5.5. Participants in IRWM regions

IRWM Region (1)	Governmental agencies			Special districts (2)					Non-governmental entities			Other (3)
	Cities, counties	State, federal agencies	Tribes	Water supply	Irrigation	Wastewater, sanitation	Flood, stormwater mgmt	Resource, watershed protection	Environment	Social justice	Citizen, landowner	
North Coast	24	2	10	24	0	2	0	9	28	0	0	1
NSV	9	0	0	2	1	0	1	1	0	0	10	0
Westside Sac	19	0	0	8	1	0	3	2	1	0	0	2
SF Bay Area	26	1	0	18	0	26	9	0	4	0	0	2
MAC	5	1	0	5	1	4	0	0	2	0	1	2
Yosemite-Mariposa	0	0	0	6	1	1	0	1	5	0	0	3
Antelope Valley	3	0	0	7	2	4	0	2	0	0	2	3
Tahoe-Sierra	6	2	1	8	0	4	0	1	9	0	0	7
Monterey Peninsula	2	0	0	5	0	3	1	2	5	0	6	1
Santa Cruz	4	11	0	4	0	2	1	1	8	0	0	1
Southern Sierra	2	7	1	2	2	0	1	3	9	0	1	3
Kings Basin	14	0	0	15	7	0	1	1	6	2	1	10
Gateway	24	0	0	2	0	0	0	0	0	0	0	0
WVCV	12	12	2	16	0	4	1	1	14	1	1	10
SAWPA	67	11	5	56	0	3	3	5	22	5	0	14
San Diego	2	4	1	5	1	2	4	0	6	2	0	0
S. Orange County	12	3	1	9	0	1	0	0	9	2	0	0
Coachella Valley	9	3	6	3	1	5	1	1	1	7	0	8
Mojave	7	7	0	13	1	5	0	1	1	0	0	50
TOTAL	247	64	27	208	18	66	26	31	130	19	22	129

Notes

- 1) Participant data for all regions except Santa Ana represent those agencies and individuals counted in the estimates of "network size" in Table 5.3. For SAWPA, data from stakeholder lists in the IRWM plan were used (probably an over-estimate) because documentation of who regularly attends meetings was not available.
- 2) Some special districts have multiple purposes, which are often not reflected in their names. Whenever possible, agency websites were reviewed to identify these multiple purposes. This is reflected in this table, such that some agencies are counted more than once. Special districts that fall into categories other than those shown here are included under "Other." Mutual water companies, although they are private entities, are included here under "Water Supply."
- 3) This category includes industry associations, consultants, media representatives, fire protection districts, parks and recreation districts, and other non-profits.

counties, some community service districts, some flood management and reclamation districts with water supply responsibilities, and others. Based on these numbers, water supply interests appear to play a dominant role in the IRWM process. While a fair number of sanitation districts participate, relatively few flood management agencies do so. A separate analysis of IRWM regions in the Central Valley, one of the most flood-prone areas of the state, also revealed low participation by flood management interests (Conrad, 2014). The number of irrigation districts participating in regions with significant agriculture is surprisingly small, suggesting that IRWM planning may not be engaging many of those holding the most senior water rights; further research is needed to assess this. Environmental groups are by far the most frequent non-governmental participants, suggesting that environmental priorities are being discussed in IRWM planning processes. However, many of these entities serve on advisory committees rather than decision-making bodies. A small number of social justice oriented NGOs participate, usually advocating on behalf of disadvantaged communities. A few regions, particularly North Sacramento Valley, have significant participation from individual landowners.²⁵

²⁵ As part of its strategic planning process, DWR analyzed the participants in all 48 IRWM regions (DWR, 2015c, Table 5). DWR used different categories to classify participating entities, and based its analysis on the stakeholders listed in IRWM plans. The numbers differ, but reflect similar patterns.

Network management in IRWM regions

As described by Klijn, Steijn, and Edelenbos (2010), network management includes four main types of activities: 1) exploring content (i.e., supporting research, identifying stakeholder perspectives); 2) structuring interactions, such as through the creation of committees or workgroups; 3) developing process rules, such as routines for meeting and procedures to join or leave the network; and 4) connecting actors, including engaging new members, coalition building, and mediation. Table 5.6 identifies the types of activities that IRWM regions undertake within these four categories, according to four main stages in the IRWM planning process: forming a region, developing an IRWM plan, requesting grant funds, and on-going regional management. The table highlights the fact network management activities involve frequent interaction with state government and the guidelines it has established. These activities, shown in italics, occur at every phase of the process.

In this section, I discuss the nature of network management activities at the regional level, explore the role of consultants in accomplishing these tasks, and assess the level of investment that IRWM regions have been making in supporting regional management.

Key network management activities

Interviews with individuals involved in carrying out these activities in IRWM regions highlighted three types of activities that account for most of the time spent on network management: 1) organizing meetings; 2) conducting outreach; and 3) writing IRWM plans and proposals. All three have the potential to provide opportunities for learning. However, whether or not learning takes place depends upon how these activities are carried out, some of which require specific skills and knowledge that may be new to public agencies involved in the IRWM process. As later sections of this chapter will describe, establishing the network structure that can support staff members who have these skills can be a challenge in the institutional context being considered here. Further, the manner in which these activities are conducted is also strongly informed by requirements in DWR's IRWM guidelines, which may constrain learning. This section discusses what these three activities involve, the constraints IRWM regions often face in undertaking them, and the kinds of tensions that arise between complying with IRWM guidelines and managing a collaborative process that can stimulate learning. Chapter 7 will specifically explore how network managers balance the tensions.

Organizing meetings. An IRWM process involves meetings of many kinds. Meetings of governing bodies and advisory committees may occur anywhere from once a month to once each quarter. In addition, many regions organize subcommittees or workgroups focused on particular tasks, such as outreach, budget issues, governance, sub-regional needs, or the management of a project selection process for a particular grant opportunity. Regions may also hold periodic workshops on specific topics, particularly during the process of updating an IRWM plan.

Table 5.6. Network management activities in IRWM regions.

Components of network management (Klijn et al. 2010)	Forming a region	Developing an IRWM plan	Requesting funding	On-going regional management
Exploring content	Discuss mutual interests and opportunities	<i>Understand DWR's requirements</i>	<i>Learn about proposal requirements</i>	Monitor new issues in the region
	<i>Understand DWR's requirements</i>	Hire consulting teams to conduct research on regional issues		Explore new grant opportunities
	Build a shared vision for a new IRWM region	Discuss and define regional objectives		<i>Monitor updates to IRWM program</i>
Structuring interactions	Convene planning meetings	Hire consultants, facilitators to manage plan development	Convene meetings to discuss proposal opportunities	Convene regular meetings of governing bodies
	<i>Develop relationships with DWR staff</i>	Convene regular meetings	Communicate with neighboring IRWM regions about their plans to request funding	Coordinate updates to IRWM plan
	<i>Submit Regional Acceptance Process application</i>	Create and support working groups	Support agencies in developing project materials and coordinate timely submission	<i>Manage invoicing and grant reporting requirements</i>
	<i>Write proposal to DWR for a Planning grant</i>		Hire consultants to write proposal	Engage in joint planning with neighboring IRWM regions
			<i>Submit proposal to DWR</i>	
Developing process rules	Agree on basic governance structure	Confirm governance structure and membership criteria	Develop process for agreeing upon which projects to include in proposal	Revise governance structure as needed
	Establish who will be responsible for key tasks	Develop project prioritization process	Develop process for supporting agencies in developing project materials	
		<i>Ensure compliance with DWR requirements</i>		
Connecting actors	Outreach to initial participants	<i>Identify stakeholder groups with which DWR requires engagement</i>	Facilitate communication between agencies to develop integrated projects	Continued efforts to engage new stakeholder groups
	Hold meetings with neighboring IRWM regions	Engage stakeholder groups in the process	Mediate conflicts over choice of projects	On-going support to DAC and tribal participants
		Specific outreach and discussions with DACs and tribes		Maintain website
		Develop website		
		Call for project submissions		

Italics indicate activity that requires engagement with state government

Managing meetings effectively requires both administrative tasks as well as strategic thinking and leadership. The administrative aspects are often the most time-consuming. As one coordinator described the process:

This involves meeting amongst ourselves [staff at the lead agency], developing the agenda and any attachments, and packaging and distributing them to the Board and [other member organizations], and to the general public email list that we have. We also send them to City Council members, the Farm Bureau, and others. On the day of the meeting, you need to bring the [agenda packets], put up signs, take them down, etc. After each meeting, you write up the minutes, which need to be approved at the next

meeting...We operate under the Brown Act, which means everything is public. So, this is a lot of work.

Most IRWM regions follow the provisions of the Brown Act, a California law enacted in 1953 to ensure that government agencies conduct their business in public. The Act contains a number of requirements, including ensuring that meetings are publicly announced a certain number of days in advance, agendas are made public, time is allowed for public comment, and meeting records are publicly available (League of California Cities, 2010). While IRWM guidelines do not explicitly require IRWM regions to follow the Brown Act, most public agencies involved in the IRWM process do so as a matter of routine. While the effort that agencies expend in complying with the Brown Act does provide a consistent baseline of public accessibility to decision-making processes, it by no means guarantees a robust stakeholder engagement process. On the contrary, some research has suggested that these mandated public participation processes do little to generate new ideas and productive dialogue, but instead are used by public agencies to generate support for pre-determined policies and often result in increased frustration among members of the public (Innes & Booher, 2004). Meaningful participation requires a very different approach, partly enabled by the outreach efforts described below.

The skills required to conduct meetings effectively are not purely administrative. They also require strategic thinking to plan effective agendas, and skills in meeting management skills and negotiation. As one consultant who has worked with multiple IRWM regions put it, “You need to have a certain level of capability beyond admin staff...[They] can organize meetings, take notes, etc., but you need someone to set agendas and priorities.” In some regions, support for agenda-setting and meeting facilitation is provided by facilitators from the Center for Collaborative Policy, or other meeting facilitation experts. However, these facilitators are only available for the period of their contract, and rely upon agency staff to implement decisions. Thus, on-going regional management requires staff with the ability and time to substantively engage in the process. One participant from an IRWM region that, due to their own limited staff availability, had contracted with another organization to provide administration support commented, “Some of these other groups have a staff that can do things and bring it back to the board. [Our region] doesn’t have that...Yes, [our contracted coordinator] will help facilitate the meetings and keep us organized...But they are more of an administrator. We need staff who can get into the issues.”

Conducting outreach. In many regions, the IRWM process is the first context in which some participants have worked with one another. Even in regions where some participants had previously collaborated, IRWM guidelines required them to consult with a wide range of stakeholder groups, including non-profit environmental and social justice organizations, which have not been regular partners for most water agencies. Thus, a crucial element of managing an IRWM region involves identifying and contacting relevant stakeholder groups, organizing meetings to discuss their involvement, and maintaining these connections through on-going communications. Such efforts to promote diverse participation in a collaborative process are crucial to supporting learning (Heikkila & Gerlak, 2013).

All regions conduct outreach during the process of developing or updating an IRWM plan, in keeping with DWR requirements. This often takes the form of a series of public workshops focused on different aspects of the plan, accompanied by specific outreach to local water agencies, irrigation districts, towns, non-profit organizations, and businesses to invite their participation. While this is labor-intensive, several coordinators noted how important individual contact really is. For example, one consultant commented, “If you’re getting an email inviting you to the IRWM meeting, you might not go because you don’t know much about it. So, the personal invitation, explaining what it’s about, is really helpful.” Other respondents noted the importance of not simply inviting stakeholders to IRWM meetings, but showing up at their meetings. One regional coordinator described the outreach they conducted in order to engage smaller communities in their region as encouraged by DWR: “We went on a roadshow...We spoke at an obscene number of water districts and community service districts. It was really hard. But some of them did get involved.” The challenge for many regions is sustaining these outreach efforts beyond the plan development process. Stakeholders who come to planning meetings may not remain involved without continued outreach and a forum through which to participate. Advisory committees provide one means for stakeholders to continue to participate and contribute to decision-making. However, organizing these committee meetings, and continuing one-on-one dialogue with participants, requires dedicated staff time.

IRWM guidelines particularly emphasize outreach to disadvantaged communities (DACs) and tribes, which not only requires additional time, but also special expertise. Many water agencies do not have previous experience engaging with DACs or tribes, and do not have the relevant knowledge or skills in the types of outreach required to meaningfully engage these communities. In some regions, there is limited trust between water agency staff and local community representatives, who often feel that their interests have long been overlooked. One coordinator of an IRWM region, who worked for a wholesale water agency, described the response he received when visiting one disadvantaged community to seek their involvement. “They saw this as a threat. They also took offense at the terminology of DAC. We revised it to be “underserved,” but that still didn’t work... they thought we were trying to get money for our own project...They wonder, why would [the water agency] do this?”

Another barrier to investment in DAC outreach is the narrow geographic and functional mandates of special districts and cities. When disadvantaged communities fall outside of these boundaries, agencies often feel constrained in providing them with support. One coordinator described the problem as follows:

If we want to engage [DACs], we’d have to go there a lot, every week or month, show up every time, and figure out what we could do. But then, our own agency would say, why are we doing this? It’s not our goal. That is the other problem we face – our own internal hurdles to do this. Our management doesn’t think we should be doing all this outreach. They think we should do public meetings and all, but that going out to visit other groups is going overboard.

Recognizing that DAC outreach involves specific challenges, DWR funded pilot studies in seven IRWM regions to assess the needs of these communities in different settings, and identify lessons learned in how to build successful engagement. Several of these studies indicate that water agencies need to move beyond their traditional outreach strategies in order to be successful. For example, the report on the Greater Los Angeles County (GLAC) IRWM region's pilot study states:

Outreach to communities can be challenging for [water] agencies. Often contact between agency staff and the public is managed through elected boards and representatives, or handled directly only through billing or mailed outreach material. Disadvantaged communities often lack connections to formal networks or civic institutions. [Water] agencies need assistance to bring the appropriate capacity to bear on the challenge of engaging disadvantaged communities. (Antos et al., 2013, p. 4)

The Kings Basin IRWM region's DAC pilot study similarly found that different modes of outreach were needed, requiring significant investment. For example, a number of DAC communities in this region - such as mobile home parks with only a dozen residents - are extremely small and isolated, face language and educational barriers, have limited technical knowledge, and little to no resources to hire consultants to identify their problems (KBWA, 2013, p. 17). Engaging such communities is not simply a matter of inviting representatives to participate in IRWM meetings; it involves helping these communities identify their own needs, thinking proactively about how the IRWM process can help, and assisting these communities in developing project proposals.

Engaging tribes in the IRWM process is also challenging for many water agencies. Tribes are not typical "stakeholders;" they interface with state and local agencies as sovereign nations. In 2011, Governor Brown's Executive Order B-10-11 created a Tribal Advisor in the Governor's office to encourage the practice of "government-to-government consultations" between state agencies and tribes. Most state agencies, including the Natural Resources Agency within which DWR operates, have established a tribal Consultation Policy to guide consultation processes. IRWM regions are required to seek engagement from tribes within their regional boundaries (DWR, 2012, p. 22). However, IRWM participants are not always familiar with the concerns of tribes, or with how consultation processes can be conducted in ways that respect their sovereignty. A UC Davis study of tribal engagement in the IRWM process found that many tribes were frustrated that they have not been included in more meaningful ways. At the same time, the study notes, "Many IRWM practitioners simply do not know how to effectively engage tribes, or are reluctant to do so out of fear of doing something wrong," (Dolan, 2013, p. 20).

The findings of the DAC pilot studies and the UC Davis study on tribal engagement suggest that non-profit organizations can bring the necessary community contacts, skills, and knowledge for effective outreach. They can also serve as mediators when there is limited trust between water agencies and communities (CVRWVG, 2014, KBWA, 2013, Antos et al., 2013). At the same time, however, these studies also acknowledge the need for IRWM regions to allocate staff time to manage outreach and provide technical assistance to DACs

and tribes. The Greater Los Angeles County IRWM region has employed a full-time DAC outreach coordinator for several years now, and the Kings Basin Water Authority is exploring potential funding sources to do the same (KBWA, 2013, Antos et al., 2013). Recommendations that emerged from a workshop focused on sharing lessons learned through the seven pilot studies emphasize the need for liaisons or coordinators at the regional level focused on DAC needs, and call for the state to share in the costs (Drew et al., 2015).

Aside from the seven regions that received funds for DAC pilot studies, many IRWM regions invest relatively little in on-going DAC outreach and technical assistance. During IRWM strategic planning workshops held during 2013, IRWM participants expressed a need for greater DWR resources to enable IRWM regions to effectively engage DACs and tribes (DWR, 2013c, 2014b). While recognizing this need, DWR has so far lacked the funding to respond. However, in the \$510 million of IRWM funding approved through the passage of Proposition 1 in 2014, some funds have been set aside for supporting DAC involvement in IRWM planning. In addition, DWR is establishing a Stakeholder Engagement Advisory Committee, which will provide guidance on how DWR can better support IRWM regions in including a broad range of voices in planning. These changes are one example of how DWR itself has learned through the IRWM process.

Writing IRWM plans and grant proposals. The focus of most of the meetings and outreach conducted by IRWM regions is on writing or updating an IRWM plan, and developing proposals to obtain IRWM grant funds. Previously, most agencies conducted their own planning processes, and submitted their own grant proposals to the state. Under the IRWM process, participants in each region must write a single plan encompassing all regional water issues and prioritize projects necessary to implement the plan. Then, in response to each IRWM grant opportunity, they must work together to agree upon which projects include in a single, consolidated proposal that is submitted to DWR. One of the core ideas behind the IRWM process was that by interacting with one another in developing plans and proposals, agencies and other stakeholders would begin to learn from one another and develop new, more holistic approaches to water management.

However, the writing of plans and proposals must be carried out according to specific guidelines established by DWR, which are highly complex and change frequently. Standards for writing IRWM plans were first issued in 2004, and were updated in 2010 and again in 2012. After the 2012 update, DWR reviewed all plans for compliance, and this process had its own set of guidelines. In addition, there have been a total of eleven rounds of grant proposal solicitations between 2004 and May 2015, and each of these also has specific guidelines.²⁶ For each planning process and grant proposal round, DWR issues draft guidelines and holds public workshops for IRWM participants to get their feedback before issuing final guidelines. Additional workshops are often held to answer questions about

²⁶ This includes three rounds under Proposition 50 (one planning and two implementation grant rounds), and six under Proposition 84 (two planning, three implementation, and one drought grant rounds), and two under Proposition 1E (two implementation grant rounds).

guidelines. Once preliminary funding recommendations are issued, DWR again holds public meetings to gather feedback before finalizing grant awards.

Simply developing an adequate understanding of these changing guidelines requires a considerable investment in reviewing drafts and attending public meetings. Even with this knowledge, writing IRWM plans and grant proposals in compliance with them is extremely time-consuming. Most IRWM plans take over a year to prepare, and grant proposals take several months to write. Interviews with IRWM participants overwhelmingly indicate that complying with these requirements takes an enormous amount of time and resources. As one staff member who has served as an IRWM regional coordinator commented, “The IRWM is by far the most laborious and difficult and labyrinthine process – exponentially more time consuming than any other funding source. It has taken so much staff time – was it really worth it to spend thousands of hours?” Since regions were formed at different times, updates to guidelines do not always come at convenient times. One coordinator commented, “DWR keeps putting out new guidelines. We were three-quarters of the way through [developing our plan], and DWR came out with a new Guideline Compliance review process that added 2-4 months...People are feeling discouraged at the increasing complexity of DWR requirements.” This complexity has made it difficult for newcomers to participate in the process. The comments of one IRWM coordinator capture this well:

I think the IRWM process is made for career public servants, for people who have been doing public planning for a long time. It is very difficult if you are new to this – it’s hard to even figure out what people are talking about [at meetings]. It’s really difficult if you are a DAC, or anyone else who has not been working on it for awhile. There is a long learning curve to figure out how to structure a project to have some chance of scoring high, and to maybe get some money.

In addition, plans and grant proposals have become increasingly standardized. One coordinator commented, “DWR has made this process so cumbersome...The application we submitted [most recently] was 1000 pages. I just feel that it’s not necessary...At this point, there are so many regulations about everything, I think it is not so local anymore...It is almost beyond some of the attendees’ knowledge or willingness to participate...It has become a cookie cutter state thing.”

All of this suggests that the complexity of these rules poses challenges in enabling a collaborative process that supports learning. At the same time, it is important to note that while the frequent updating of IRWM guidelines imposes significant burdens on IRWM regions in terms of assuring compliance, this iterative process also provides opportunities for learning on the part of DWR. Regional staff and consultants have regularly provided input on the implementation of the guidelines, and over time, this has led to some changes. For example, in response to feedback from IRWM regions, DWR has reduced the complexity of cost-benefit analysis requirements for small projects or those intended to address the DAC needs (DWR, 2012, p. 44).

The growing role of consultants

Given the limited staff at most local public agencies, IRWM regions have increasingly relied upon consultants to provide them with the knowledge, expertise, and labor needed for compliance with IRWM guidelines. Out of the 19 regions studied, in only two have public agency staff members written the IRWM plan. All other regions have hired consulting firms to write their plans, and to organize the many meetings and public workshops involved. Most regions also hire consultants to write their grant proposals. According to a survey of IRWM regions conducted in 2011 by the Roundtable of Regions, 19 out of 21 regions that responded to the survey hired consultants to help prepare an Implementation grant under Proposition 84. The average cost of these proposals was \$114,000, and consultant fees represented two-thirds of this cost (RoR, 2011). In some regions, consultants have also been hired on an on-going basis to carry out the administrative aspects of managing the IRWM process as well as to conduct outreach.

This reliance on consultants is not unusual in the water management community in California, and is consonant with broader trends in public agencies across the United States (Milward & Provan, 2000, Terry, 2005). Yet, it has important implications for how network management is carried out, and for learning. In some cases, consulting firms have served as a neutral third party, and are better positioned to convene dialogue among diverse water interests in a region than would be a large public agency that is not trusted by other participants. In this manner, consultants may play a positive role in supporting learning within regions. In addition, since consulting firms are often involved in more than one IRWM region, they can transfer lessons learned from one region to another.

However, in some cases, heavy reliance on consultants may limit learning. One IRWM participant commented that in the IRWM program, “there’s funding available for consultants, and [they] do a good job, but then they are gone, and you lose that institutional knowledge.” Interview evidence from consultants themselves suggests that the key to avoiding this outcome is for a public agency staff to work closely with consultants in the plan or proposal development process. One consultant interviewed was involved in developing the first plan for a particular region as well as an update to the plan several years later. He reflected on the difference it made when the lead agency included its own staff in updating the plan:

The first time, [the plan] was heavily consultant generated...this time, [the lead agency’s general manager] wanted lots of support and leadership from the consultants, but he wanted to develop his staff as part of the process. So, [he told us], we know you could probably do this faster if you just did it [yourselves]. But we don’t want to do it that way. We want a project team...where the staff have hands-on responsibility for developing the plan, along with the consultants...And they have – they have really bought in, they have been participating on a regular basis, they’ve helped run meetings, we’ve had [lead agency] staff running public outreach meetings and disadvantaged community conversations...So when we walk away from there, they will feel like this is our plan, we made this plan – they have ownership in it.

Thus, while consultants can help relieve administrative burdens and assist regions in complying with complex IRWM requirements, in order for the process to be more than simply an exercise in compliance, agencies managing an IRWM process must dedicate staff time to managing the work of consultants, and being involved in the management process themselves. This finding is echoed in literature on collaboration, suggesting that the sustained presence of a coordinator is crucial to success. For example, Margerum (2002) found in his study of river catchment committees in the United States and Australia that insufficient funding for coordinators was perceived by participants as one of the most important barriers to success. Margerum comments that coordinators “were not simply there to facilitate a process, they were like program managers – an integral part of the institutional history and institutional structure created for consensus building and implementation,” (2002, p. 246). Further, 60% of the studies reviewed by Leach and Pelkey (2001) indicated the “importance of managerial assets such as funding and effective leaders, facilitators, or coordinators” in contributing to the success of watershed partnerships (p. 383).

Assessing degrees of investment in network management

Given the importance of these network management activities for supporting learning in IRWM regions, it is important to assess the level of investment that IRWM regions are making in them. To do this, an estimate was made for each of the 19 regions of the percentage full-time equivalent (FTE) of staff time dedicated on an on-going basis to managing the IRWM process. The above discussion suggests that time dedicated to network management is likely to be a better indicator of effective network management than the time dedicated by consultants, unless these consultants are contracted for the long-term. Staff time is also a more relevant indicator than the amount of funds involved, because network management activities are often not explicitly budgeted for, but are simply added to the responsibilities of existing staff members. Yet, estimates of staff time are also uncertain. The amount of staff time dedicated to network management varies over time; for example, when a region is updating its IRWM plan or developing a new grant proposal, significantly more coordination, outreach and negotiation takes place compared to times between grant proposals. Further, tasks are often dispersed across multiple staff members and consultants, and sometimes across multiple agencies.

Estimates of staff time dedicated to network management were primarily based on data from interviews with staff members involved in these activities. During interviews, staff members were asked how many staff members were involved in managing the IRWM process, and how much time each spent on these activities, on average. In some regions, interviews were conducted with multiple people involved in the process, and in these cases, an effort was made to triangulate this information. Several biases may exist in these estimates. Some of the staff members felt that they do not receive adequate recognition for the amount of time and effort they invest in coordination activities, and it is possible that these respondents may have over-estimated the amount of time invested. However, it seems equally possible that, given that these activities are often dispersed across numerous individuals, not all of whom were interviewed, that the level of investment may also be under-estimated in some cases. In order to account for these uncertainties, investment in

each region is reported as falling within one of three broad ranges: less than 50% FTE, between 50-100%, and more than 100% FTE.

This analysis revealed a range of investment levels. Eight regions dedicate less than the equivalent of a 50% time staff member to managing the regional process, four dedicate 50-100% staff time, and seven regions have the equivalent of more than one full-time staff member focused on managing the regional process. In most cases, these estimates reflect the efforts of multiple staff members within a given region. In a few regions, such as the North Coast, time contributed by consultants who are working under long-term contracts to support the regional process. The Santa Ana Watershed Project Authority (SAWPA) is by far the most heavily staffed IRWM process, with a total of 22 employees working for this regional organization, including six full-time staff in its planning department. In contrast, the Mokelumne Amador Calaveras (MAC) IRWM region employs a 25% time coordinator.

What explains such a wide range of investment levels in regional coordination? I explore this in the next two sections. First, I examine how these regional networks are structured to support network management activities, and show that more centralized network forms are associated with higher levels of investment in network management. I then examine the specific organizational settings within which these different network forms have emerged, and assess the conditions that may support the formation of one form over another.

Structuring network management in IRWM regions

The framework provided by Provan and Kenis (2008) is useful for analyzing the relationship between network structure and investment in network management activities. It suggests that more centralized network structures can enable a network to dedicate more resources and time to management activities, and that this is likely to be needed when participants are numerous and have diverse interests, when initial levels of trust are low, and when tasks are complex. In these situations, a network is likely to be organized around the leadership of a single organization. In a “lead agency” mode, this organization is a member of the network, and plays a coordinating role in addition to acting in its own interests as a network member. In a “network administrative organization” mode, members form a new organization for the specific purpose of managing the network. On the other hand, in networks with less of a need for coordination – such as when only a small number of entities are involved, when they already have high levels of trust, are largely concordant in their interests, or joint tasks are relatively simple – a “shared governance” arrangement may be adequate. This occurs when several members of the network share responsibilities for network management activities. They might do this either by dividing up responsibilities amongst themselves, or by rotating in a leadership role.

IRWM regions involve participants with diverse goals, and regions must undertake complex tasks such as writing an IRWM plan and developing grant proposals involving multiple agencies. Following Provan and Kenis (2008)’s framework, we might expect to

Table 5.7. Indicators used for distinguishing network forms in IRWM regions

Network Form (Provan & Kenis 2008)	Characteristics	Indicators
Shared governance	No single entity serves in a coordinating capacity on an on-going basis	1. There is a formal or informal understanding among participants that the responsibility for coordinating the process is shared among all, or a subset of, participating organizations. 2. Sharing may occur by dividing up tasks, or by rotating in the coordinating role. 3. Some of the tasks of coordination may be delegated to a hired consultant, but ultimate responsibility for leadership of the process is shared among participants.
Lead agency	A single entity, which is also a member of the network, serves as in a coordinating capacity	1. An agency that is a member of the regional process dedicates staff time to managing the network. 2. This agency's leadership role is recognized, either formally or informally, by other participants in the process. 3. A lead agency may hire consultants to manage the process, but commits to supporting these consultants on an on-going basis and continue to play a leadership role.
Network admin organization	A single agency is created to focus on managing the network process	1. Mandate of the coordinating organization is focused on managing the network 2. The staff of this agency, or consultant hired on a continuous basis, primarily dedicate their time to managing the network

find that most IRWM regions would develop centralized structures, either following a lead agency or a network administrative organization model. This section presents results of an analysis of IRWM regional structures and the relationship with investment in network management activities.

Analysis of IRWM regional governance structures

Indicators were developed to distinguish between shared, lead agency and NAO network structures among the 19 sample IRWM regions, as listed in Table 5.7. To the extent possible, this categorization reflects how each region supports network management activities in practice, rather than simply how they describe this in their IRWM plans. While governance documents such as IRWM plans and memoranda of understanding were consulted for each region, interviews with coordinators in each of the 19 regions were used to confirm how responsibilities for network management activities have been allocated in practice.

In categorizing regions as shared, lead agency or NAO forms, several nuances emerged. First, it might seem that the formation of a Joint Powers Authority (JPA) indicates that a region is following an NAO form. However, these regions were only classified as such if the JPA actually hired staff, or at least long-term consultants, to conduct network management

Table 5.8. Governance forms and network size

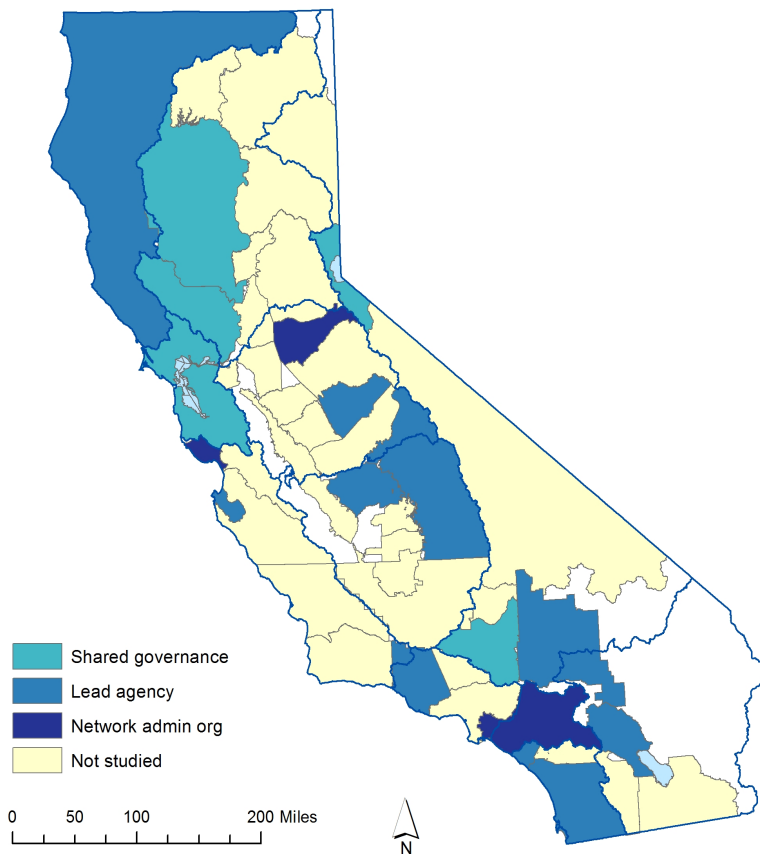
Governance form	IRWM Region	Total estimated network size	Average size
Lead	North Coast	101	50
	Watersheds Coalition of Ventura County	81	
	Mojave	75	
	Kings Basin	57	
	South Orange County	44	
	Coachella Valley	37	
	San Diego	34	
	Southern Sierra	32	
	Monterey Peninsula	22	
	Yosemite-Mariposa	16	
NAO	Santa Ana Watershed	120	51
	Santa Cruz	35	
	Gateway	26	
	Mokelumne-Amador-Calaveras	21	
Shared	San Francisco Bay Area	84	41
	North Sacramento Valley	37	
	Westside Sacramento	36	
	Tahoe-Sierra	30	
	Antelope Valley	18	

activities. For example, both the Gateway and Kings Basin IRWM regions formed JPAs. However, the JPA in the Kings Basin does not have its own staff; instead, the Kings River Conservation District (KRCDD), a member of the regional process, was hired to manage the process, making this a lead agency region. In the Gateway IRWM region, the JPA hired an independent consultant, not affiliated with a member of the network, to manage the process on an on-going basis. Gateway is thus categorized as an NAO form.

Second, a common way to share network management tasks in shared governance regions is for participating agencies to split the cost of hiring a consultant to conduct administrative, outreach and other activities. For example, the Westside Sacramento and San Francisco Bay Area regions have relied on consultants who have been hired on a temporary basis for specific tasks, such as completing an IRWM plan, organizing meetings, or conducting outreach. Instead of agencies each dedicating portions a staff member's time, they all chip in to hire a consultant to play this role. However, ultimate responsibility for managing the network remains shared across these agencies, making these an example of shared governance. In lead agency regions, the role of consultants is managed differently. For example, in the North Coast and San Diego regions, consulting teams work under long-term contracts, and the lead agencies retain ultimate responsibility for managing the process.

Finally, the structure of some networks has evolved over time. This analysis is based on interviews conducted in 2013-2014, but some regions now appear to be in a process of transition. For example, Antelope Valley's IRWM process has been informally supported by Los Angeles County Water District 40, but this agency has actively stepped back from leadership in order to ensure that it is not perceived as dominating the process. At the time

Figure 5.1. Network governance forms in 19 IRWM regions.



of this analysis, informal contributions from participating agencies were being used to support consultants who are largely responsible for managing the process. Thus, Antelope Valley was classified as a shared governance arrangement, but this may change over time.

The results of the analysis of the governance structures of the 19 sample IRWM regions are presented in Figure 5.1. A lead agency structure is most common, with ten out of 19 regions following such an arrangement. Five regions follow a shared governance arrangement, and four represent NAOs. Table 5.8 lists the regions according to network size, and indicates the average network size for each of the three forms. The average size of shared governance regions is smaller, at approximately 40 members, compared to lead and NAO forms, which average 50 and 51 participants, respectively. This suggests that IRWM regions conform somewhat to Provan and Kenis (2008)'s hypothesis that shared governance arrangements are more likely to emerge in smaller networks. This relationship would be much stronger if the Bay Area, one of the largest IRWM networks, did not follow a shared arrangement. However, the fact that governance of the Bay Area region is shared suggests that other factors in addition to size may be at play in determining the choice of governance modes. The next section of this chapter will take a closer look at the context in

Table 5.9. Time invested in network management v. governance mode

Staff time invested (% FTE)	Shared governance	Lead agency	Network admin org
Less than 50%	5	2	1
50 - 100%	0	4	0
Greater than 100%	0	4	3

Table 5.10. Financial support for network management v. governance mode

Source of support for coordination	Shared	Lead agency	Network admin org
Informal member contributions	5	0	1
Lead agency support	0	5	0
Formal membership dues	0	5	3

which shared, lead agency and NAO governance forms have emerged, and at the institutional factors that appear to be at work.

Relationship between governance mode and investment in network management

When data on levels of investment in network management are examined across the three categories of network structures, a clear pattern emerges, as shown in Table 5.9. Shared governance arrangements are more likely to dedicate less than 50% FTE to network management activities, and lead agency and NAO arrangements are more likely to fall within the 50-100% or over 100% FTE range. This aligns with Provan and Kenis (2008)'s assumption that centralized network forms offer greater capacity for network management activities.

Among the 19 IRWM regions, lead and NAO regions also tend to have more stable arrangements for funding network management activities. Through interviews and a review of IRWM plans, data were gathered about how each region has found the resources to pay for staff and long-term consultants to sustain network management activities over time. Most regions received a planning grant from DWR to write their first IRWM plan, and some also received an additional grant to update that plan according to new guidelines issued in 2010 and 2012. These grants often included funding to support coordination, outreach, and staff or consultant time to write the plans. However, they required local agencies to match at least 25% of funds received, and once the grant funds were expended, regions had to find a way to sustain these coordination activities. DWR's 2012 guidelines require that regions explain how the implementation of their IRWM planning process will be financed, including funding for projects and programs over the 20-year planning period (DWR 2012, p. 21). In response to this standard, many IRWM plans include a discussion of how coordination efforts will be sustained financially. In addition, interviews with coordinators of IRWM regions included questions about how their work is supported.

Analysis of these data revealed three broad approaches among IRWM regions for sustaining the IRWM process. First, some have developed membership dues structures to cover basic costs of managing the regional process. Dues vary considerably in size; South Orange County's dues are \$3,000 per year for each of the 20 members, while in the San Diego IRWM region, the three RWMG members pay approximately \$100,000 each per year. Some regions have tiered membership dues, in which larger entities pay more than smaller ones. While formal membership dues can provide stable financing for IRWM regions, they can also conflict with DWR guidelines requiring that all groups be allowed to participate, regardless of their ability to pay. Some regions, such as Gateway, have addressed this by developing systems through which non-profit agencies or lower-income communities can participate as full members without making a contribution. Other regions, such as the Kings Basin, have created a separate category of membership that is advisory in nature, but for which contributions are not required.

A second approach involves a single member agency contributing significant funding to support the on-going management of the regional process. As one might expect, these are regions following a lead agency model. In these situations, this lead agency allocates and pays for staff time, provides funding for outreach, and even hire consultants on a long-term basis. Finally, a third approach is for participants to make informal, one-time contributions, either of funding or in-kind staff time. Since these contributions are not made as part of a long-term agreement for funding the IRWM process, the stability of this arrangement is lower than the first two approaches.

Table 5.10 shows that NAO and lead agency governance forms tend to have more stable financing arrangements for supporting network management activities than do shared governance regions. This suggests that in addition to dedicating more time to network management, NAO and lead agency regions are more likely to be able to sustain these activities over time than are shared governance regions.

Explaining the diversity of governance forms among IRWM regions

Provan and Kenis (2008)'s framework focuses on a core challenge involved in establishing a collaborative network: creating capacity for managing the interface between all actors involved, such that the network becomes viewed as legitimate internally and externally, and can be sustained over time. Given the nature of the IRWM process, which calls for numerous actors with diverse interests to undertake complex tasks together, Provan and Kenis would likely expect that such networks would be best structured in a centralized manner, following either a lead agency or NAO form. Yet, five out of 19 IRWM regions studied have chosen a shared governance approach. This section explores the conditions under which this diversity of governance forms among IRWM regions has emerged. It examines the types of entities that have taken on the network management role in lead or NAO regions, and the reasons why shared governance regions have not appointed a single entity to manage the process. This section highlights that within California's highly

Table 5.11. Characteristics/roles of lead agencies

IRWM region	Lead agency name	Type of agency	Agency mission	Staff dedicated to IRWM regional management (as of 2014)
North Coast	Sonoma County Water Agency	County water agency	Water supply, flood protection, wastewater, environment; land use, watershed mgmt	Part-time staff position at SCWA, supported by consulting team on long-term contract
Yosemite-Mariposa	Mariposa County Resource Conservation District	Resource conservation district	Resource conservation through cooperation with landowners	3 days/week staff time
Monterey Peninsula	Monterey Peninsula Water Management District	Water management district (Special Act)	Water supply (surface and ground), stormwater, water conservation, watershed protection	10-20% time staff member
Southern Sierra	Sequoia Riverlands Trust	Non-profit organization	Land and resource conservation	Project coordinator at less than 50% time
Kings Basin	Kings River Conservation District	Water management district (Special Act)	Hydropower, groundwater, flood protection, environment	Two staff members at 50-60% time, portion of director's time
Watersheds Coalition of Ventura County	County of Ventura	County government	Land use planning, watershed protection, water supply	Part-time staff (approx. 2/3 FTE)
San Diego	San Diego County Water Authority	Wholesale water supply district	Water supply (wholesale), water conservation	85% time coordinator, plus part-time grant administrator
South Orange County	County of Orange	County government	Land use planning, watershed protection	Part-time coordinator, plus administrative assistance
Coachella Valley	Coachella Valley Water District	Water district	Water supply, irrigation, wastewater, stormwater, groundwater	40% time coordinator
Mojave	Mojave Water Agency	Wholesale water supply district	Water supply (wholesale), water conservation	50% time program manager, 75% admin assistance, plus portions of at least 10 other staff members

Sources: IRWM plans, lead agency websites, interviews

fragmented institutional landscape for water management, in which most agencies have relatively narrow mandates and have little history of working closely with one another, it can be a significant challenge to find staff and resources that can be dedicated to a neutral convening role at a regional scale.

Lead agency regions

Among the ten lead agency regions studied, a variety of types of lead agencies are represented: special districts or county water agencies focused on multiple aspects of water management, wholesale water agencies, county governments, resource conservation districts, and one non-profit organization. Table 5.11 provides an overview of these entities, their mandates, and the staff time they invest in network management. While they vary considerably in their roles and their scales, they share an interest in addressing problems that require involvement from multiple stakeholders. Most have sufficient staff resources to invest in leadership, but several lead agencies located in rural parts of the state have struggled with this. Interviews with coordinators working for lead agencies revealed that they have, for the most part, worked to maintain a neutral stance with respect to participants in the process.

Special districts focused on multi-purpose water management. Compared to many water-related special districts in the state, those that have taken on leadership of an IRWM region tend to have relatively broad mandates. For example, the mandate of the Sonoma County Water Agency includes water supply, wastewater, flood control, and environmental management. The Kings River Conservation District, the Monterey Peninsula Water

Management District, and Coachella Valley Water District have similarly broad mandates. Evidence from interviews suggests that these districts were able to take on management of an IRWM region in part because they viewed coordination of multiple stakeholders as part of their mission. A staff member at the Monterey Peninsula Water Management District commented, “My agency was a pretty obvious choice, because the state legislation that created us said we’re responsible for the integrated management of water resources in this region. Other agencies have jurisdiction over a particular aspect, but the water district has the facilitation/coordination role built into it.” A staff member of the Kings River Conservation District commented,

It’s something we do – we serve as coordinator, agent, convener, for lots of different types of water related entities in [this area]. People trust who [we are]...Not everybody has that umbrella regional agency. Frankly we don’t have a dog in a lot of these fights, we are just there to support and collaborate and bring people together to try to solve bigger problems.

This comment highlights trust as another important quality involved in establishing their role as network manager. The initial degree of trust between lead agencies and participants varies across regions. While KRCD appears to have started with a relatively high degree of trust among individual participants, in other cases – as will be described throughout this section – the IRWM process presented an opportunity to develop that trust.

Wholesale water agencies. Two lead agencies in the 19-region sample - San Diego County Water Agency and Mojave Water Agency – are large, wholesale water agencies. Also formed as special districts, their mandate is to deliver water to local retail entities. However, despite this focus on water supply, these two agencies have demonstrated a commitment to engaging with a broad range of water issues and stakeholders through the IRWM process, which has become embedded in their approach to water planning.

In the San Diego IRWM region, the San Diego County Water Agency (SDCWA), the County of San Diego, and the city of San Diego comprise the RWMG, and SDCWA has taken on the leadership role. Instead of retaining exclusive control over decision-making, in 2006 these three agencies established a 28-member Regional Advisory Committee (RAC) involving wide range of water stakeholders, many of whom are non-profit entities. In her remarks at the statewide IRWM conference hosted in San Diego in May 2015, the general manager of SDCWA described the RAC as essential to the region’s success, even though at the beginning, there was some apprehension. She commented, “When we said to water agencies involved that nearly half of the RAC positions will be filled by non-profit agencies, it was scary for them.” Yet, the RAC has become the primary forum for discussion within this IRWM region, and the three members of the decision-making body – SDCWA, the city and the county – have consistently followed its recommendations. They have also covered the costs of all grant proposals, including a wide range of participating agencies, thereby enabling small public agencies and non-profits to access IRWM funding.

Similarly, the IRWM process has become fundamental to the Mojave Water Agency's approach to water planning. Although MWA's mission is primarily focused on supply, it views its role in the IRWM process as broader, and is willing to invest in supporting the work of other agencies. MWA has dedicated significant staff time and its own funding toward establishing a process by which all key water stakeholders come together to identify, plan and seek funding for projects. A staff member commented, "Our role could shift between secondary and primary. [For example], we're not a wastewater reclamation entity, so another other group will do that, and our role shifts more to support of the integrated planning process."

For these two wholesale water agencies, the IRWM process has represented a significant change in approach. Instead of focusing only on the projects that they undertake themselves, they see it as in their interest to help other agencies obtain funding to achieve their missions. The participation requirements for the IRWM process have led SDCWA and MWA to build relationships with water stakeholders in their regions did not exist previously. As the general manager commented at the 2015 IRWM conference, "IRWM was really the step that forced, and also created, the opportunity to work together." SCDWA now views these relationships as a key benefit of their investment in the IRWM process. A SDCWA staff member commented, "IRWM in San Diego has brought together folks who normally only talk in court...That is probably the greatest benefit of IRWM - this idea of building collaboration between folks who didn't work together before." In the Mojave region, the IRWM program began during the late stages of a lengthy groundwater basin adjudication process that had created adversarial relationships between MWA and groundwater users. MWA saw the IRWM process as a way to re-build productive engagement.

County governments. Within the 19-region sample, two county governments are serving as lead agencies. In general, counties in California are involved in multiple aspects of water management, although sometimes indirectly. They have authority over land use, which is closely intertwined with water management even though land use and water management decision processes operate quite separately from one another. Counties also have a role in promoting coordination among the many local government agencies providing services within their boundaries. Local Agency Formation Commissions (LAFCos) have been established in each county to approve the formation, changes and consolidation of local agencies, while accounting for goals such as the preservation of agricultural lands and the prevention of urban sprawl (California Association of LAFCos, 2015). In rural parts of the state, counties may play a more direct role, serving by default as the entity responsible for water management in unincorporated areas.

However, the quality of the relationship between counties and local water districts or individual landowners can vary substantially. Counties are not always viewed as impartial actors, and this can affect whether a county government can be effective in managing an IRWM region. In Ventura County, the county's Executive Office has a long history of interaction with water districts and other stakeholders, and the county's role as coordinator of this IRWM region is broadly accepted. However, in another region, the

coordinator described how a low level of trust in the county led water stakeholders to choose another entity as coordinator: “There is some friction with the county among some of the local jurisdictions. Some of that is natural – local districts don’t like the county, the county doesn’t like the state...And it was perceived by some that the county would insert its own interests and shape how things go in terms of projects.” Another coordinator described how this lack of trust affected the way the IRWM region was managed: “[In 2009], we decided to pull the county out of the lead position and just have them as a member. Even though the county borders are the region’s, the county became one member, one vote. Nothing special. They can apply for grants like anyone else.” In addition, a county’s bureaucratic procedures may limit its flexibility, making it a poor network manager. “Even adopting the IRWM plan is hard for [the county],” one coordinator commented.

Resource Conservation Districts (RCDs). RCDs are another type of special district that is often well positioned to support the IRWM process. Formerly known as Soil Conservation Districts, RCDs in California are intended to promote resource conservation on public and private lands (CARCD, 2012). RCDs play an important role in working directly with landowners to develop conservation practices that are compatible with agricultural land use. There are 103 RCDs in California, each established under the rules of each county’s LAFCo, and many are closely associated with the county government (CARCD 2012). Within the 19 region sample, the Mariposa County RCD leads the Yosemite-Mariposa IRWM region. Its mission is to “encourage and facilitate cooperative solutions to local resources conservation issues and problems,” (Mariposa RCD, 2015). A staff member at Mariposa RCD commented that coordinating an IRWM region “fits our purpose...it gives us kind of a neutral position.”

However, many RCDs have quite limited resources, relying largely upon grants to fund staff positions. The Mariposa RCD spent several years seeking adequate funds to initiate the IRWM process, and eventually received start-up funds from the Sierra Nevada Conservancy as well as from the county. Some RCDs have been able to contribute to IRWM processes because they received funding for a staff position through the Department of Conservation’s Watershed Coordinator program. This program provided rare support to hire staff to coordinate stakeholder engagement processes related to watershed management. From the early 2000s until 2014, state funding supported approximately 50 watershed coordinators, hosted by RCDs, non-profits or other local agencies. Some of these coordinators have taken on the management of IRWM processes, or played important roles in facilitating connections between participants. However, in 2014, funding for watershed coordinators ended, and these regions have had to search for other funding to support IRWM coordination.

Non-profit organizations. Among the 19-region sample, one IRWM region is led by a non-profit. The Sequoia Riverlands Trust (SRT) took on the task of forming and leading the Southern Sierra IRWM region when no other entities stepped forward to do so. SRT focuses on promoting land conservation through direct management of preserves, purchasing conservation easements, and collaborating with landowners and local agencies. It describes

itself as a “regional non-profit land trust,” and has worked across five counties in the southern San Joaquin Valley and the Sierras (SRT, 2015). Although its focus is on land conservation, water management issues pervade SRT’s work, and the IRWM process seemed to be an opportunity to advance SRT’s land conservation mission through building partnerships across land and water interests. Since the regional process was initiated in 2008, SRT has dedicated its relatively limited staff resources and funding to coordinate meetings and lead the process of developing grant applications for planning and implementation grants. However, the region has struggled to secure funding, and for periods of time, SRT staff and other interested participants have volunteered their own time to continue the process. As a lead agency, SRT has sought to maintain a neutral role in the process. An SRT board member commented, “I hope we are perceived as honest broker. We are not taking a position as an environmental organization or an industrial group.”

Based upon interviews with staff at the two other non-profit organizations involved in leading IRWM regions in the state, non-profits often step easily into the role of coordinating a broad range of stakeholders, and usually have the necessary skill sets in facilitation and conflict resolution. However, they often lack the resources and in-depth knowledge of the state’s complex guidelines. All three IRWM regions in the state that are led by non-profits have struggled with receiving grant funds, and the grant applications of two of them were rejected because they did not adequately comply with the guidelines. While this may be partly due to a lack of experience in submitting grant applications to the state, a lack of adequate staff time and resources to hire consultants with the necessary expertise is a significant factor. Further, public agencies may not always view non-profits as legitimate representatives of the public interest, creating additional barriers for them in leading IRWM regions (see Chapter 4).

Network administrative organization regions

In four out of the 19 regions studied, participants decided to form a new entity that would take on the responsibility for managing the collaborative process at a regional scale. As shown in Table 5.12, three of these regions chose to form a Joint Powers Authority (JPAs), governed by a board composed of representatives from each of the member agencies. The Santa Ana Watershed Project Authority (SAWPA), a JPA formed by five counties, already existed when the IRWM program began, and served as a model in designing the statewide program. With 22 staff members, SAWPA is by far the most well-established and well-resourced NAO among IRWM regions. Its goal is to promote sustainable management of the Santa Ana Watershed, by providing “a stable regional leadership through creative professionals, and balance the needs of diverse interests in the watershed to accomplish significant programs and projects,” (SAWPA, 2015).

The other two JPAs leading IRWM regions are not nearly so large. Gateway IRWM Authority is composed of 19 cities and other local government agencies in southeastern Los Angeles County, and has one primary staff member (hired as a long-term consultant), who manages its operations. The Mokelumne-Amador-Calaveras region is managed by the Upper Mokelumne River Watershed Authority (UMRWA), which has six member agencies, and

Table 5.12. Characteristics and roles of network administrative organizations

IRWM regions	Lead or NAO agency name	Agency type	Agency mission	Staff dedicated to IRWM regional management
Mokelumne-Amador-Calaveras	Upper Mokelumne River Watershed Authority	Joint Powers Authority	Regional water planning, watershed protection, education	25% time coordinator, part-time secretarial assistance
Santa Cruz	Regional Water Management Foundation	Non-profit organization	Regional water planning	Full-time staff member, volunteer board members
Gateway	Gateway Water Management Authority	Joint Powers Authority	regional water planning	75% time coordinator, plus an administrative assistant
Santa Ana Watershed	Santa Ana Watershed Project Authority	Joint Powers Authority	regional water planning, project implementation	22 employees (6 in planning dept)

Sources: IRWM plans, lead agency websites, interviews

operates with the support of a quarter-time staff member who receives administrative support from one of the member agencies.

The fourth NAO region, Santa Cruz, decided to form a new non-profit organization to handle the administration and leadership of the IRWM process. The small steering committee that was in charge of forming and managing this IRWM region realized that they needed the capacity to manage grants and coordinate multiple stakeholders. As one committee member put it, “no single entity seemed to be the right choice. That is where the third party admin idea came up.” The Regional Water Management Foundation was created as part of the Santa Cruz Community Foundation, an entity that was already trusted by participants in the process. Initially, project grants provided the funding to support a full-time staff member for the RWMF, but when this funding ran out, the steering committee members for the IRWM process each contributed funding to help support this full-time position. The steering committee members serve as the board members of this non-profit.

The decision to create a new organization to manage the IRWM process involves a relatively significant commitment on the part of participants involved. Motivators for this vary across regions. When the responsibilities for regional planning and implementing regional-scale projects exceed to capacities of individual entities participating in the process, and problems are perceived as severe enough, participants may be motivated to create a new entity if they have resources available to do so. For example, SAWPA emerged in the 1960s when participants identified a number of large-scale infrastructure projects that they all needed, but could not undertake on their own. Some water agencies prefer to create a JPA, since this would shield them from liabilities associated with activities undertaken by the JPA. The fact that NGOs cannot become members of JPAs has presented some challenges. In some regions, public agencies have preferred not to share decision-making authority with NGOs, but this has generated tensions with NGOs, and appears to conflict with explicit IRWM requirements to include them. A few regions, including Santa Cruz, have resolved this by forming a network administrative organization as a non-profit entity, in which both public agencies and NGOs can participate.

Table 5.13. Characteristics of shared governance arrangements

IRWM region	Key agencies contributing to network management	How network management tasks are shared	Staff dedicated to IRWM network mgmt (2014)
North Sacramento Valley	Six county governments	Dividing tasks among core participants	Estimated 40 hours per quarter for one staff member per county
Westside Sacramento	Four water agencies (one per county); local public agency under contract for admin tasks	Dividing tasks among core participants; contracting for admin support	20% FTE for admin tasks; small, irregular amounts of time dedicated by staff at four water agencies
San Francisco Bay Area	Consultants; staff members of agency serving as chair of Coordinating Committee; staff of agencies participating in Coordinating Committee	Rotating leadership roles; contracting for admin support	Approx. 10% FTE for YY staff members
Antelope Valley	Consultants; agency representatives serving on the Advisory Team	Dividing tasks among core participants; contracting for admin support	Part-time consultants for admin tasks, meeting facilitation
Tahoe-Sierra	South Tahoe Public Utility District, Tahoe Regional Planning Agency, Tahoe RCD	Rotating leadership and admin support roles	Ten hours per month

Sources: IRWM plans, lead agency websites, interviews

Shared governance IRWM regions

Table 5.13 lists these regions and key features of the five regions that follow a shared governance arrangement. These regions represent diverse socio-economic contexts, ranging from the large and highly urbanized region of the San Francisco Bay Area to several relatively rural regions in the Sierras. In terms of network size, they are on average smaller than lead or NAO regions, but the San Francisco Bay Area, one of the largest regions, is an exception to this. Rather than network size, interviews with participants suggested three main reasons for choosing shared governance: 1) avoiding dominance by a single entity; 2) inadequate resources or lack of willingness on the part of any one agency to serve as a lead; and 3) an interest in minimizing transaction costs in a complex institutional environment. Each of these three situations is described briefly below in the context of the five shared governance regions.

Avoiding dominance by a single entity. This factor appears to have played a role in three out of the five shared governance regions, although it takes a slightly different flavor in each. Tahoe Sierra formed relatively early among IRWM regions, and from the beginning, sought to avoid creating new formal structures that would require funding to sustain. One participant commented, “We take turns doing the work to keep it going...I know a lot of regions pay people out of their grants. But we want all of our dollars to go into projects. We don’t pay anybody.” Representatives of Tahoe Sierra have expressed a strong preference to remain informal in their governance structure, and not to create a new agency or establish formal membership dues. On the other hand, North Sacramento Valley, governance is relatively formalized, but the six counties involved wanted to avoid any one county taking control of the process. Each county appointed representatives to the governing body. Administrative tasks were divided up across staff members of the six counties, each putting in an estimated 40-60 hours per quarter on either managing the website, coordinating meetings, or writing grant proposals. This approach allowed each county some autonomy, with no one taking overall control. The comments of one participant reflect this: “The process we have developed is really solid. In the very beginning, one of the county

supervisors thought he would run the process, but he eventually got voted out – he tried to speak on behalf of the group in ways he should not have...No county has really taken over. There was a fear that [our county] would, since we have more population, but that hasn't happened."

Finally, in Antelope Valley, distrust of the county's water district led to the development of a process that so far has relied upon consultants to coordinate meetings, with no one agency responsible for management over the long term. Small cities and local water districts have historically had little trust in the county water district, in part because it is viewed as part of county government, even though it is a separate organization financially. Initial efforts by the county water district to lead an IRWM process met with resistance, so the agency hired a consultant to facilitate and develop a governance structure. A county water district staff member commented, "We decided to form a leadership committee. We talked about forming a JPA. But I don't think the circumstances lend themselves to a more structured body than we have now. The participants wanted a loose body that doesn't connote political control from any agency." Consultants are currently responsible for organizing meetings, and participants have agreed that after the consultant contract has ended, they plan to work together to organize meetings without designating a single agency to be in charge of the process.

Lack of an entity willing or able to serve as a lead. One region appears to have chosen a shared governance approach primarily because no single agency was available at the scale of the region with adequate resources or mandate to undertake coordinating tasks. As described in Chapter 4, participants in the Westside Sacramento region began their IRWM planning efforts at the county level, but in 2009, DWR strongly encouraged them to consolidate and form a region encompassing two watersheds. However, no single agency existed at the scale of this new region. Those that had been involved in developing the previous county-level IRWM plans only have jurisdiction at the scale of their counties, and have relatively limited resources. As a result, the region has hired contractors to carry out administrative aspects of the process. As one participant commented, "We don't have a super agency, and we don't have the power, so this is how we had to do it." Interview evidence also suggests that in addition to having limited organizational resources at the regional level, participating agencies did not see much value in working together at the Westside Sacramento scale, which limited their willingness to invest.

Minimizing transaction costs in a complex institutional environment. Home to over 7 million people in 101 cities and 9 counties, the San Francisco Bay Area is an enormous region in terms of population, and a complex one in terms of institutional arrangements. Based on Provan and Kenis (2008)'s hypothesis that shared governance is most appropriate for small networks with relatively high degrees of trust, the Bay Area is not where one might expect to find this approach. Yet, since its creation in 2004, the Bay Area's IRWM process has functioned through an informal sharing of administrative and leadership tasks, which are rotated across a small number of agencies and supported by consultants.

Prior to the initiation of the IRWM process, certain water agencies were already connected through existing coalitions, such as the Bay Area Water Agencies Coalition (BAWAC), the Bay Area Clean Water Agencies (BACWA), and Bay Area Stormwater Management Agencies Association (BASMAA). BAWAC, then chaired by the Santa Clara Valley Water District, initiated the process of creating an IRWM region, and engaged the other coalitions to broaden the partnership beyond water supply agencies. A coordinating committee was formed to guide the process, with agencies from each of these coalitions informally selected to represent “functional areas” of water supply/water quality, wastewater and recycled water, flood protection and storm management, and watershed management/habitat protection. A team of consultants provided administrative support to the committee. When the leadership of BAWAC changed, another agency, the Marin Municipal Water District, took over as chair of the Coordinating Committee, once again with support from consultants. This pattern has largely continued. The chair of the Coordinating Committee rotates periodically, but the individuals representing the functional areas have largely remained consistent, with no formal process for appointing new representatives.

When the IRWM process began, the water supply and wastewater coalitions (BAWAC and BACWA) were already highly organized, whereas agencies involved in the other two functional areas, stormwater/flood management and watershed management/habitat protection, were not. The structure of the Coordinating Committee along Functional Area lines motivated these groups to organize themselves in order to advocate for receiving IRWM funding. Thus, one result of the IRWM process was the creation of the Bay Area Flood Protection Agencies Association (BAFPAA), and greater coordination between environmental state agencies and non-profits, mainly the State Coastal Conservancy, the San Francisco Estuary Partnership, and the Bay Area Watershed Network. The Bay Area IRWM region also established four geographic sub-regions across the Bay Area, and allocated to each region a certain percentage of funding expected from each grant application. Although this regional structure was not reflected in the structure of the Coordinating Committee, agencies within each region began to meet periodically to discuss project ideas for upcoming proposals. Interviews with participants revealed that these interactions have led some water agencies to build new relationships with one another.²⁷

However, the Bay Area region’s governance structure has largely relied upon informal norms to coordinate across functional areas. Representatives on the Coordinating Committee are not formally appointed by the coalitions they represent, and the committee itself operates very informally. One consultant who has been involved in the process since it began commented, “To try to give some balance, we said let’s have 3 voting members [from each Functional Area]. We have never actually voted. For awhile we took roll. Now, it’s consensus among whoever is there.” At one stage there was an effort to engage elected officials in the process, but this did not lead anywhere. Participants in the process indicated

²⁷ Lubell and Lippert (2011)’s survey of participants in the Bay Area IRWM region revealed that changes in collaborative patterns have been relatively limited. This finding aligns with mine in the sense that the changes in relationships that were highlighted during my interviews affect a small number of entities compared to the total number of water management entities in the Bay Area.

that this was because compared to the costs of water projects in the Bay Area, the amount of funding the IRWM process provided was relatively small, and elected officials did not feel sufficiently motivated to invest time in the process. In addition, staff at water agencies felt they would have lost control over the process if elected officials got involved.

Shared governance appears to have emerged in this region because participants perceived the creation of a centralized structure as costly compared to the benefits they expected to gain. For large water agencies and entities that are heavily involved in the coalitions that are informally represented on the Coordinating Committee, this informal approach is probably relatively efficient, since agency staff can rely upon personal relationships to advance their interests. However, for agencies or organizations that have not been previously involved, this informal approach is not very transparent or accessible. One interviewee commented on his experience trying to get representatives from his community to participate in the Bay Area process: “[they] don’t like the Bay Area process. Those meetings are really tough. You could sit there and not know what is going on the whole time.” Others have expressed that the process for accessing funding is opaque. One representative of a small non-profit addressing watershed management issues commented that her group had submitted a project application through the Bay Area’s project solicitation process, but nothing ever came of it, and it was not clear how to pursue it further.

Conclusion

Managing an IRWM region involves a significant investment of time and resources, as well as skills in stakeholder engagement and facilitation that have not been commonly found within water management agencies. IRWM regions also require a certain degree of administrative capacity in order to comply with the IRWM program’s relatively complex guidelines. In this context, capacity for network management entails not only the skills of the individuals involved, but also an organizational commitment to managing a collaborative process at a regional scale.

I have used the framework developed by Provan and Kenis (2008) to analyze the governance structures that have emerged to support network management activities in IRWM regions. Provan and Kenis would likely predict that a centralized network form would be best suited for IRWM regions, which require a diverse set of stakeholders to work together on complex tasks. Indeed, most IRWM regions – 14 out of the 19 studied here – operate under a lead or NAO network structure. These IRWM regions tend to invest more in network management compared to shared governance regions. Out of the 14 centralized regions, 11 invest at least 50% FTE in managing the network. In comparison, four out of the five shared governance regions invest less than 50% FTE.

Network governance scholars have also emphasized that those who manage networks must do so in a neutral and impartial manner, enabling all interests to have a voice in the process (Koppenjan & Klijn, 2004). A centralized structure, while it enables staff to specialize on network management activities, also raises the possibility that the lead

agency may use its central position to favor its own interests (Provan & Kenis, 2008). Given California's highly fragmented institutional setting, many public agencies are likely to have difficulty in allocating staff and resources to coordinate a regional process that extends beyond the bounds of their service areas and functional mandates.

I find that most agencies that have taken on a lead role in one of the 19 regions have a relatively broad mandate that encompasses multiple aspects of water management. In two regions, large, wholesale water agencies have also served as leads. While one might expect them to utilize the process to advance their own interests, this does not appear to be the case. Instead, the IRWM process has provided a platform for these lead agencies to build trust among a range of stakeholders. According to interviews with staff at these two agencies, the IRWM process has transformed their approach to water management. This suggests that in some cases, the IRWM program requirements to engage a broad range of stakeholders have indeed led to lasting changes in relationships in some regions.

While most IRWM regions have centralized structures, five out of the sample of 19 followed a shared governance approach, despite facing complex joint tasks and in some cases, a large number of actors. Provan and Kenis (2008) suggest that shared governance arrangements are more likely among actors with high levels of trust in one another. Yet, in several IRWM regions, it was actually low trust that led participants to choose a shared governance approach, which they felt would limit the possibility that one entity could gain undue control over the process. This seems to have occurred in regions where participants deeply value their autonomy, as is the case in many rural communities across California. In addition, the hypothesis that shared governance is unlikely to emerge in very large networks is challenged by the Bay Area IRWM region's use of a shared governance arrangement. In this case, in a very complex institutional context in which agencies have many different opportunities to interact and many different sources of funding to pursue, participants seem to have decided that investing in creating and managing a regional-scale governance structure is not worth the benefits it might generate. By comparison, the four regions that chose to form a network administrative organization were willing to do so because they perceived their problems as urgent enough, and the scale of the solutions large enough, to merit investment in managing a new organization.

Multiple factors, including the existing institutional context and the nature of water management problems, have helped determine network structure in IRWM regions. While a centralized structure has emerged in most regions, California's fragmented institutional environment, and the histories of conflict that accompany this, have sometimes made it difficult for a single agency to take on a network management role. Even so, some agencies with a dominant position in their regions appear to be serving as relatively impartial network managers, using the process not to gain more control but instead to re-frame their relationships with a wide range of water interests in the region. This chapter has laid out the challenges involved in managing an IRWM region, and has described how this has played out in a variety of settings across the state. The task of the next two chapters is to investigate the role that governance structure and investment in network management play in shaping the process of learning in IRWM regions.

Chapter 6. Learning through IRWM planning: Evidence from two case studies

The county had worked with the cities before, but we hadn't worked with the water districts. So it gave us a reason to be at the table together. In the early days when we were talking about runoff, the districts said, that is your problem. But we have been able to work through that. Now they are taking responsibility for runoff, and are looking at water conservation programs. It's a whole different mindset – it is now OUR problem.

—IRWM coordinator in southern California, 2014

The initial context described by this IRWM coordinator is common across California. Cities, counties and water districts assume responsibility for specific aspects of water management, divided into seemingly well-defined categories such as water supply, stormwater runoff, wastewater, and flood management. Yet, in focusing narrowly on their own mandates, connections between these aspects have been neglected. For example, agencies responsible for stormwater runoff have sought to channel it away from urban areas and into water bodies as fast as possible, leading to water quality problems as well as missing opportunities for recycling or groundwater recharge. Building a shared understanding of water problems in a region and taking joint responsibility for them – recognizing runoff as “our” problem rather than “your” problem – is the central goal of the IRWM program.

In this chapter, I assess the collective learning that has taken place in two IRWM regions in the Central Valley. Learning is a challenging process to study. Evaluations of learning must be based at least in part upon the perceptions of individuals involved, in which subjective biases are often embedded. Different kinds of learning may occur through a collaborative process, many of which may not be anticipated at the outset. Finally, learning is highly context-specific. This makes it difficult to compare learning outcomes across the very different settings of IRWM regions, and to identify explanatory factors. For all of these reasons, this assessment of learning in two IRWM regions is necessarily a partial one. Rather than seeking to track all instances of learning, my focus is on learning related to the goals of the IRWM program, which are embedded in the IRWM program requirements. My choice of case studies was framed by my interest in understanding the role that capacity for network management plays in supporting learning, which will be more specifically explored in Chapter 7. In this chapter, I seek to place this learning within the specific socio-economic and institutional context of each region, recognizing that multiple factors are at play in generating the learning outcomes that I have observed.

This chapter is organized as follows. First, I provide background about the two case studies. I then review how I have defined learning, following the framework of cognitive, strategic and institutional learning (Koppenjan & Klijn, 2004), and discuss the methods I have used. Finally, I present my findings regarding learning in each region, and conclude by analyzing the possible factors that may have contributed to differences in learning outcomes.

Figure 6.1. Case study regions.



Overview of case study regions

Figure 6.1 shows the locations of the two case studies, Kings Basin and Westside Sacramento. Key background and governance features of these regions are summarized in Table 6.1. Selected from the 19 sample regions, these two regions differ in their network structures and levels of investment in network management. The Kings Basin operates under a lead agency model, and a single, trusted and relatively well-resourced public agency has served in the lead agency role since the region's formation. Westside Sacramento has followed a shared governance model, and overall investment in managing the network has been more limited. These are the two most common governance arrangements among IRWM regions.

In addition to maximizing differences in governance structure, the selection of these two regions also sought to minimize other differences. Of course, both are subject to the same IRWM program rules. The boundaries of both regions are hydrologic (watershed or groundwater basin), rather than jurisdictional, and involve multiple counties. In addition, these two regions are both located in the Central Valley, and both have significant

Table 6.1. Overview of case study regions

	Kings Basin	Westside Sacramento
Regional Features		
Land area	953 sq. mi	3,000 sq. mi
Boundaries	Groundwater basin	Two watersheds
No. of counties involved	3	4
Major water sources	Groundwater (replenished by surface supplies)	Surface and groundwater; sources vary across region
Water quality issues	Nitrates and naturally occurring pollutants, making water unsafe to drink in some rural communities	Surface: mercury, algae blooms Groundwater: naturally occurring pollutants, nitrates, dissolved solids
Major stakeholder groups	Agriculture, cities, environmental groups, rural low-income communities	Agriculture, cities, environmental groups, rural low-income communities
Governance		
Decision-making body (before and after 2009)	<u>2001 - 2009</u> : all participants who signed memorandum of understanding <u>2009 - present</u> : Board of Directors and Advisory Committee	<u>2002 - 2009</u> : one agency in each county led its own IRWM process <u>2009 - present</u> : Coordinating Committee, with one agency representing each county, and informal Stakeholder Group
Number of Participants (in 2014)	16 voting Board members (cities, counties, irrigation districts), 41 non-voting Advisory Committee members (small cities, non-profits)	Four voting committee members (three water agencies, one non-profit association of water agencies); number of stakeholders varies
Average meeting attendance (2012 - 2013)	27	19
Network management mode (Provan and Kenis 2008)	Lead agency	Shared governance
Entity handling network management tasks	<u>2001 - present</u> : Public agency with a broad, regional mandate	<u>2002-09</u> : each county led its own IRWM process <u>2009 -13</u> : shared by Coordinating Committee, tasks delegated to consultants <u>2013 - present</u> : small public agency contracted for administrative tasks
% full-time equivalent (FTE) staff dedicated to network management (in 2014)	Greater than 100%	Less than 50%
Funding for network management (in 2014)	Regular membership dues	One-time payments from Coordinating Committee, negotiated each year

agricultural activity as well as urban populations. They both involve four main stakeholder groups: agricultural water users, urban water users, environmental interests, and rural low-income communities.

However, the regions also differ in significant ways, particularly in type and severity of water management problems they face, and in their socio-economic and institutional contexts. While the focus of this analysis is on how network management has supported learning the context of hierarchy, the capacity for network management emerges within a

specific hydrologic, socio-economic, and institutional setting, which itself shapes patterns of learning. This section provides crucial background about both case study regions, setting the stage for the analysis of learning.

The Kings Basin

Background and historical context

The Kings Basin IRWM region encompasses approximately 953 square miles, covering portions of Kings, Fresno and Tulare counties in the Tulare Basin area of the southern San Joaquin Valley. Prior to the arrival of white settlers in the mid-1800s, rivers in the region fed into the Tulare Lake, which was once the largest freshwater lake west of the Great Lakes. In wet years, the lake expanded, often overflowing into the San Joaquin River. These periodic floods brought fertility to the soil, but the constant threat of flooding – along with the desire to capture water for irrigating during the dry season – motivated farmers to build dams and diversions upstream of the lake. By the early 1900s, the lake was almost completely gone (Arax & Wartzman, 2003).

Irrigated agriculture across the entire Central Valley expanded rapidly in the early 1900s, with acreage growing from less than one million acres in 1900 to over 3 million acres by 1940. Much of this was – and still is – held by large landowners. In 1935, 70% of the land in the Central Valley was within farms of 1,000 acres or more (Hundley 2001, p. 239-40). These large landowners have had significant influence in local decision-making due to the practice of property-weighted voting in certain kinds of water districts. Further, these large farms benefited from extremely low-wage immigrant labor, from Chinese immigrants in the late 1800s, the Japanese in the early 1900s, and primarily Mexican immigrants by the 1930s (Hundley 2001, p. 242). Many of these migrants were excluded, through political, economic or cultural means from living in cities established by white settlers, and instead, they formed their own small, unincorporated communities. Now numbering over 450 throughout the Central Valley, these communities continue to be predominately home to people of color, and tend to have limited public services and poor infrastructure. Thus, amidst the vast wealth generated through industrial agriculture across the Central Valley, this region also has one of the highest poverty rates in the nation (Pannu, 2012).

Early settlers had established riparian or appropriative surface water rights, but by about 1910, nearly all of the surface water supplies in the San Joaquin Valley had been diverted (Galloway & Riley, 1999). In order to fuel the Valley's agricultural expansion, farmers therefore sought new sources, below ground and above. California's Central Valley has vast underground water aquifers, with total storage estimated at approximately 800 million acre-feet in 1986 (Bertoldi et al., 1991). By 1930, groundwater pumping was made easier with the advent of improved pumps and greater access to electricity, and many farmers began to meet their water needs in this way (Galloway & Riley, 1999). However, farmers across the Central Valley also sought greater access to surface water with assistance from the state and federal governments, leading to the construction of the Central Valley Project by the Bureau of Reclamation during the 1940s and 50s (Hundley 2001). As part of this project, the Friant Dam, completed in 1942, impounds almost the entire flow of the San

Joaquin River in Millerton Lake (WEF, n.d.). Some farmers in the Kings Basin region receive water from Millerton Lake, delivered via the 152-mile Friant-Kern Canal (KBWA, 2012, p. 1-1).

The construction of the Central Valley Project marked the beginning of the significant and controversial role that federal and state government agencies have played in water politics in the Central Valley. The relationship between farmers and the Bureau of Reclamation (BoR) was rocky from the start. Guided by its Progressive Era mission sought to support small farmers, BoR required that only farmers of 160 acres or less could benefit from its projects; yet, many of the farmers with rights to San Joaquin River water had much larger farms. These landowners used their political influence, and leveraged BoR's rivalry with the Army Corps of Engineers, to avoid enforcement of this rule (Worster, 1992, p. 255).

This inter-agency rivalry also played out in the debate over the construction of the Pine Flat Dam along the Kings River. After years of disputes over their riparian and appropriative rights, in 1927 Kings River water users had come to a voluntary agreement on a monthly schedule of water usage, and formed a private association called the Kings River Water Association to serve as a watermaster. KRWa participants also decided to work together to advocate for federal funding for a dam to help control flooding and allow for storage of irrigation water (McFarland & Tufenkjian, 2009). Because of the Bureau of Reclamation's acreage limitation, KBWA sought to have the project allocated to the Army Corps of Engineers, rather than to BoR (Worster, 1992, p. 252). The fight between BoR and USACE over the Pine Flat Dam project illustrates how deeply engrained a siloed approach to water management has been in the structure of government agencies. The BoR was authorized to provide irrigation water, while the Army Corps had authority over flood control projects; yet, the Pine Flat Dam would eventually serve both purposes. After a prolonged battle that directly involved President Franklin Roosevelt and his successor Harry Truman, The Army Corps eventually built the project, but contracts for irrigation water were to be negotiated with the BoR.

The Kings River Conservation District (KRCD) emerged out of the need for a public entity that could interface with federal agencies on behalf of water users. Created through a special act of the state legislature in 1951, KRCD was granted the authority to negotiate irrigation contracts with the BoR, develop hydroelectric projects to generate power from the Pine Flat Dam, and to undertake other projects that involved multiple interests in the region (McFarland & Tufenkjian, 2009). KRCD's operations were supported through property taxes, and governed by a publicly elected board. Thus, KRCD – which now serves as the lead agency for the Kings Basin IRWM region – has a long history of mediating relationships between water users along the Kings Basin river and interfacing on their behalf with state and federal government agencies.

The irrigation storage provided by these dams enabled the continued expansion of agriculture in the region. However, the dams also caused severe damage to the ecosystems and fish populations in the San Joaquin and Kings rivers. The Friant Dam left the San Joaquin River completely dry for long stretches, resulting in the loss of its native salmon

population. The Pine Flat Dam also led to heavily diminished flows and damage to its steelhead trout and salmon fisheries. In the decades that followed, efforts mounted to restore sufficient flows to enable the return of salmon to the San Joaquin, and to reverse the decline of fisheries along the Kings. Yet, these two rivers have followed quite different paths toward restoration.

Along the San Joaquin River, a group of environmental organizations, led by the Natural Resources Defense Council (NRDC), filed a lawsuit against the Bureau of Reclamation for their removal of water from the river in violation of state laws requiring dam owners to allow sufficient water below the dam to maintain fish populations in “good condition,” (NRDC, n.d.).²⁸ An 18-year legal battle eventually led to a 2006 agreement with the Bureau of Reclamation and the Friant Water Authority, requiring Friant Dam water users to allocate some of their water toward restoring the river system, and to contribute to a fund for restoration efforts. One of the important steps toward this outcome was the passage of a federal law, the Central Valley Project Improvement Act of 1992, in which 800,000 acre feet per year of San Joaquin River water was allocated to fish and wildlife. This represented a significant loss in allocations for farmers who had been receiving irrigation water from the Friant Dam, and contributed to a growing dependence upon groundwater, described below.

In contrast, restoration efforts along the Kings River have been largely voluntary. In 1964, the Kings Basin Water Association entered into an agreement with the California Department of Fish and Game to maintain a minimum flow for the purpose of sustaining fish populations. However, as more diversions and a new hydroelectric plant were added to the system, trout populations declined. A group of citizens and fishing associations formed the Lower Kings River Committee to try to reverse this. Instead of filing a lawsuit, in 1991 the group filed a complaint with the State Water Resources Control Board, asserting that current practices on the Kings River were in violation of the public trust doctrine (SWRCB complaint, 1991).

While trust between fishing advocates and the irrigation districts, KRWA and KRCD was quite low at the time, the complaint led to dialogue. In 1999, a Framework Agreement was signed that is still in place today. Under this agreement, water users along the Kings River agreed to allocate 12% of their water storage rights to create a 100,000 acre-foot temperature control pool to sustain the fish population. It also established the Kings River Fisheries Management Program, under which KBWA, KRCD, and the California Department of Fish and Game (now renamed Fish and Wildlife) meet regularly to implement the agreement. A Public Advisory Group provides opportunities for fisheries advocates to engage in the process (Kings River Fisheries Management Program, n.d.). KRCD has played a crucial role in managing this program, and in doing so has developed strong working relationships with the fisheries advocates involved. This history of trust between KRCD and environmental groups was crucial in establishing a collaboration within the IRWM process.

²⁸ This provision in state law, found in §5937 of the California Fish and Game Code, dates to 1915.

In the face of increased water allocations for environmental purposes, rapid urban population growth, and increasingly favorable markets for selling water-intensive crops such as nuts and other tree crops, farmers and cities in the region have turned to groundwater to meet growing water demands. Of the estimated 93 million acre feet of water stored in the Kings Basin as of 1961, approximately 6 million acre feet has been extracted over the past 50 years (DWR, 2003). Current estimates indicate that annual withdrawals exceed the basin's sustainable yield by approximately 100,000 to 150,000 acre-feet per year (KBWA, 2012). During drought periods, groundwater usage increases even further. Overdraft conditions in the southern San Joaquin Valley are the most severe of any region of the state (DWR, 2015b).

Over the past several decades, serious groundwater quality problems have also emerged in the Kings Basin, similar to those across much of the Central Valley. The intensive use of fertilizers has meant that irrigation water percolating into the groundwater contains nitrates, a contaminant linked to serious health problems, including the death of infants from "blue baby syndrome" (Harter et al., 2012). A study by UC Davis of nitrate contamination in the Tulare Lake Basin and the Central Coast regions indicated that one in ten public wells exceeded the maximum contaminant limit (MCL) for nitrates. The percentage was far greater for domestic wells, with over 40% of wells exceeding the nitrate MCL in several domestic well sample datasets in the Tulare Lake Basin (Harter et al., 2012). Studies have shown that nitrate contamination has increased significantly since the 1950s (Boyle et al., 2012). Since 90% of the population in the Central Valley depends upon groundwater for their drinking water, nitrate contamination has gained increasing attention as a water quality problem. Further, nitrate contamination disproportionately affects small community water systems, and in particular, Latino and low-income communities (Balazs et al., 2011). These communities, many of which are unincorporated, have limited technical and financial resources available to find alternative water sources. Unable to drink or cook with their tap water, many low-income households are forced to buy bottled water (Moore & Matalon, 2011).

Awareness of nitrate contamination has been growing in the Central Valley. Since 2004, the Community Water Center has advocated on behalf of low-income residents in the Kings Basin region to increase attention to the issue, and gain funding and technical assistance from the California Department of Public Health and other state agencies. Another non-profit group, Self-Help Enterprises, has also been working with communities to access state grant funds and implement projects. The state legislature responded to pressure from advocacy groups, authorizing funding for the State Water Resources Control Board to study nitrate contamination and identify approaches for addressing the problem (SWRCB, 2013). In the legislative update to the IRWM program in 2008, awareness of this issue contributed to the requirement that DWR set aside 10% of IRWM project funds to address the needs of disadvantaged communities (DACs).

Origins of IRWM planning in the Kings Basin

Amidst increasing concern about the condition of the groundwater basin, DWR reached out to the Kings River Conservation District in 2001 to encourage convening a dialogue

between three major irrigation districts (Alta, Consolidated, and Fresno Irrigation Districts) regarding the region's overdraft problems. DWR provided funding for professional facilitators to guide the process, and for KRCD to lead the development of a groundwater model to establish a common basis for understanding the condition of the basin. As this effort proceeded, it became clear that participation was needed from other groundwater users, particularly from cities whose expanding populations were placing increasing demands on the groundwater basin. Around this same time, the IRWM planning process was established, which provided a framework and a financial incentive to expand the dialogue to include a broad range of stakeholders.

In 2004, the Upper Kings Water Forum was formed, and by 2007, the group included four irrigation districts, three counties, ten cities, five environmental groups, a water association, and three state agencies. These participants signed a memorandum of understanding stating their intent to collaborate, and all had an equal voice in decision-making. The group's initial IRWM plan was completed in 2007, and emphasized their primary focus on addressing the problem of groundwater overdraft. The groundwater model was also completed, enabling participants in the process to better understand the extent of the groundwater overdraft problem, and how their management actions affect it. The group applied for and received a grant of \$6 million from DWR to support several projects to create or expand groundwater recharge and banking facilities, and another project to install water meters in the city of Fresno.

As significant funding began to arrive, participants decided they needed a more formalized governance structure, as well as a means to contribute financially to support KRCD's management of the process. In 2009, they established the Kings Basin Water Authority as a Joint Powers Authority.²⁹ Under this arrangement, public agencies such as cities, counties and irrigation districts would serve on the Board of Directors. Each member agreed to pay annual dues, set initially at \$7,000 per year, plus an initial, one-time fee of \$30,000 to help cover the costs that KRCD incurred during the initial years of the collaboration to develop the groundwater model and conduct other activities. The \$30,000 fee could be paid in installments over time.

However, under California law the non-profit organizations that had participated in the Kings Basin Water Forum could not be members of a JPA, and most could not afford the membership dues anyway. To enable them to participate, as well as to satisfy the IRWM program requirement that no stakeholder be excluded for lack of funds, another category of membership was created called Interested Parties. These members would serve on an Advisory Committee, which would meet on a quarterly basis and provide recommendations to the Board. In addition to non-profit organizations, many small cities also became Advisory Committee members due to their inability to pay the full membership fee. These meetings, which also include board members, became the primary

²⁹ Under California law, two or more public agencies may form a Joint Powers Authority to carry out joint activities (California State Government Code, §6502). A JPA is a separate organization, governed by a Board of Directors composed of member agencies.

forum for discussion of key decisions within the KBWA. Interested Parties could also participate in the various working groups established to work on specific topics such as the budget, outreach, and disadvantaged community issues.

The Kings Basin has continued its success in obtaining IRWM funding. The region was awarded grants during two rounds of Implementation grant funding under Proposition 84, amounting to approximately \$17 million. In addition to several more groundwater recharge and water meter installation projects, these funds have supported projects addressing the water quality or water supply needs of disadvantaged communities. Fresno Metropolitan Flood Control District, a participant in the Kings Basin IRWM process, has also received a total of about \$9 million through Proposition 1E for efforts to improve flood protection while also supporting groundwater recharge. In all, the Kings Basin IRWM process has garnered approximately \$87 million in grants or matching funds to support projects in the region (KBWA, 2015).

Network management: the role of KRCD

The Kings River Conservation District (KRCD) has managed the IRWM process since it was initiated in 2002. Several factors made it an appropriate choice for this role. KRCD's service area spans approximately 1.2 million acres, and largely coincides with the boundaries of the groundwater basin, and those of the IRWM region. Originally formed in 1951 to negotiate water contracts with state and federal agencies on behalf of water users, KRCD's broad mandate now includes groundwater management, flood control, hydropower generation, water quality issues, and the environment (KBWA, 2012, p. 2-2). KRCD's 50 staff members are supported by the agency's relatively stable revenue sources, which include the sale of hydroelectricity and a property tax assessment. The agency has built strong working relationships with relevant water interests in the region, including irrigation districts, cities and environmental groups, and throughout its history, has frequently played a mediating role. According to one KRCD staff member, "frankly, we don't have a dog in a lot of these fights. We are just there to support and collaborate and bring people together to try to solve bigger problems."

Since 2002, KRCD has dedicated significant amounts of funding and staff time to the IRWM process. During the initial years of the Kings Basin Water Forum, KRCD covered coordination expenses, and part of the cost of developing the groundwater model. Today, two KRCD staff members dedicate between 25-50% of their time to coordinating the IRWM process, in addition to the director's time in chairing meetings and interfacing with state-level policymakers. KRCD estimates that since 2002, it has spent \$3-4 million on the IRWM process, for which it has been only partially reimbursed through state grants and membership dues. Formally, the annual budget for KRCD's administration of the KBWA is approximately \$115,000. However, KRCD still regularly expends some of its own funds beyond this amount to sustain its network management activities.

The Kings Basin region is best characterized as a "lead agency" network, because KRCD handles network management activities while also being a member of the regional collaboration. Provan and Kenis (2008) note that a lead agency may be tempted to use its

position as network manager to advance its own interests. There is little evidence that KRCD has done this. One irrigation district representative noted the potential for a conflict of interest, but had not observed any problems. He commented, “KRCD is doing a great job...The only thing I see as a potential issue is, their staff is responsible for preparing the proposal for funding, but they do have their own projects. If you have an agency that is going to apply for projects, and they are doing the admin, you have a potential problem. I haven’t really noticed anything, though.” Other interviews confirmed that there is a high level of trust in KRCD among participants in the process, and that the agency has maintained a neutral stance in its role as network manager. In addition to its long history of engagement in multiple aspects of water management, some of this trust may be due to the commitment and management style of KRCD’s current director, who took up the position just as the IRWM process was beginning. With a long history of working with water interests in the San Joaquin Valley, the director is trusted by the irrigation districts. At the same time, he has been committed to the ideals embodied in the IRWM program, and has encouraged broad stakeholder engagement.

Westside Sacramento

Background and historical context

The Westside Sacramento region is three times the size of Kings Basin, covering 3,000 square miles and portions of five counties west of the Sacramento River. Its boundaries encompass the watersheds of Cache Creek and Putah Creek, and a portion of the Sacramento River Valley floor. The upper watershed and valley floor areas have distinct geographic, hydrologic, and socio-economic features. In the upper watershed areas, some land has been cleared for agriculture, largely for vineyards and orchards, but much of the area remains forested and has a relatively small population. The Valley floor area, on the other hand, was originally marshland but was drained in the 1800s for agriculture, which now dominates the landscape. Most of the region’s population of approximately 390,000 resides in this area, in small cities such as Davis, Woodland, Vacaville, and Dixon, all established before 1917. The upper watershed areas depend largely upon surface water from Cache or Putah Creek, while the Valley floor area receives surface water supplies from these creeks but also draws upon the Yolo subbasin of the Sacramento Valley groundwater basin. The use of mercury in gold mining in this region during the second half of the 1800s left a legacy of methylmercury pollution in both watersheds, which continues to impact fish and wildlife in these creeks. The Valley floor area is also subject to significant flooding in wet years from Cache and Putah Creeks as well as the Sacramento River itself, and efforts to manage these floods date from the mid-1800s (Westside Sacramento RWMG, 2013).

The Pomo and Wintun Indian tribes inhabited this region for thousands of years prior to the arrival of white settlers. Most were displaced or killed through disease or conflict beginning in the early 1800s. Today, the Wintun people, now called the Yocha Dehe Wintun Nation, hold some land in Yolo County, and own several casinos that provide income to tribal members. In Lake County, the Pomo Indians do not have land of their own and are not federally recognized, but continue to engage with the county to assert their traditional

rights. Compared to the Kings Basin, where they have a very limited presence today, tribes play a significant role in resource management in the Westside Sacramento region.

Expansion of agriculture in the Valley floor area in Yolo County and parts of Solano County was initially supported by groundwater pumping. However, as groundwater levels began to decline, farmers sought new surface water sources, leading to the construction of a number of major dams and diversions. In 1914, the Yolo Water and Power Company established an appropriative right to water in Clear Lake when it built Cache Creek Dam to store and release irrigation water. In 1920, a lawsuit filed by Lake County residents concerned about flooding resulted in the Gopcevic Decree, which specifies the amount of water that can be stored in Clear Lake in order to reduce the risk of flooding.³⁰ Clear Lake water, amounting to approximately 150,000 acre-feet in good water years, provides a crucial water supply for farmers in Yolo County (Westside Sacramento RWMG, 2013). Today, the fact that Yolo County owns the water rights to Clear Lake remains a source of conflict with Lake County, where the lake is located.

In Solano County, agricultural and urban water use is largely supported through water stored in Lake Berryessa behind the Monticello Dam, built by the U.S. Bureau of Reclamation in 1957. Solano and Napa counties also receive some surface water via the North Bay Aqueduct, constructed in 1988 as part of the State Water Project (Westside Sacramento RWMG, 2013). Thanks to these surface water sources, Solano and Napa counties have relatively reliable water supplies. Unlike Yolo County, they do not face significant shortages in drought years.

Overall, increased access to surface water has relieved pressure on the groundwater basins in the region, which are now in relatively good condition. The Yolo County Flood Control and Water Conservation District (YCFCWCD) plays a crucial role in groundwater management of the Yolo County subbasin through a strong groundwater monitoring program and conjunctive use of groundwater in combination with its surface water sources (YCFCWCD, 2015). During drought years, when surface water deliveries from Clear Lake are reduced, Yolo County farmers rely exclusively on groundwater pumping for their crops, and farmers without groundwater pumps cannot plant during those years.³¹ However, because of the availability of surface water during wet years, the groundwater supplies usually recover in wet years (DWR, 2003).

Origins of the Westside Sacramento IRWM region

Westside Sacramento is a consolidation of four previous county-level IRWM planning efforts. In 2002, water stakeholders in Yolo, Solano, Napa and Lake counties each began developing integrated regional water management plans, led by entities with an established role in water management. Over the years, unique institutional arrangements

³⁰ The Cache Creek Dam is now owned and operated by the Yolo County Flood Control and Water Conservation District (YCFCWCD), which was established in 1951 and purchased the dam and the rights to the water in 1967 (County of Lake, n.d.).

³¹ This was the case in 2014, when farmers received no water at all from Clear Lake.

had emerged for water stakeholders to interact with one another at the county level. In Yolo County, water supply entities formed the Water Resources Association of Yolo County (WRA) in 1993 as a forum for information sharing and coordination among the cities, the county, and flood control districts. Incorporated as a non-profit, WRA has one staff member, and a board of directors with representatives of its ten member agencies. When the IRWM program began, WRA members adopted IRWM as a framework and since 2004, this has been the main focus of their work.

In the other three counties, mechanisms for interaction among water stakeholders are less inclusive and well established. Solano County Water Agency took up leadership of the IRWM process in Solano County. As the county's water wholesaler, this agency has formal relationships with cities as well as the county, and city mayors and members of the county board of supervisors serve on its board of directors. In Napa, the Napa County Flood Control and Water Conservation District had formed an IRWM planning group involving agencies in Napa County, who completed a plan together in 2005. Parts of Napa County and Solano County also fall within the Bay Area IRWM region, and as a result, these agencies have also directed some of their effort toward participating in the Bay Area IRWM process. Finally, Lake County water management staff also began a county-level IRWM planning effort in 2005 (Westside Sacramento RWMG, 2013). Most water purveyors in this county are small water companies with very limited staff and resources. The county was the primary entity with the capacity to coordinate such a process, but its relationships with the small water purveyors were minimal. The county has a history of interaction with tribes, but this has often been contentious.

As these county-level planning processes moved forward, DWR staff felt that they did not fulfill the goal of the IRWM program to engage in water resources planning at a regional scale. A DWR staff member involved at the time commented, "When we saw places [Westside] where they shared resources but weren't in the same region, we thought it was hard to argue that they were doing regional integration." Indeed, Yolo County depended upon Clear Lake and the upper reaches of Cache Creek, while Solano County received water from Putah Creek, which originates in Lake County, and Lake Berryessa Reservoir is in Napa County. As DWR prepared to implement its Regional Acceptance Process in 2009, it informed the leadership of these four county-level plans that they would be unlikely to receive approval for their boundaries, and encouraged them to consolidate their efforts at a watershed scale. DWR suggested the use of the Cache and Putah Creek boundaries, as well as a small portion of the Sacramento River watershed. This would cover all of Yolo County, and portions of Napa, Solano and Lake counties. A small portion of Colusa County was also included, although Colusa County was already involved in the North Sacramento Valley IRWM process. The representatives of each of these county IRWM processes were reluctant to work together, feeling that that they did not have much in common and that the scale was simply too large, making in-person meetings difficult to organize. One participant in Yolo County commented:

Westside Sacramento is at the wrong scale. DWR said, we don't believe in counties as regions. I also would want to promote watershed-based boundaries...I told them, let's

just make this Cache Creek, but DWR didn't like that. I guess for them, it's easier to deal with fewer regions. Putah Creek is next door, but we have very little interaction. It's an artificial region that doesn't link interests. It created a false relationship, which is hurting us now. Why do we need to spend time working with Napa, when we don't have much in common?

Participants in the Yolo County IRWM plan were particularly frustrated, since they had found real value in the development of their county-level IRWM plan, completed in 2007. One commented, "At the WRA of Yolo County, we embraced the IRWM process. It was hard to do – when you get a whole lot of different viewpoints in the room, feelings escalate and there can be high emotions. But it was a neat project. A year later after we completed the plan, DWR told us our region was too small...But we already had a regional group that really brought us together and addressed the IRWM goals." However, faced with the apparent alternative of not being eligible for IRWM funding, the lead agencies for each of the four counties decided to go ahead with developing an IRWM plan at the scale suggested by DWR.

To govern the new process, a five-member Coordinating Committee was formed, including the lead agencies of each of the four counties, plus the Colusa County Resource Conservation District to represent the small portion of Colusa County within the new region. None of these entities had a mandate to act outside of their own county, and each had limited staff resources. Instead of selecting a single lead agency to manage the process, Coordinating Committee members hired a consulting team with significant experience in developing IRWM plans. This team included a facilitator who was involved in designing the IRWM program at the state level, and had worked closely with several successful regions in southern California. He encouraged the five agencies to follow a governance arrangement similar to that used by the southern California regions, in which a small coordinating group holds formal decision-making authority, but in practice, all major decisions are made in consultation with an inclusive Stakeholder Group. The stakeholder group would be open to all interested participants, would meet regularly, and only in cases of significant disagreement would the Coordinating Committee exercise its formal authority.

The consulting team sought to implement this approach, but it did not play out in the same way. As the consultant described it, "In the Westside, it was difficult to get people to engage, we had very inconsistent levels of participation. Some stayed with it throughout the process, but for the most part, there was minimal interest." The 2013 IRWM plan describes the Westside's governance structure during the plan development process as involving a stakeholder group, and the MOU signed in 2013 by the four Coordinating Committee agencies indicates an intention to continue to engage stakeholders in the decision-making process, and to fall back to the Coordinating Committee for decisions only when "broad stakeholder agreement" cannot be reached (Westside Sacramento RWMG, 2013, Appendix A.1.2, 2013). However, in practice, decisions have been made by Coordinating Committee members. These meetings are open to the public, but no broader stakeholder engagement meetings have been held since the plan was completed.

To date, the Westside Sacramento IRWM process has yielded much less funding for the region than has the Kings Basin. None of the county-level IRWM processes had received project funding, and only the Yolo County plan received a planning grant from DWR. In 2011, DWR provided \$1 million to the new Westside Sacramento region to develop a plan, which was completed in 2013. The region applied for a project grant of \$9.5 million in 2013, but it did not score well and was not funded. However, in 2014, the region's \$7 million proposal in a grant round focused on drought response was successful. This funding supports five projects to improve infrastructure for small water systems in Lake County, promote the use of recycled water, and groundwater recharge (Westside Sacramento RWMG, 2015).

Network management: the development of shared governance

Upon completing their contract to develop the region's IRWM plan in 2013, the consultants urged the Coordinating Committee to designate at least a part time staff member to handle on-going coordination tasks. However, the Coordinating Committee decided to share the responsibility for managing the region. One of the consultants recalled, "I really challenged them as to who is going to do the facilitation? [The consulting team] had been providing not only facilitation...but leadership of the whole process. We actually had the vision, we were going step by step, queuing up everything. Who was going to do that when we were gone? And what they said is, we're going to do it – the representatives on the Coordinating Committee."

To share leadership responsibilities amongst themselves, Coordinating Committee members agreed to rotate the chair and vice-chair positions in the committee. Further, each committee member was responsible for representing their county's interests, including identifying and vetting projects put forth by stakeholders in their county.³² Committee members recognized that they needed administrative support for organizing meetings and taking notes, managing a website, and managing and updating a database of projects included in the IRWM plan. To cover these costs, committee members each contributed a one-time payment of \$20,000, and issued a request for proposals for administration services. Out of the five proposals received, four were from consulting firms and one was from the Yolo County Resource Conservation District (Yolo County RCD). Yolo County RCD was selected, according to one committee member, "number one because they are cheap – about one-third the cost – but they are also good because they are a local agency. Once the contract is up, they will still feel connected."

The mission of the Yolo County RCD focuses on protecting natural resources through a watershed approach, and meshes well with the IRWM process. However, its ability to serve as a regional-scale network management entity is limited. A staff member at Yolo County RCD commented, "By direction of the Public Resources Code, we are supposed to work with

³² After the plan was completed in 2013, the agency representing Colusa County (Colusa County RCD) withdrew from the Westside Sacramento process. Only a small, uninhabited portion of the county was included in the region, and when it came time to contribute funding to the on-going management of the Westside region, Colusa County RCD decided it was not worth the investment.

local landowners. This IRWM process is in five counties, beyond the scale of our work. The only way I can look at projects is within Yolo – we don't have jurisdiction outside." Yolo County RCD is also a small agency, with only six staff members whose salaries are dependent on grant funds. Yolo County RCD's budget for administering the IRWM process in 2013-14 was approximately \$34,000, covering 20% of one staff member's time plus expenses. Without a stable funding base, it has not been able to contribute its own resources to supporting the process.

The Westside Sacramento region is best described as a "shared governance" network (Provan & Kenis, 2008). Coordinating Committee members are sharing leadership of the process, rotating as chair and vice-chair of the process. They are also sharing the responsibilities of developing proposals and managing grants.³³ Committee members each contribute funding to support management of the region, at a level determined each year. Finally, each Committee member serves as the interface between the IRWM process and stakeholder interests in their county. Aside from Yolo County, where the WRA has established a relatively robust process, stakeholder engagement appears to be relatively ad hoc. Efforts to involve new stakeholders appear to be quite limited.³⁴ Overall, investment in network management is lower and more decentralized than in the Kings Basin.

Learning in the Kings Basin and Westside Sacramento IRWM processes

The previous section has described the very different contexts in which the Kings Basin and Westside Sacramento IRWM processes emerged. While the Kings Basin region began by focusing on a relatively defined groundwater management problem that motivated stakeholders to participate, the Westside Sacramento emerged as a result of pressure from DWR to form at a scale at which stakeholders had relatively little stake in working together. The Westside Sacramento's larger geographic size made it more difficult for participants to meet regularly, as compared to the Kings Basin region. Furthermore, the institutional landscape and historic patterns of collaboration among water interests differ greatly between the two regions. In the Kings Basin, both irrigation districts and environmental groups had experience working with one another at the scale of the groundwater basin and the Kings River. In Westside Sacramento, previous collaborations had taken place at the county scale, and institutional arrangements for these interactions differ significantly across the four counties.

³³ The region's first proposal was developed by Solano County Water Agency (it was not funded). For its second proposal, the region hired a consulting firm to do much of the work, but the Yolo County Flood Control and Water Conservation District served as the lead in submitting the proposal.

³⁴ One exception is Lake County, where the IRWM process led to the creation of a series of dialogues facilitated by the Center for Collaborative Policy. This process is still on going as of this writing, but has the potential to yield stronger relationships between the county, local water companies, and tribes.

Finally, Kings Basin began with a much higher capacity for network management. Since its inception, the Kings Basin has been managed by KRCD, a relatively well-resourced agency whose mission encompasses multiple aspects of water management, and which has long experience in mediating between water interests in the region and interfacing with state and federal agencies. In contrast, the Westside Sacramento region has no single lead agency, with leadership roles shared among the four agencies participating in the Coordinating Committee, and administrative tasks performed by a small public agency on an annual contract.

Given the many differences between these two regional settings, one might expect different outcomes in terms of learning. This section discusses the results of an investigation of learning in each region, particularly with regard to the overall objectives of the IRWM process. This enables a focus on whether IRWM program rules have become an opportunity for learning, or instead have served to constrain it. In this section, I first describe the framework and methods used to assess learning, and present findings for the two case study regions.

Assessing learning

The framework of cognitive, strategic, and institutional learning laid out in Koppenjan and Klijn (2004) was used to assess learning. As described in Chapter 1, *cognitive learning* refers to an improved understanding of a problem, its causes, and solutions. *Strategic learning* involves developing a greater understanding of each other's interests and mutual dependencies. Finally, *institutional learning* relates to the development of rules, norms and practices that increase the predictability of interactions and build trust. This approach assesses learning in terms of changes in understanding and patterns of engagement within the collaborative process, rather than in terms of policy change. This is important because IRWM regions operate within a set of state requirements, with which they must comply to receive funding. The challenge is to distinguish between regions in which formal statements about a regional vision and addressing multiple interests do not represent a change in views, and regions in which such statements hold real meaning in terms of a sense of shared priorities and the creation of new relationships.

Cognitive and strategic learning

My study of cognitive and strategic learning focused around the IRWM program's overall intent to promote a more holistic understanding of regional issues and build engagement among diverse stakeholders. These broad program goals are embedded in the IRWM program rules, first instituted in 2010.³⁵ To guide my interviews, I identified three specific themes that relate to broad IRWM program goals and are embedded in the IRWM requirements:

³⁵ In 2010, DWR released IRWM Program Guidelines that incorporated the legislative updates made to the IRWM Planning Act in 2008, and incorporated requirements from other pieces of legislation (DWR, 2010b). These guidelines were updated in 2012 (DWR, 2012).

- The creation of a regional vision for water management. A key purpose of the IRWM program is to encourage individual water agencies to conduct more holistic planning for water management, taking into account interconnections with other aspects of water management at a regional scale. How this plays out in practice depends upon the hydrologic and socio-economic context. In a watershed-oriented region, this might involve upstream and downstream users beginning to understand how their actions affect one another, and identifying opportunities to work together. Critical to a regional vision for water management is an understanding of how multiple water supply sources integrate with one another in a “portfolio” approach. In regions involving both agricultural and urban water users, the actions of either party to reduce their water use or promote groundwater recharge helps ensure water supplies for the region as a whole. A regional vision would involve urban and agricultural users understanding each others’ roles and contributions to water management. The creation of a regional vision for water management is embedded in the 2010 IRWM guidelines, which requires that IRWM plans include a broad overview of the region’s water issues, and identify opportunities for integration at the regional scale.
- Incorporation of environmental stewardship into water management activities. Another aim of the IRWM program has been to incorporate environmental priorities into water management activities. Some of the architects of the program were environmental advocates, who hoped that the IRWM program would encourage integration of habitat protection and other environmental measures in the early stages of the planning and design of water management projects, rather than as an add-on at the end. A critical challenge here is to build opportunities for meaningful dialogue between public water agencies and non-profit environmental groups. In many parts of the state, there has been limited trust between these groups, with interaction mostly occurring in the context of lawsuits. The IRWM process was partly intended to build stronger relationships as a foundation for greater environmental stewardship. The IRWM guidelines incorporate this by requiring IRWM regions to reach out to environmental non-profit organizations, and awarding greater points to grant proposals that incorporate environmental priorities.
- Consideration of the needs of low-income communities. A third important aim of the IRWM program is to find new ways to address the needs of low-income or “disadvantaged” (DAC) communities. Advocacy on the part of environmental justice organizations led to an increased awareness of the needs of DACs, particularly those in the Central Valley who lack access to safe drinking water due to nitrate contamination, as well as other rural communities with very limited resources for infrastructure repair. Through the IRWM process, these small communities might be able to develop partnerships and access additional resources. In the 2008 update to the IRWM Planning Act, the priority for supporting DAC was expressed through a new requirement that 10% of all project funding be allocated to “critical water

supply and water quality needs” in DACs. In addition, IRWM regions were required to conduct specific outreach to include DACs in the planning process.

These three themes guided the coding of my interviews, and are reflected my analysis. Within the two case study regions, learning was assessed before and after DWR’s 2010 IRWM guidelines, allowing for a focus on the role that these rules may have had in shaping the process of learning. The specific mechanisms through which has learning occurred, and the constraints that may have prevented learning, will be explored in Chapter 7.

Cognitive and strategic learning relate to changes in how individuals participating in an IRWM region perceive water management issues and their relationships with other stakeholders. These two types of learning were assessed primarily through interviews with participants in each case study region. However, the focus of this study is on *collective* rather than *individual* learning. In each case study, cognitive and strategic learning were considered to have occurred at a collective level if multiple participants perceived that a shared understanding of an issue or set of relationships had developed. Interviews were conducted with representatives of the four different stakeholder groups in each region (agricultural users, urban users, environmental advocates, and representatives of low-income communities) to assess the degree to which perceptions of issues and of relationships were shared.

Semi-structured interviews were conducted in the case study regions during the period of June 2013 to June 2014, as summarized in Table 6.2. Respondents included representatives of the four key stakeholder interests (agricultural, urban water, environment, and low-income communities), as well as lead agency staff, consultants involved in network management activities, and representative of DWR responsible for interfacing with the two regions. In total, 17 interviews were conducted for the Kings Basin, and 11 for Westside Sacramento (in which participation was lower). Respondents were asked to describe their level of understanding of regional water issues and their relationships with other stakeholders before and after the initiation of the IRWM program, and in particular, after the 2010 IRWM guidelines were issued. They were also asked to reflect on how their participation in IRWM planning contributed to any changes in their understanding of water issues, or in how they viewed other participants in the process.³⁶

Interviews were coded manually for instances of cognitive and strategic learning around the three identified themes related to the state’s objectives for the IRWM program, as identified above. Although cognitive and strategic learning are distinct types of learning, most respondents treated them as highly connected. When they learned about issues, they seemed to also learn about the interests of other stakeholders with respect to those issues. Therefore, in this analysis cognitive and strategic learning are considered together.

Broad measures of the degree of learning around the themes were developed for each region. If the majority of stakeholders interviewed in a region expressed that they

³⁶ See Chapter 2 for additional discussion of interviews.

Table 6.2. Case study interviews

Stakeholder type	Kings Basin	Westside Sacramento
Network managers (lead agencies, consultants)	4	3
Dept. of Water Resources	1	1
Cities	2	0
County/county agencies	1	2
Irrigation/flood control districts	3	2
Conservation/environmental interests	4	2
Low-income community representatives	2	1
Total	17	11

experienced learning around a certain theme, this was ranked as a “high” level of learning. If less than half of interviewees indicated learning around a particular theme, or if they indicated that they learned something but it was not significant, this was ranked as a “moderate” level of cognitive and strategic learning. Finally, if only a few interviewees noted learning around a theme, then learning was ranked as “low.”

To confirm instances of learning identified through interviews, two additional types of evidence were gathered in each region: the *degree of participation* by stakeholders relevant to the three specific themes, and whether or not *partnerships or projects* were developed related to that theme as a result of the IRWM process. Participation is an indicator of the potential for learning, because learning occurs through the exchange of knowledge and information among diverse stakeholders (Heikkila & Gerlak, 2013). Projects and partnerships related to a specific theme may be an outcome of cognitive and strategic learning, but also provide an opportunity for learning, through practical problem solving (Ansell, 2011). Combined with interview evidence, participation and projects provide additional confirmation that learning has occurred around a specific theme in the case study regions. Data for these indicators was gathered from interviews, meeting observations, and analysis of IRWM plans and meeting notes.

Institutional learning

According to Koppenjan and Klijn (2004), institutional learning is evidenced by observing the development of increasingly durable arrangements that facilitate interaction between stakeholders. To assess this, I observed changes in formal and informal rules and organizational structures that support predictable patterns of interaction between participants in each region. Several indicators of the predictability of interactions among IRWM participants were identified. These include: 1) the regularity of meetings; 2) existence of working groups in which a sub-group of participants works on a particular issue; 3) stability of finances; and 4) the transparency of decision-making processes.

The focus was on interactions in practice, rather than formal arrangements described in an IRWM plan. For example, a plan might indicate that a specific type of meeting is to occur on a quarterly basis, but in practice the schedule may be different. Stability of finances was assessed primarily through information from interviews and meeting notes, regarding the region has established a system of regular membership dues or whether contributions

informal and re-negotiated each year. The degree of transparency in decision-making was assessed through document review and interviews. IRWM plans for both regions were reviewed for their descriptions of the decision-making process, and in particular, the manner in which interested organizations or individuals could participate in the process. Then, through interviews, information about the actual implementation of this process was gathered, along with stakeholder perceptions of their ability to participate in the process.

The remainder of this section discusses findings regarding learning in the two case study regions, which are summarized in Tables 6.3 (cognitive and strategic learning) and 6.4 (institutional learning).

Learning in the Kings Basin

Cognitive and strategic learning

As shown in Table 6.3, interviews, participation, and projects and partnerships suggest that cognitive and strategic learning has occurred in the Kings Basin with regard to all three learning themes, and has been particularly high with regard to building a regional vision for water management and understanding the needs of DACs.

Building a regional vision for water management. Prior to the IRWM process, there had been little collaboration between irrigation districts, cities, and counties. KRCD had worked with all of these entities, but they did not share a common perspective on the region's needs. Instead, they were focused primarily on meeting their own needs. Interviews suggest that attitudes have changed considerably through the IRWM process. One participant commented, "[Before], you watched out for yourself...It was, what can I get for [my city or county], versus having this collaborative come together and say, okay, what could work for the region?" A staff member of KRCD noted, "Before, we didn't even know what the regional issues were. At least now we can think about regional-scale projects. It all started with getting people together and understanding opportunities for collaboration." A representative of one of the three counties involved in the region commented, "It's given me a great understanding and appreciation of what some of the interests are from the local irrigation districts, and some of the cities. And because this IRWM includes portions of Tulare County, we're hearing about things going on south of us, which unless this process existed, I would have never known or thought to ask...It's given me a better perspective of what's going on regionally."

Building a regional vision in this context requires both a common understanding of the nature of the groundwater problem (an example of cognitive learning), and a greater awareness of the interests of specific stakeholders and their roles in solving this common problem (an example of strategic learning). With respect to cognitive learning, the integrated ground and surface water model (IGSM) developed by KRCD in the early phases of the IRWM process appears to have played an important role in helping participants understand groundwater overdraft and how they contribute to the problem. One city water manager described how her understanding changed regarding groundwater levels in different parts of the basin. With regard to a significant depression in the groundwater

Table 6.3. Cognitive and strategic learning in case study regions

	Focus of cognitive/strategic learning	Interview evidence?	Participation of relevant groups?	Projects and partnerships?
Kings Basin (2002 - 2014)	Regional vision for water management	High	High	High
	Environmental stewardship	Moderate	Moderate	High
	Low-income community needs	High	High	Moderate
Westside Sacramento (2009 - 2014)	Regional vision for water management	Moderate	Low	Low
	Environmental stewardship	Moderate	Moderate	Low
	Low-income community needs	Low	Moderate	Low

table, she commented, “Obviously, I’ve always understood that we are not the only straw in the groundwater table. I got a better understanding of the Raisin City problem. Before IRWM, I didn’t really understand that they don’t have any surface water, and they just suck, suck, and suck.” With regard to strategic learning, an irrigation district manager mentioned how his view of a “regional project” evolved to include water use efficiency efforts in cities. In discussing the city of Fresno’s project to retrofit its water meters, he commented, “If you think about it, getting more of their users on meters will reduce their demand. That was, to me, a truly regional project. I hate for the city to get all the money, but it does help big-time for the water use problem.” In other words, this irrigation manager had begun to see how his interests were inter-related with those of the city of Fresno in the context of the region’s groundwater overdraft problem.

While most participants believed that the IRWM process helped them gain a better understanding of regional-scale problems, several noted that it has not enabled them to undertake the solutions they feel are necessary. Groundwater overdraft is so significant in the basin – in excess of 100,000 acre feet per year, and more in drought years – that the kinds of groundwater recharge projects that can be undertaken with IRWM project funding are nowhere near sufficient. As one respondent described it, “When you start looking at IRWM projects, the typical yield of a recharge project is 5-10,000 acre-feet of new yield. But the gap we have [in the Tulare Basin] is 1.5 million acre-feet. So the big picture is not being addressed.” Another participant commented that the Kings Basin process has generated discussion of regional-scale projects, but so far, no action. “We have talked about developing a truly regional project, like a dam or large groundwater bank...But the money that’s available is generally small. In the scheme of things, 8 million dollars sounds like a lot of money, but it’s not really, when you’re talking about a huge project. That is the case where it would be nice if there is a huge pot of money to develop some major storage.”

Environmental stewardship. Learning around this theme was not as pronounced as around other themes. The IRWM process unfolded after relationships between water users and environmental advocates had already been established. According to several irrigation district managers, they had recognized the importance of environmental priorities before the IRWM program. One irrigator described how his relationship with the environmental community had changed as a result of interactions in the Kings River Fisheries

Management Program launched in 1999. “In 1992, [environmentalists] filed a complaint against us. We didn’t like each other then, but we said, let’s talk with them. And now [they] are one of our biggest fans. They like what we’ve done.” The IRWM process built upon this foundation.

Views within the environmental community differ. Several representatives who had been deeply involved in the fisheries management program appeared to have fairly high levels of trust with irrigators. As an example, they described a situation in which they allowed an irrigation manager to use 20 cubic feet per second of their environmental flow allocation to save some trees along the river bank, on the promise of being paid back in the future. These representatives viewed the IRWM process as productive, although not transformational. One environmental advocate commented, “We had to realize that this wasn’t ever going to be primarily focused on environmental projects...I never really thought that – we just want to be there to help the water agencies be educated about things like using native plants, doing environmental clean-ups, etc. I don’t think the focus of the big [irrigation districts] has changed.” These environmental advocates saw that water agencies needed to incorporate environmental stewardship in order to gain points on grant proposals, and saw this as an opportunity to advance some of their goals. From this perspective, learning in the IRWM process regarding the environment was not exceptionally high, but it was nonetheless occurring through the incorporation of environmental components into water projects. However, at least one environmental participant saw very little learning taking place. He felt that irrigation districts and cities only wanted to add a bit of landscaping into their projects, just to be able to say that their project incorporated the environment, but otherwise did not change their views on the role or importance of environmental priorities.

Nonetheless, the incentive within the IRWM program to include the environment in projects did result in the development of new partnerships. One irrigation district manager described how he met experts in the use of native plants through the IRWM process, and sought out their expertise in developing his groundwater bank. He commented, “I only got to know these guys through the IRWM process. They just showed up and said they wanted to be part of it, and we were like, who are these guys? And now, I’ve found out that they are really good guys.” This led to their involvement in planting native grasses on 10 acres of this irrigation district’s groundwater banking facility. According to another environmental advocate, the incentive water agencies have to incorporate environmental components does present an important opportunity for learning. Water agencies are willing to sit down and discuss these issues, and the participation of environmental groups in the process helps facilitate knowledge sharing. For example, following an Advisory Committee meeting observed in 2013, this representative of an environmental organization held a separate meeting with a water district representative to discuss possible ways to integrate habitat protection into a project being proposed for inclusion in the IRWM plan.

Disadvantaged community needs. With respect to the needs of low-income communities, the Kings Basin experienced a high degree of cognitive and strategic learning, and DWR’s 2010 requirements played a significant role in sparking this. Almost all irrigation districts, cities, counties, and non-profit representatives reported gaining a better understanding of

the drinking water quality problems in these communities, the interests of community representatives, and potential opportunities to work together. The director of an irrigation district remarked upon this significant shift, saying, “Ten years ago, we weren’t thinking about DACs...Originally, the process was developed to address the overdraft problem. As the years went on, water quality became a bigger issue, and we are doing some projects on that now. And it’s a good thing.” Non-profit advocates agreed that the dialogue has changed, with one participant commenting, “I think we have interest in the issue now. There are always going to be people with reservations, but I see that changing.”

This is a remarkable development, given the tensions surrounding this topic. Irrigation combined with heavy fertilizer use is the most significant cause of nitrate contamination in the Kings groundwater basin (Harter et al. 2012). Declining groundwater levels have raised contaminant levels even further, and also limited the management options for low-income communities, who now needed to drill even deeper wells or perform highly costly treatment processes. The farmers whose interests the irrigation districts represent have not only contributed significantly to this problem, but they also hold the rights to cleaner surface water sources, and have far more resources available. Initially, irrigation districts felt threatened by the participation from non-profit advocates and DAC community members, fearing that these groups might push for them to give up some of their surface water rights. However, through the IRWM process, representatives of most irrigation districts and cities have developed a better understanding of the needs of DACs, and have begun to work with them to seek out solutions. This shift is reflected in the region’s 2012 IRWM plan update. While the 2007 plan stated that groundwater overdraft was the primary focus of the regional planning effort, the 2012 plan expands this to include water quality, stating that “within certain areas of the region and for certain stakeholders, water quality and water reliability are higher priorities than overdraft protection,” (KBWA, 2012, p. ES-3).

An important step in this learning process was a pilot study assessing the needs of DACs in the region, supported by a grant from DWR. To conduct the study, KRCD contracted with two NGOs, the Community Water Center and Self-Help Enterprises, as well as Provost and Pritchard, a consulting firm that has worked with the Kings Basin since its inception. This project team identified specific communities facing serious drinking water quality problems in five sub-areas of the region, and sketched out possible projects in each sub-area. Balazs and Lubell (2014) used a social learning framework to analyze the outcomes of this study, and found that it increased information and awareness about DAC needs, broadened participation in the regional planning process, and sparked consideration of regional-scale solutions.³⁷

³⁷ As discussed in Chapter 1, a social learning framework traces how interactions between individuals lead to learning, which causes small adjustments in their actions (single-loop learning), deeper changes based on revisions to their assumptions and values (double-loop learning), and over the long term, can change the structural context (Pahl-Wostl et al., 2007).

Table 6.4. Institutional Learning in case study regions

Indicator of institutional learning	Kings Basin (2002 - 2014)	Westside Sacramento (2009 - 2014)
Routine meeting schedule created?	<u>Yes</u> . Schedule set a year in advance	<u>No</u> . Meetings organized as needed
Active working groups?	<u>Yes</u> . Seven active working groups	<u>Limited</u> . One active working group
Stable financing?	<u>Yes</u> . Regular membership dues established	<u>Moderate</u> . Contributions re-negotiated each year.
Mutually agreed and transparent decision-making?	<u>Yes</u> . Clear membership process and decision-making roles.	<u>No</u> . Avenues for stakeholder participation are unclear.

Observations at a meeting in 2013 to discuss the project's outcomes and recommendations confirmed these findings. During this meeting, held in the evening to enable broader community attendance, NGO representatives as well as DAC community members spoke frankly about the problems that they face, and irrigation district representatives, even those who remained reluctant to expand the region's focus to include DAC needs, listened and participated respectfully. The meeting also included discussion of specific project opportunities, as well as the barriers that need to be addressed in order for these small communities to receive funding. KRCD staff encouraged the communities represented at the meeting to join the Kings Basin IRWM process as members or Interested Parties, and indicated their willingness to work with them to find solutions.

Institutional learning

Table 6.4 summarizes findings regarding institutional learning in the two case study regions. In the Kings Basin, these indicators suggest that the IRWM process has led to the development of new, predictable patterns of interaction between stakeholders in the region. The Board of Directors and Advisory Committee of KBWA each meet four times per year, with meeting dates announced a year ahead of time. In addition, seven working groups have been established, involving members of the Board and the Advisory Committee and focusing on topics such as the groundwater model, groundwater monitoring, disadvantaged community needs, outreach, the budget, and projects. Working groups are supported by staff from KRCD, and report back to the larger group during Advisory Committee and Board meetings.

Stable financing arrangements have also been developed. When the Kings Basin Water Authority was formed in 2009, annual membership dues were set at \$7,000 annually, plus a one-time fee of \$30,000 to help recoup the costs KRCD incurred during the early years of the collaboration. Interested Parties serving on the Advisory Committee did not pay a membership fee. This allowed non-profits and small communities with limited budgets to participate, and also complied with a DWR requirement that no one be excluded from an IRWM process for lack of funds. After a few members withdrew from the Board and became Advisory Committee members instead, the group revised its membership dues structure in 2013, instituting \$3,500 annual rate for cities with populations of less than 20,000, and requesting Interested Parties to contribute \$250 each on a voluntary basis. Budget documentation from KBWA indicates that within the first few months of this

change, 19 out of 39 Interested Parties had sent in their contribution, suggesting a relatively high degree of commitment to the process.

Finally, transparency in KBWA's decision-making and participation is relatively high. Working groups meet regularly and report to the Advisory Committee, and the Advisory Committee provides recommendations to the Board. The role of the Advisory Committee is quite significant; most respondents indicated that the real discussion and decision-making happens there, and Board meetings simply review and approve recommendations. KBWA is open to new members, and there is a clear process for a group that wishes to join, either as a member or an Interested Party. An application is submitted to KRCD, and then brought to the next Advisory Committee or Board meeting for approval, which is routinely given. During the early phase when many new members were joining, new participants would have a chance to make a brief presentation so the group could become acquainted with their work.

Overall, these new patterns of interaction appear to have fostered increased trust, and created opportunities for new partnerships. Participants indicated that early meetings of the Advisory Committee were relatively tense, as the Community Water Center and other representatives of disadvantaged communities began to attend, pushing the group to pay attention to water quality issues. However, over time, relationships began to develop, and meeting observations in 2013 revealed a sense of camaraderie and openness to hear DAC perspectives as well as those of others. Participants have also developed relationships through working group meetings. For example, a representative of an environmental NGO was invited to participate in the Project Workgroup, and through this, she met a representative of a disadvantaged community and offered to help put together a grant proposal for support to DACs. In other words, these routine patterns of interaction have helped spark new relationships and opportunities for learning.

Learning in Westside Sacramento

In the Westside Sacramento region, evidence of learning around the three themes is more limited. Interviews revealed moderate cognitive and strategic learning with respect to developing a regional perspective on water management, and low levels of learning around environmental stewardship and disadvantaged community needs. Institutional learning is also relatively low. This does not mean that the IRWM process has been without value in this region. However, it does not appear to have yielded the same degree of shared understanding of regional priorities or new relationships.

Cognitive and strategic learning

Building a regional vision for water management. Prior to establishing the Westside Sacramento region, there had been little interaction between upstream and downstream actors in either of the two watersheds encompassed by the region, and even less interaction between the two watersheds. Stakeholders are, however, interdependent within each watershed. Yolo County depends upon water resources originating in Lake County, and Solano County's water supply, although extremely reliable due to the large Monticello Dam operated by the Bureau of Reclamation, originates in Lake and Napa

counties. Resource management decisions upstream do have an influence on conditions downstream. Interviews suggest that the agencies participating in the Coordinating Committee have gained a moderate level of understanding of the overall conditions and water issues in the other counties, and the different circumstances they face. For example, one representative from Yolo County noted that he had not been aware of the level of poverty in Lake County, while a representative from Solano County learned how well off his own county is in terms of water issues.

Most participants appear to have experienced both cognitive and strategic learning with respect to managing invasive species in the region's lakes and water systems. Quagga mussels and other invasives can decrease the food supply for aquatic wildlife, clog water intakes, and cause water quality problems that increase water treatment costs (CISR, 2015). The presence of these invasives in Clear Lake and Lake Berryessa would impact downstream water users in Yolo and Solano counties. All participants interviewed mentioned this as an issue that they had learned about and now considered a shared priority for the region. In 2013, Westside Sacramento participants established a working group to develop more specific steps to address this problem, and has met 2-3 times. This is the most significant example of cognitive and strategic learning that has emerged in the Westside Sacramento region.

However, the comments of many respondents also revealed that aside from the invasive species issue, they have not developed a broader vision for managing water resources at a regional scale. Several viewed the process as useful to a degree, but not central to their work. As one participant put it, "there isn't really a single cementing issue that bring us together, as of yet. But there are ways we can help each other out, so I don't think it's a wasted effort." Another commented, "It was good to get to know [a county in a different watershed] better, but we really don't share that much in terms of common interests or needs. So, it was good, but not \$2 million worth of good," referring to the funding required to undertake the planning process.

The fact that these members of the Coordinating Committee are lukewarm toward planning at the scale of these two watersheds may be at least partly related to a genuine lack of interdependence in terms of shared water resources. At the same time, there is also evidence to suggest that relatively low stakeholder engagement in the process may have meant that fewer perspectives were represented in discussions, leading to less learning. While the planning process involved over 50 public meetings, interviews and data on participation indicate that relatively few agencies and individuals participated on a sustained basis, aside from the five agencies involved in the Coordinating Committee. One committee member from Yolo County commented, "At the Coordinating Committee, you have 8-10 people. But the county government, cities and others are not involved...They don't have the time. The Water Resources Association of Yolo County is actually representing some of the cities and other entities. But does this approach generate engagement? Do the mayors of the cities become aware and get involved? No." A committee member also reflected on the limited public participation generated by the Westside process. "Public participation in this plan was not too good. A few people would show up,

and they would want to do things that were beyond what we could do. So we'd explain that to them, and then they wouldn't come back."

Respondents who had participated in the Yolo County IRWM planning process between 2002-2007 universally reported more examples of cognitive and strategic learning stemming from that process than from the larger-scale Westside process. For example, a representative of a flood control district described how he benefited from the Yolo County process in terms of understanding and building relationships with cities:

Rural/urban partnerships are really important. Urban areas have a lot more resources and we can benefit from collaboration...We have to figure out how to pay for our 100-year-old canal system and 750 gates which are old and need repair. How do we maintain them? We need cities. We need to collaborate with the roads department to get them to pay for some things...If you don't talk to people, you really don't know what the issues are. So now, personally knowing people in the cities, I can call them up to talk about these things.

From his perspective, the much larger Westside Sacramento process did not enable the same level of engagement with stakeholders, in part because they were not present at meetings. The large geographic scale of the region also posed a challenge, since it would take an entire day for a participant in the northern end of the region to participate in a meeting held at the southern end. Meetings were rotated across the region and participation via webcast was also an option, but nonetheless, many participants felt that participation was hampered by distance.

Environmental stewardship. A total of five environmental groups participated in public meetings during the development of the IRWM plan, including the Lake County chapter of the Sierra Club, a land conservation group called Tuleyomne, the Cache Creek Conservancy, Putah Creek Council, and small non-profit called Berryessa Trails and Conservation. A review of meeting attendance records indicates that only Tuleyomne had representatives at more than two of the eight meetings for which attendance records are available (Westside Sacramento RWMG, 2013, Appendix B.4). One interview was conducted with an individual representing two of the environmental groups involved (others were contacted but not available for interviews). This respondent indicated that she found the two meetings she attended valuable, but did not stay engaged due to other commitments. She also noted that neither of the groups she represented – which includes Tuleyomne, which attended the most meetings – had remained substantively involved in the process after the IRWM plan was completed. While evidence is limited due to the inability to reach more environmental representatives for interviews, the combination of this interview and the lack of actual participation by environmental groups suggests that the IRWM process has not led to significant cognitive or strategic learning regarding environmental priorities.

Disadvantaged community and tribal needs. Compared to the Kings Basin, the discussion of the needs of disadvantaged communities and tribes has received much less focus in the Westside Sacramento region. DACs are primarily located in the area around Clear Lake in

Lake County, and in parts of Yolo County. A key concern of these communities is aging or inadequate water infrastructure, for which they have limited resources and technical capacity to address (Westside Sacramento RWMG, 2013). Tribes have similar needs, and some have even fewer resources and technical capacity. Tribes in Lake County are also concerned about the declining population of the Clear Lake hitch, a native fish found only in Clear Lake. Representatives of DACs and tribes have participated in Westside Sacramento meetings. Similarly to the Kings Basin, a non-profit organization, the Rural Community Assistance Corporation (RCAC) has been involved in the process in support of DAC needs, and has attended meetings regularly. Meeting records also show that representatives of four different tribal groups have attended IRWM meetings, including one tribe that participated in five out of eight meetings with attendance records.

Evidence from interviews suggests that despite their participation, these meetings did not generate significant discussion of DAC or tribal needs. One representative of a group advocating for DAC needs, who has also been involved in other IRWM regions, commented on the style of meetings and discussion in the Westside. “It was kind of like a classroom setting. The engineer conducts the meeting. I guess to me, when you have a partnership and you have some DACs involved, it’s great when they are all around the table and they get to hear from the mom and pop folks, rather than hearing overviews of legislation or policy.” Interviews with some Coordinating Committee members suggested that while some effort was made to include DACs and tribes in the process and develop DAC projects in order to obtain additional points on grant proposals, this did not lead to a shift in understanding on the part of water agencies as to how DAC needs fit in with a regional perspective. One participant commented, “DACs haven’t been too much of an issue. You get more points on your grant application if you include DACs, so we make sure to do that. It’s not like we think they shouldn’t have a voice, but we each really have a full plate.”

Tribes have also expressed dissatisfaction with the process. The Westside Sacramento region was one of six IRWM regions of special focus in a study by UC Davis of tribal engagement in the IRWM process, which found significant frustration among tribal representatives with regard to how they have been involved and the degree to which their needs are incorporated (Dolan, 2013). There has been an effort to address some of these issues in Lake County, where many tribes are located. With DWR support, Lake County received facilitation services through the Center for Collaborative Policy to try to build more dialogue between the county, tribes, and small water supply companies and the communities they serve. This process, currently underway at the time of writing, may yield additional learning with regard to tribal issues. So far, tribes have not yet been successful in receiving project funding through the region. One tribe that regularly participated in Westside Sacramento’s meetings sought to get a project included in the region’s first grant proposal, but had to pull out after receiving little support in compiling the necessary documentation.

Institutional learning

As shown in Table 6.4, indicators of institutional learning suggest that development of new and predictable routines of interaction within the Westside Sacramento region has been

limited. The Coordinating Committee meets fairly frequently (about 6 meetings per year since 2013), but the schedule is erratic. Meetings are typically planned a only few weeks ahead of time, and are often held via conference call, which are more difficult for stakeholders and the public to access. One working group, the Mussel Task Force, has formed to advance the region's work to prevent the spread of quagga mussels and other invasive species. According to the region's website, this committee met only twice in 2014. Financing arrangements for the region are moderately stable. The four Coordinating Committee agencies have agreed in principle to contribute resources to sustaining the regional process, and made initial contributions of \$20,000 each in 2013. The Committee expects to review and agree upon contribution levels each year.³⁸

The development of mutually agreed and transparent decision-making processes has also been moderate. Despite an emphasis on stakeholder involvement in decision-making in the IRWM plan, in practice, decisions are primarily made by the four-member Coordinating Committee. The region follows a representative model, in which each of the four Coordinating Committee members represent the interests of stakeholder in their counties. This means that there are no procedures for new members to join the committee. Mechanisms for representation vary by county. In Yolo County, the Water Resources Association represents the county's interests, and provides a relatively clear avenue for stakeholder engagement. WRA primarily includes water supply interests in the county, but issues related to conservation and flood management-related are also addressed. The WRA holds meetings once a month at a regularly scheduled time, which are often attended by interested community members. During these meetings, the WRA shares updates on the IRWM process, and has developed a system for vetting any Yolo County projects that are proposed for inclusion in the IRWM plan. While representation appears relatively robust in Yolo County, similar processes do not exist in the other three counties for stakeholders to discuss issues of relevance to their county or to the region as a whole.

Stakeholders do have the opportunity to participate directly in Coordinating Committee meetings. These meetings are public, and are announced on the website ahead of time, in compliance with the Brown Act. However, there are no mutually agreed expectations for how stakeholder perspectives expressed during these meetings will be considered in decision-making. So far, participation aside from representatives of the Coordinating Committee agencies has been limited. For five meetings for which participation records are available between March 2014 and March 2015, 3-8 people attended who did not represent the Coordinating Committee, consultants, or DWR. This lack of participation may reflect the low level of effort being invested in conducting outreach to relevant stakeholders, in addition to the lack of an advisory body or other established avenue for contributing to the process.

³⁸ A year after these initial contributions, funds still remained from initial \$80,000 funding pot. Committee members will contribute less in 2015, likely around \$10,000 each according to recent meeting notes.

The finding that cognitive, strategic and institutional learning within the Westside Sacramento region has been relatively low compared to the Kings Basin does not suggest that the IRWM process has had no value for the region. Participants expressed that they had gained some new knowledge and connections through the process, which may deepen with time. In 2014, the Westside Sacramento region was awarded its first IRWM project funds, totaling \$7 million to support five projects focused on responses to the current drought. This success may help generate greater interest and commitment to the process. However, the lack of a governance structure that can enable and sustain greater stakeholder engagement may limit the region's ability to utilize this opportunity in ways that promote learning, as will be discussed further in Chapter 7.

Conclusion

This chapter demonstrates that the IRWM process has generated learning in the Kings Basin IRWM region following the state's implementation of new program rules in 2010. I have examined learning around three goals that the IRWM program rules were intended to promote, and found evidence of changes in the shared understanding of key problems and of the interests and roles of critical stakeholders. In the Kings Basin, this is particularly true with regard to developing a vision for regional management of water problems, as well as understanding the needs of disadvantaged communities. This suggests that the IRWM program does hold the potential for generating outcomes beyond mere compliance with grant program rules.

However, the experience of Westside Sacramento indicates that not all IRWM regions are undergoing the kinds of learning as observed in the Kings Basin region. Many questions still remain as to the conditions that may affect learning outcomes. Socio-economic, institutional, and hydrologic conditions vary dramatically across IRWM regions. Even though the two case studies presented here are both located in the Central Valley and combine agricultural and urban water interests, an examination of their historical and socio-economic context reveals deep differences in the nature and severity of water problems, and in the evolution of institutional arrangements to address them. Drawing upon previous research on collaborative processes, multiple factors may have led to the different learning. These include:

- Different levels of interdependence in terms of the biophysical features of each region's water system. While all participants in the Kings Basin depend upon a common groundwater basin, participants in the Westside Sacramento region rely upon a variety of surface and groundwater resources, not all of which are physically connected. Previous research has suggested that when actors do not perceive a high level of interdependence, collaborative processes are less likely to be successful at sustaining participation (Ansell & Gash, 2008).
- Perceived urgency of water management problems. In the Kings Basin, groundwater overdraft is severe, and water quality problems are so serious that many communities must rely upon bottled water. In the Westside Sacramento region, while some agricultural users have inadequate supplies during dry years and face

both ground and surface water quality problems, the groundwater basin is not in perpetual overdraft and low-income communities and tribes largely do have access to clean drinking water. Research also suggests that when problems are urgent and stakeholders have limited alternatives for addressing them, collaboration is more likely to emerge (Sabatier et al., 2005).

- Geographic size of the region. The Westside Sacramento region is three times the size of the Kings Basin, making it more difficult for stakeholders to interact in person on a regular basis. Westside has used webcasting and teleconferences to try to overcome this hurdle, but many researchers have suggested that collaboration thrives on in-person interaction (Thomas, 1999).
- Capacity for network management. Network management plays a crucial role in creating opportunities for learning through a collaborative process (Koppenjan & Klijn, 2004). As I have argued in Chapters 1 and 5, the capacity for network management encompasses both the skills of individuals involved in managing the network and a network structure that supports sustained investment in these activities. While both case study regions benefitted from skilled facilitation, they differ significantly in the organizational support available for managing the network. Kings Basin process has been supported by a relatively well-resourced entity that views the IRWM process as part of its mission, and that had already developed relationships with critical stakeholders in the region. On the other hand, the Westside Sacramento region did not have an entity willing or able to convene a collaborative process at the scale of the region, and instead shared the responsibilities for this across the four Coordinating Committee members and contracted out administrative tasks.

All of these variables may have played a role in the learning outcomes observed in the two regions. In fact, they are intertwined with one another in multiple ways. If water agencies or other stakeholders within the region do not perceive problems as urgent, this may reduce their motivation to invest significantly in managing a regional network. However, the relationship may also work the other way around. If an entity decides to invest in network management and coordinates opportunities for dialogue on a on-going basis, then participants may discover new ways in which they are interdependent with one another, and recognize how their actions at a regional scale can help them address problems they had previously defined as local. Indeed, Ansell and Gash (2008) and Weber (2009) suggest that the degree of interdependence between actors is not always recognized at the beginning of the collaborative process, but instead is discovered through dialogue.

Evidence presented in Chapter 4 regarding the creation of the North Coast IRWM region supports the argument that network managers can indeed help create the conditions in which mutual interests can be discovered, even when they were not immediately apparent. Encompassing 19,000 square miles and involving a large number of stakeholders with diverse interests, the North Coast region emerged out of several years of dialogue organized by the Sonoma County Water Agency. SCWA's efforts helped generate a commitment to the process, despite the diverse interests among participants across a vast geographic area. Westside Sacramento also encompasses a relatively large area and

includes stakeholders with diverse interests, but it lacked an organization willing and able to commit to leading a sustained process of engagement.

While many factors are at work in the process of learning in IRWM regions, capacity for network management appears to play a role. The following chapter hones in on the specific ways in which differences in this capacity in the Kings Basin and Westside Sacramento regions has helped or hindered learning. In particular, it highlights a role for network managers in negotiating between the interests of the state, as expressed through IRWM guidelines, and the region's needs and problems as perceived by local stakeholders.

Chapter 7. Bridging the hierarchical and collaborative divide: The role of network management in supporting learning

I think you really have to have some lead agency that coordinates everything and really is focused on keeping it together. When you have so many people involved and so many different agencies, if you don't have someone who takes that ownership and leadership role, it's going to fall apart.

We could sit around and chew all we want, but it really takes folks like [KRCD staff] to really bring it together. They get paid peanuts for the amount of work they do, but they're really valuable in terms of the process: understanding how the application process works, and talking with the state.

—Participants in the Kings Basin IRWM process

Chapter 6 demonstrated that learning has indeed taken place through the IRWM process in the Kings Basin. In the process of complying with the state's participation requirements and complex grant proposal rules, participants have developed a new, shared understanding of regional priorities, and meaningful engagement on the part of disadvantaged communities who have long been excluded from water planning. The Westside Sacramento region's experience, however, was quite different. This chapter focuses on the mechanisms and conditions that may help to explain why the IRWM process leads to learning in some regions, but not in others.

A comparison of the Kings Basin and Westside Sacramento experiences suggests that a region's capacity for leading and convening a collaborative process is a critical factor in supporting learning. This accords with findings in recent network management literature (Weber & Khademian, 2008, Koppenjan & Klijn, 2004), and is also reflected in the comments of numerous participants interviewed in the case study regions. The quotes presented above reflect two roles that were frequently referenced: coordination of the diverse and numerous stakeholders involved in a region, and interfacing with the state government to understand program requirements. Together, they point to a critical function that network managers played in the Kings Basin region: mediating between the interests of the state, as expressed through IRWM program rules, and the concerns of stakeholders involved in the region. Through my research, I identified three specific mechanisms through which the Kings River Conservation District accomplished this:

- Setting the stage for learning by brokering across state and regional interests to establish a vision for regional water management;
- Developing collaborative processes that transform program rules into learning opportunities, by providing the administrative support needed to enable practical, problem-oriented engagement among participants; and
- Providing stability and support to enable the development of informal rules and norms that are crucial to institutional learning.

I used process tracing to assess how differences in capacity for network management influenced learning in the two case study regions. According to George and Bennett (2005, p. 206), process tracing “attempts to identify the intervening causal process – the causal chain and causal mechanism – between an independent variable (or variables) and the outcome of the dependent variable.” I began with the hypothesis that greater capacity for network management – in particular, a centralized network structure – plays a role in promoting learning by helping the IRWM region cope with externally imposed requirements. To explore this, I assembled data from interviews, observations and public documents (see Chapter 2 for details) to uncover the set of events and actions that appear to have contributed to learning outcomes, as described in the next section of this chapter. As George and Bennett (2005) note, process tracing also involves assessing alternative hypotheses that might have a causal role. Several other possible factors in shaping learning, including the geographic size of the region, the degree of interdependence between actors and the perceived severity of problems, are also considered in this analysis.

Mechanisms for bridging the hierarchical and collaborative divide

The state’s rules for developing IRWM plans and applying for grant funds were intended to provide a framework for local agencies to engage with one another, ultimately leading to a transformation in their relationships and approach to water management. My analysis of the experience in the Kings Basin and Westside Sacramento region indicates that while other factors also matter, a trusted, well-resourced lead agency can play a critical role in translating the state’s rules into a meaningful collaborative process that generates learning. In the Kings Basin, the lead agency accomplished this through three key mechanisms, discussed below. This analysis will show that appropriate network management skills such as facilitation, leadership, or administration were important, but sustaining these over time required the support of an agency committed to regional-scale water management. This is particularly apparent when the Kings Basin experience is contrasted with the Westside Sacramento region, which lacked a single entity with capacity and willingness to serve as a lead agency.

Setting the stage for learning: brokering across state and regional interests

IRWM program rules instituted in 2010 required broad participation in the development of IRWM plans, and funding priorities were established to encourage the multi-benefit projects. In Chapter 6, I demonstrated that significant cognitive, strategic and institutional learning occurred in the Kings Basin, leading to a shared vision for regional water management and greater understanding of the needs of disadvantaged communities (DACs). A detailed examination of the process through which this learning took place indicates that the Kings River Conservation District used its position as a trusted, neutral convener to broker conflict between the state’s requirements and powerful water rights interests in the region. This set the stage for cognitive and strategic learning about the needs of the region as a whole, and in generating learning around the needs of low-income communities. In Westside Sacramento, on the other hand, the lack of a lead agency with

brokering capacity appears to have resulted in a process largely defined according to the state's guidelines but without deep stakeholder engagement, leading to only moderate learning about the region's needs.

Prior to 2010, the Kings Basin's IRWM process included irrigation districts, cities, counties and environmental organizations, each of which already had some experience working with KRCD in other settings. Low-income communities, who have had a difficult time engaging in water planning efforts due to their lack of resources, technical expertise, and relationships with other key players, were not involved. However, after DWR issued its new rules, non-profit agencies – including some that had advocated at the state level for IRWM planning to be more inclusive of DACs – began to attend meetings and urge attention to groundwater quality problems. However, broadening the tent was controversial. Many irrigation districts and cities were aware of the drinking water quality problems faced by many small, unincorporated communities, but most viewed it as the responsibility of others, such as the county and the communities themselves, to seek assistance from the Department of Public Health.

As community representatives and advocates began to attend Kings Basin meetings, initial interactions were adversarial, and NGO advocates were very vocal. As one environmental NGO representative commented, “they were really pounding on the table, and people were kind of like, I’m not sure about this.” This issue was threatening to irrigation districts and cities, which were concerned that attention to groundwater quality would divert resources from the group's primary focus on groundwater overdraft. It presented an even more fundamental challenge to their water rights. Irrigation districts in the region hold most of the rights to surface water, which is cleaner than groundwater. They worried that communities with contaminated groundwater supplies could demand access to surface water, threatening the long-standing rights of farmers. Yet, the new DWR guidelines required that the region demonstrate efforts to engage DACs, and growing attention among state policymakers to the drinking water quality problems these communities face meant that ignoring the issue had political costs.

Recognizing these facts, KRCD used its role as network manager to reframe the purpose of the collaboration. First, KRCD staff began to speak more inclusively about goals of the collaboration. Once participant noted, “I hear [KRCD staff] all the time saying, it's not just about groundwater. It's about all of these things.” They also met individually with members who were opposed to the involvement of DACs, laying out a rationale for why working proactively to find solutions would reduce threats to their own water rights. A KRCD staff member commented that they “had to, at some times, pull one of our member agencies aside and say, what you're trying to do is not consistent with where we want to go...we were able to talk about, well, casting them out isn't the solution, so what are the conditions for bringing them back into the process?” Over time, irrigation districts began to see that addressing water quality problems through the IRWM process was in their interest. As the KRCD staff member explained, “I've told them, at the end of the day, this is water rights protection. The way we protect your water rights is we solve problems so people don't look over the fence and covet your water rights.”

At the same time, KRCD engaged directly with non-profit advocates and DAC community representatives. They met with the non-profits who had started attending meetings, and encouraged them to formally join the IRWM process. One KRCD staff member described the interaction:

[The non-profits] started showing up as community members, and engaging in a fairly adversarial way. We approached them and asked if they wanted to be formally involved as an Interested Party. They said no, they didn't actually represent DACs, they represented the ideas. But we said that is still valuable. So they eventually joined.

KRCD also launched an extensive outreach effort to encourage low-income communities themselves to become members, and represent their interests directly in the process. In addition, KRCD invested considerable effort in putting together a proposal to DWR to obtain funds to study DAC needs. This pilot study, implemented by KRCD in collaboration with the Community Water Center and Self-Help Enterprises, among others, provided a crucial forum through which disadvantaged communities were able to understand their own needs better, and learn how participating in the IRWM process could help them obtain assistance in addressing those needs. Balazs and Lubell (2014) document how the interactions between DACs, KRCD and other participants in the Kings Basin process generated social learning around DAC needs. Over time, perspectives among regional participants changed. As one KRCD staff member commented, "I think the DAC community sees [The Kings Basin's IRWM process] less as an enemy and more as an opportunity, and I think the irrigation districts have come to recognize this potential conflict or threat, and the opportunity to mitigate it by engagement...so, that's been a big evolution." Although skepticism still remains on the part of a few participants, the vast majority of interviews with stakeholders confirmed this.

This does not mean that all barriers to DAC participation have been overcome. On the contrary, these communities still face significant technical and resource challenges in developing proposals that meet the IRWM requirements. However, there is now a commitment – certainly by KRCD and to increasing extent, by other participants – to work through problems that arise. For example, in 2013, a disadvantaged community put together a proposal for a project to address water quality needs, and requested that it be included in one of the region's grant proposals to DWR. The proposal was considered by a committee of Kings Basin participants established to review and select projects to be included in proposals to DWR (see the next section for a detailed discussion). The DAC project was not selected because committee members felt it would not meet DWR's standards. DAC community members expressed their frustration in Advisory Committee meetings. In response, KRCD and members of the project review committee took the step of forming a committee to discuss why this happened and propose solutions. One participant in the committee commented, "Instead of saying just, oh tough, we're going to move on, we immediately...I mean, immediately...convened a meeting with those who got their project and those who didn't, and out of that meeting came this need to work with DACs and find a way to get some funding." This led to the creation of a new working group on DAC issues,

whose on-going activities are supported by KRCD. Recognizing that DACs needed more support in order to comply with DWR requirements, one of the principal recommendations of this committee has been to find funding to hire a staff member for the region who could work full-time to provide assistance to DACs.

In Westside Sacramento, however, a lack of brokering across stakeholder interests has meant that the stakeholder outreach process complied with DWR requirements, but did not generate transformative dialogue among participants. The Westside process has been jointly managed by the four agencies on the Coordinating Committee, who hired consultants as well as a public agency to perform administrative tasks. These consultants and contractors did not lack skills or dedication. On the contrary, the lead member of the consulting team hired by the Westside Sacramento region had been involved in developing the statewide IRWM program, and was deeply committed to the program's overall purpose. Instead, the lack of consistent leadership in setting a direction for the region, and inadequate institutional capacity to sustain network management activities over time, appear to have limited this region's ability to engage deeply and build localized meaning around the IRWM requirements.

The consulting team responsible for developing the region's IRWM plan created a stakeholder engagement process focused on the required plan components, involving a series of public meetings and targeted consultations with specific stakeholders. This process did lead Coordinating Committee members to develop a shared understanding of a few common priorities, particularly around the problem of invasive species. However, some significant differences in perspectives remained unaddressed, such as tensions between a downstream county with long-standing rights to water originating in a county upstream. Stakeholders attended public meetings, but this did not seem to result in dialogue around issues of mutual concern. In comparison with the Kings Basin, one element that appears to be lacking is a consistent effort to engage stakeholders, particularly DACs and tribes, on issues of concern to them, inside and outside of formal meetings. Comments by one DWR staff member who interfaces with the Westside region reflected this. "You need to go out and ask people how their wells are doing. I think they didn't get a feel for this...A lot of regions struggle with this. It is a really intensive process, you need to be persistent in these efforts." With regard to tribal participation, the DWR staff member commented, "The consultants held a few different tribal meetings. I felt like it was good, but they were also trying to check off a box. I'm not sure what the follow through has been."

Evidence from interviews suggests that although the consultants were dedicated to the spirit of the IRWM process, their primary responsibility was to ensure that the region was complying with the IRWM program requirements. Coordinating Committee members remained responsible for providing leadership, including setting the overall direction for the regional planning process, brokering conflicts, and sustaining relationships over time. It appears that Committee members did not invest significantly in these roles. As one participant explained, "We hired consultants, and no one could afford to invest in ownership. We relied on [the facilitator] to drive things...[it] was more of a 'check the box' process - did we have all the required chapters to meet the standards?"

The comparison of the experiences of these two regions suggests that a trusted lead agency can play a unique role in bridging standards and rules established externally and the specific, contextual needs and interests of stakeholders. In the Kings Basin, the lead agency's long-term, neutral presence in the community, combined with its capacity to engage with the state, enabled it to translate otherwise generic requirements into priorities that are meaningful to participants. As a KRCD staff member commented, "You need an agency that is willing to step out and lead with local credibility, with commitment to try to keep everybody somewhere on the same direction." In Westside Sacramento, the consultants were not able to play this role without leadership on the part of local entities. Thus, while those involved in managing an IRWM region need to have skills in facilitation and stakeholder engagement, for leadership and brokering conflicts, without an organizational base from which to operate it is difficult to sustain this over time.

The lack of a single organization committed to managing the regional process is not the only reason why Westside Sacramento has not generated the same degree of learning in response to IRWM requirements as has the Kings Basin. The Westside participants do not rely upon a common water source, which has been an important motivator for Kings Basin participants to engage in the IRWM process. Because of this, the willingness of Coordinating Committee members to invest deeply in the process is understandably more limited. However, as Weber (2009) and Ansell and Gash (2008) argue, not all interdependencies are immediately apparent at the beginning of a collaboration, and instead require the development of shared meaning. The comparison of these two regions indicates that a trusted lead agency may be important for helping create this shared meaning, particularly in the presence of external requirements. For example, when DWR required regions to involve low-income communities, participants in the Kings Basin also did not initially perceive their interdependence with these communities' concerns. It was through KRCD's brokering efforts that their perspectives changed.

The experience of the large and diverse North Coast IRWM region (discussed in Chapter 4) also suggests that leadership and brokering on the part of the lead agency helped the region identify shared values that have made the IRWM process meaningful in that region. Like Westside Sacramento, no single agency existed at the scale of the region. However, Sonoma County Water Agency was committed to engaging deeply with stakeholder interests as they followed the IRWM program requirements. They hired consultants to run meetings and engage stakeholders, but implemented this as a long-term arrangement, which has been sustained over the past decade, allowing for relationships and trust to develop over time. This key ingredient of a sustained organizational commitment to brokering across regional and state interests appears to have been lacking in the Westside Sacramento region.

Developing collaborative processes that transform requirements into learning opportunities

One of the most significant changes brought about by the IRWM program was to require each IRWM region to submit a single grant proposal addressing regional needs. Previously,

local agencies had submitted their own applications to DWR for grant funding, based on their agency's needs and in response to calls for specific types of projects. In contrast, IRWM grants could be used to fund a wide variety of projects, but these had to meet regional needs as defined in an IRWM plan. Regional participants had to come together to agree upon which projects to include in the proposal. In addition, proposal development is one of the most rule-intensive aspects of the IRWM process. A survey of 27 IRWM regions indicated that regions spent an average of \$115,000 each to prepare a proposal for the 2011 grant round (Roundtable of Regions, 2011). While the state's requirements were intended to encourage participants to work together to define regional needs, complying with them involves significant administrative burdens, which regions often cope with by hiring consultants. In the process, opportunities for learning may be missed. The Kings Basin and Westside Sacramento illustrate two different approaches to developing proposals, and highlight the crucial role of a committed lead agency in creating and supporting a process that promotes practical engagement of network participants in the process of meeting DWR's requirements.

Before 2010, participants in the Kings Basin were not closely involved in developing proposals, and KRCD, with support from consultants, handled most of the process. However, after DWR issued its new, more detailed guidelines in 2010, KRCD established the Project Review Workgroup, composed of representatives of a small number of participating agencies. Those who are proposing a project for inclusion can participate but cannot rank their own project. The workgroup was charged with adapting DWR's proposal requirements into a set of criteria for ranking projects, and reviewing each project proposal based on those criteria. Committee members would then discuss their rankings, explore ways to combine or adjust projects to maximize competitiveness, and ultimately select which projects to include. KRCD would then prepare the proposal, with support from a consulting firm.

This process not only helped generate successful proposals that meet DWR's requirements, but also offered committee members an opportunity to learn about the work of other participants. In addition, deciding upon which projects to include required them to think concretely about the region's needs as a whole and reconcile this with the need to meet the state's priorities. As one committee member described it, "obviously, some people aren't happy if their project doesn't get in. But we have to look at it as, well, we're trying to get as much money as possible for the region. And so we have to look at what projects will score the best with the state and also meet the needs of the region...it's really complicated and difficult." Consultants working with The Kings Basin recognized the Workgroup's value. One commented, "[During the first round of funding], there were maybe 2-3 people understanding what the plan says, what they requirements were, etc. [In the next funding round], we had a workgroup reviewing and scoring internally. That has been a major success in my mind...previously, I think the process was too dependent on consultants or others who weren't as vested in the process."

Managing this process required significant investment and dedication on the part of KRCD staff. First, in order for the Project Review Workgroup to function effectively, KRCD had to

get participants to volunteer their time to review project proposals on behalf of the region. KRCD tried to make the process as easy as possible by coordinating the submission project materials by a certain deadline, compiling them and even delivering them to members of the workgroup. One participant in the Workgroup commented on KRCD's well-organized process: "First and foremost, they have a deadline. These projects have to be in, and they are well done...Then I'm told, we have a box for you at KRCD. That's a 30-mile round trip for me, and they offered to bring it to me. But I said, no problem I'll come pick it up...I called ahead, it was very organized. I had hard copies, a CD if I wanted it."

Also crucial to making this process work were KRCD's efforts to help translate DWR's requirements for agencies proposing projects for inclusion in a proposal. For example, KRCD developed a template to guide local agencies in submitting necessary project materials to the Workgroup, and even helped agencies with limited expertise and resources to fill it out. An environmental non-profit representative commented, "the project scoring process has changed two or three times, and for us that has been a challenge because each time you have to re-format. That is where we have depended heavily on [KRCD]. If it weren't for them, we wouldn't have had the time and experience to put it all together." Finally, involving stakeholders in the process takes time, so KRCD would start the proposal development process early to allow for this. One stakeholder who participates in multiple IRWM regions commented, "KRCD always sends out a call for proposals way earlier than other groups do, so they start developing and vetting things earlier than other groups. That might be one reason why Kings is so successful in getting funds." Another stakeholder recalled that during one proposal round, getting the final details sorted out took longer than expected, so KRCD staff member "actually drove the application all the way to Sacramento. We were at the last minute in finishing it, so he just got in his car and drove it up there."

In Westside Sacramento, instead of providing an opportunity for learning among network participants, DWR's requirements became a barrier to collaboration. During the 2011 funding round, Coordinating Committee members took on the task of proposal development themselves, seeking to avoid the expense of hiring consultants. After the Coordinating Committee discussed and agreed upon which projects to include, one member volunteered to assemble the proposal. However, this agency had limited staff time to dedicate to managing the process, and lacked in-depth knowledge of DWR's requirements. The resulting proposal did not score well and was not funded. This led participants to become increasingly frustrated with DWR's rules. Agencies whose projects were to be included in the proposal had struggled to produce the necessary materials. One project being prepared by a tribe had to be pulled out of the proposal because materials were not ready in time. Some questioned the value of working together on a joint proposal, with one participant commenting, "given how much rests on one organization's ability to put [a proposal] together that passes muster, there are some inherent hazards in there. This is not serving the whole region." For their next proposal, the Coordinating Committee hired consultants, who handled the entire process, including developing scoring criteria and ranking projects. This proposal complied with all requirements, scored well, and was

funded by DWR. However, this left limited opportunities for stakeholder interaction around the process of reconciling the needs of the region with the state's requirements.

The IRWM program's requirement that participants in a region develop joint regional grant proposals can present a considerable opportunity for learning. Processes that enable participants engage with one another in practical ways to accomplish specific tasks can be quite fruitful in terms of learning (Ansell, 2011, Innes & Booher, 2010, Healey, 2009). Those involved in designing the IRWM program indicated that they intended for the process of jointly developing and selecting projects to build new relationships. However, a comparison of how this process has played out in the Kings Basin and the Westside Sacramento regions suggests that considerable investment is needed at the regional level to turn this process into an opportunity for learning. This has been possible in the Kings Basin because of KRCD's capacity to invest staff time in understanding DWR's requirements, and to facilitate the participation of stakeholders in deciding which projects to include. In the Westside Sacramento region, consultants carried out the project selection and proposal preparation process in a way that complies with DWR requirements, but provided few opportunities for practical engagement on the part of stakeholders. This process has less potential to yield cognitive and strategic learning around the region's water management needs.

Providing stability and support for institutional learning

Institutional learning involves the creation of predictable patterns of interaction, helping participants gain sufficient certainty about the actions of others to enable them to invest in the process (Koppenjan & Klijn, 2004). These norms can be informal as well as formal, and informal dynamics are often critical for collaboration, enabling open exchange of information among participants and the flexibility needed for creativity (Ostrom, 1990, Innes et al., 2007). However, as Innes et al. (2007) point out, informal dynamics do not always mesh well with implementation of formalized, top-down rules. The experiences of the two case study regions demonstrate that a trusted lead agency can play a crucial role in providing the stability needed to develop predictable interactions, and in creating opportunities for informal dynamics to guide network functions, despite externally imposed requirements.

Prior to 2009, participants in the Kings Basin's IRWM process each signed a memorandum of understanding that provided everyone with an equal voice in decisions. However, when DWR issued new guidelines in 2010 requiring broader stakeholder engagement, it became clear that a new structure was needed to balance stakeholder interests, some of which were in tension with the state's new requirements. First, some irrigation districts and larger cities were concerned that their water rights might be threatened in a broad coalition involving environmental interests and low-income communities. Yet, DWR's guidelines required the involvement of these groups. This presented a tension between norms of interaction based on a representation, in which public agencies implement the will of the public, and the norms of collaboration – embedded in DWR's guidelines – in which legitimacy is built through meaningful participation by all stakeholders. In addition, there was a need to build sustainable financing for managing the IRWM process, and not

rely so heavily on KRCD's support. This could be achieved through member contributions, but DWR guidelines required that the process be accessible to all groups, regardless of their ability to pay.

After considerable discussion and consultation with lawyers, the group eventually decided to form a Joint Powers Authority (JPA), led by a Board of Directors composed of a representative from each member agency. Under California law, only public agencies can hold decision-making authority in JPAs, which relieved some of the concerns of water rights holders. As a KRCD staff member described it, "One of the original 6-8 foundational points that we all agreed to...was that we weren't going to mess with water rights. The JPA structure allows those who hold water rights, public agencies, to be in a position as the governance body to continue to protect those water rights." The JPA also enabled the group to build a stronger financial base, with each agency serving on the Board contributing \$7,000 each year, as well as a \$30,000 one-time contribution to cover costs incurred by KRCD starting in 2002.

However, this new governance structure did not allow non-profit organizations to be voting members, and the new membership dues were beyond the reach of some small communities. To sustain their engagement, another category of participation was created, called Interested Parties, which did not require a membership fee and could include non-profits. Interested Parties provided input to the Board through Advisory Committee meetings. However, for this arrangement to meet the needs of non-profit entities, participants needed to feel confident that Board members would take their recommendations seriously, even though they did not have a formal vote. Evidence regarding the functioning of this arrangement over the past several years suggests that while non-profits would still prefer to have a vote, informal norms have indeed emerged such that the decisions of the Board have always followed the recommendations of the Advisory Committee. In effect, decisions are made during Advisory Committee meetings, in which Interested Parties and Board members both participate, and are then confirmed through a vote by the Board.³⁹

KRCD played a crucial role in enabling this. Non-profits dropped their initial resistance to the new governance structure when an environmental representative stood up in a meeting to express his confidence in KRCD, based on his previous experience working with them. Trust between KRCD and non-profits representing low-income communities was still limited when this arrangement was established, and interactions in early Advisory Committee meetings were somewhat tense. However, KRCD consistently encouraged the full participation of non-profits representing low-income communities, as well as the communities themselves, and took actions to support their interests. This included

³⁹ The status of the Advisory Committee as equivalent to the Board became so well recognized that in 2013, several smaller cities decided to withdraw from Board membership and become Interested Parties instead, thereby avoiding paying the \$7,000 annual fee. This caused the group to revise its membership fee structure, creating a new membership fee level of \$3,500 for cities of less than 20,000 people, and instituting a voluntary contribution of \$250 for Interested Parties.

obtaining funding for a study of disadvantaged community needs, which KRCD implemented in partnership with several non-profits. Over time, the tone of Advisory Committee meetings changed. Meeting observations in 2013 revealed a camaraderie and humor among participants, and active participation on the part of low-income community representatives.

KRCD's commitment of staff resources has gone a long way toward supporting stable patterns of interaction between participants, as well as ensuring compliance with DWR requirements. Two KRCD staff members organize the group's eight meetings per year (four Board meetings and four Advisory Committee meetings), maintain meeting notes, handle new membership requests, ensure that all participants formally adopt the IRWM plan, and more. In addition, they handle all interactions with DWR. One participant emphasized how important this role was to the group's functioning, stating, "We could sit around a table and chew all we want, but it really takes folks like [KRCD's staff] to really bring it together. They get paid peanuts for the amount of work they do, but they're really valuable in terms of understanding how the application process works, talking with the state, attending workshops."

In contrast, the experience in Westside Sacramento reveals that institutional learning can be quite difficult to sustain without a lead agency, particularly when networks face significant external demands. The governance structure for Westside Sacramento, proposed by the consulting team, was adapted from an approach successfully used in an IRWM region in southern California. In that region, the formal decision-making body was a small committee representing core participants, but in practice, all decisions were made in close consultation with a Stakeholder Group. This group did not have a defined set of members, and anyone interested in participating could join at any time. Despite the relative informality of this group, the lead agency of the southern California IRWM region invested significantly in relationship building, resulting in robust participation in the Stakeholder Group, which became a real forum for collaborative decision-making.

This governance structure was designed to balance the need for a clearly defined decision-making body in order to comply with DWR requirements, with the need for flexibility in stakeholder engagement. However, when transferred to Westside Sacramento, the informal norms required to make this arrangement meaningful did not emerge. Although the consultants who developed the region's plan conducted outreach to numerous stakeholders with the intention to develop a Stakeholder Group, without a stable leader and administrator, routine patterns of interaction did not develop. Once their contract ended, the consultants encouraged the Coordinating Committee to dedicate at least part of a staff member's time to managing the process. However, the committee decided instead to contract with another agency, the Yolo County Resources Conservation District (Yolo County RCD) to handle a limited set of administrative tasks. Operating on a small budget and a one-year contract, Yolo County RCD has neither the resources nor the mandate to invest significantly in the administration and relationship-building required to build predictable patterns of engagement beyond Coordinating Committee meetings. Members of the Coordinating Committee recognize the limits to Yolo County RCD's role. One member

commented, “They will help facilitate the meetings and keep us organized. Keep records, do the tracking, some of that staff-type stuff. But their role is rather limited – they aren’t going to be doing the bulk of the work on this. They are more of an administrator. We need staff who can get into the issues.”

Under this arrangement, responsibility for building mechanisms for stakeholder engagement fell to the four agencies serving on Coordinating Committee, each of whom is intended to represent water interests within their county. One member, the Water Resources Association of Yolo County, had already developed routine interactions through its previous county-level IRWM process. The consistency and transparency with which WRA managed its county-level IRWM planning process from 2002-2007 had an impact on relationships with non-profit agencies in the county. One participant in the WRA-led IRWM process commented, “One of the major things the Yolo IRWM plan helped do was create partnerships with groups that we didn’t have trust with before. This was especially true for environmental groups. They appreciated that we had a transparent process, and they felt they could give input. Previously, they weren’t invited to meetings, and it wasn’t clear how to participate in the process.” Stakeholder engagement in WRA has continued to be robust, even after the IRWM planning process shifted to the Westside Sacramento scale. WRA meetings are held once a month, and still attract significant participation. As described by one participant from Yolo County, “Of all the meetings I go to, that is the best and most important meeting in terms of staying in touch with what’s really happening around Yolo.”

However, aside from WRA of Yolo County, other Coordinating Committee members do not appear to have developed similar patterns of consultation in the other counties, offering little routine opportunity for routine engagement on the part of stakeholders who do not have an official position on the Coordinating Committee. In Solano County, the Coordinating Committee member is the wholesale water agency, which has regular board meetings, in which the IRWM process is sometimes discussed. However, beyond participation in these board meetings, stakeholders have limited opportunities to bring their concerns to the table in order for the Solano County Water Agency to represent them at Coordinating Committee meetings. In Lake County, interactions between small water companies, tribes, and the county’s watershed protection district have been sparse, and often tense. The IRWM process has led to a new effort to build more constructive relationships and more regular patterns of interaction, led by a facilitator from the Center for Collaborative Policy. It is not yet clear whether stronger relationships between the county and stakeholder interests will emerge. In Napa County, the process for engagement appears limited. All of this suggests that opportunities for informal dialogue, which is so critical for learning, are limited across most of the Westside Sacramento region.

Finally, it also appears that the Westside Sacramento region’s efforts to comply with the Brown Act have limited opportunities for informal discussion among Coordinating Committee members themselves. The Brown Act prohibits a majority of members of a public governing body from discussing the business outside of publicly announced meetings. One of the Coordinating Committee members noted during an interview that because the Committee has only four members, even if two of them meet or even talk by

phone between meetings, they are technically out of compliance with the Brown Act. The lack of staff dedicated to coordinating the process presents a key barrier here. As this Committee member explained,

We don't have an administrator, that makes it kind of difficult. You can't put something together before the meeting because that is a violation of the Brown Act...If we all independently came up with ideas, and showed up at the meeting, that would be ok. But I couldn't independently talk to [other Committee members] and come up with an idea...When counties do this, their board of supervisors don't meet together outside, they send staff to develop stuff. The staff can work together and do things.

In comparing the process through which the Kings Basin and Westside Sacramento regions have developed new routines of interaction – that is, the process of institutional learning – once again the role of the lead agency emerges as crucial. In the Kings Basin, the creation of a formal governance structure that placed public agencies in a decision-making role was accompanied by significant investment on the part of KRCD in building strong relationships with a broader set of stakeholders who participate as Interested Parties. Through this, informal norms have developed such that in practice, Advisory Committee meetings involving all participants have become the main forum for discussion and decision-making in the Kings Basin. The Westside Sacramento region, on the other hand, has operated with only basic administrative support since the completion of its IRWM plan. Informal routines of interaction involving stakeholders outside of the four-member Coordinating Committee have not evolved. While this might be partially attributed to a lower degree of motivation due to diverse interests and less severe problems than in the Kings Basin, it appears that the lack of investment in network management has also limited the potential of this region to generate new, stable patterns of interaction with one another at a regional scale.

Conclusion

The comparison of the process of learning in the Kings Basin and Westside Sacramento regions reveals three specific ways in which network managers, supported by a centralized network structure, help to bridge the divide between hierarchical and collaborative modes of governance. The delineation of these roles contributes to current theory regarding learning in networks and collaborations. In particular, I argue that that a centralized network structure is important for providing the necessary support for staff to build the knowledge and skills they need to be effective network managers. The skills and personal leadership qualities of network managers are important, but in order to cultivate these skills and build sustained relationships, network managers need support from an organization that is motivated to invest in activities that benefit the whole region. The experience of Westside Sacramento suggests that while contractors can provide administrative help, they are unlikely to build long-term relationships or exercise leadership in brokering solutions to conflict.

First, the two case studies explored here indicate that a lead agency with brokering capacity can help to reconcile state interests with those of stakeholders within a given

regional network. This builds a sense of purpose, and enables dialogue and learning, rather than focusing solely on compliance. This analysis links the specific skills and commitments of network managers with the organizational capacity needed to accomplish this. Weber and Khademian (2008) describe a “mind-set” of network managers that is crucial for networks grappling with “wicked” problems.⁴⁰ Included in this “mind-set” is “a commitment to governing *with* government” and “a commitment to govern within the rules yet think creatively” (p. 341). In this case study comparison, these qualities certainly emerge as important factors in how KRCD staff supported learning within the Kings Basin. However, this chapter’s empirical analysis emphasizes that they were supported in this by a lead agency with an organizational commitment to regional planning. The importance of organizational capacity is highlighted by Hahn et al. (2006), who identify the role of a “bridging organization” in providing crucial capacity for learning. Such entities supporting learning by building “vertical” connections within the larger institutional environment, while also establishing “horizontal” relationships with local entities who would otherwise would be suspicious of government. Other research on collaborative processes has also suggested the importance of a sustained local presence, arguing that agency staff play a unique role in maintaining institutional memory that cannot be replaced by external facilitators or consultants (Margerum, 2002, Leach & Pelkey, 2001).

Second, research on collaboration has found that learning is often best supported when participants have the opportunity to work together in practical ways to solve problems (Innes & Booher, 2010, Ansell, 2011, Shields, 2003). My study demonstrates that externally imposed rules, which are typically viewed as constraining learning (Lejano & Ingram, 2009, Currie & Suhomlinova, 2006), can actually become a platform for such practical problem solving. In the Kings Basin, accomplishing this required the presence of skilled network managers with adequate organizational support who were able to translate and communicate requirements in accessible ways, and provide the administrative support needed to enable network participants themselves to wrestle with balancing state requirements with local needs. My findings indicate that a centralized network form provides more support for sustaining these efforts than does a decentralized, shared approach, as long as the lead agency can act in a neutral manner. Despite being a member of the Kings Basin process, KRCD appears to have behaved in an impartial manner toward all participants.⁴¹

Finally, research on collaborative processes has suggested that informal dynamics are crucial in supporting learning (Innes et al., 2007), leading some to conclude that rule-based

⁴⁰ Weber and Khademian (2008) use the term “collaborative capacity builders” to describe a very similar role to that of network managers.

⁴¹ Although this study does not analyze learning in IRWM region following a network administrative organization (NAO) structure, these findings are likely applicable in NAO networks as well. For example, Provan and Kenis (2008) suggest that an NAO may be even more likely to provide neutral brokering, since the organization has been formed for the purpose of managing the network.

approaches will necessarily limit learning (Lejano & Ingram, 2009). This analysis confirms the importance of informal dynamics, but suggests the possibility that they can be still flourish in a hierarchical setting if adequate capacity exists for network management. Lead agencies acting impartially on behalf of a network can invest in cultivating relationships, building trust, and establishing routines of interaction that enable informal dialogue, while still complying with rules.

In identifying mechanisms through which a lead agency may help enable learning in the presence of external requirements, it is important to acknowledge that other factors play a role in determining learning outcomes. More limited biophysical interdependence, less severe problems, and a larger geographic size may all have contributed to lower levels of learning in Westside Sacramento than in the Kings Basin. Rather than downplay the relevance of these factors, this analysis suggests that the presence of a trusted, well-resourced lead agency is also important, and is closely intertwined with these other factors. In some cases, the presence of a lead agency may help mitigate their effects. As other researchers have found, interdependence is not always evident at the beginning of a collaborative process, and instead must be cultivated (Ansell, 2011). This analysis suggests that a lead agency may be able to help set a vision and support dialogue that can help participants discover mutual dependencies that they had not previously recognized. Similarly, a lead agency may also be able to help overcome some of the constraints posed by long travel times to attend meetings. For example, although Westside Sacramento's larger size may have limited stakeholder interactions, it is also true that some participants in the Kings Basin had to travel long distances to participate in meetings. Regular meeting schedules and frequent communication with KRCD between meetings appear to have helped overcome this barrier.

Chapter 8. Conclusion: Toward adaptive water governance in California

As natural resource managers face increasingly complex problems – heightened by new risks presented by climate change – collaboration has become an increasingly common approach to management, particularly because of its capacity to enable learning (Koontz, 2014). When confronted with ecosystem dynamics that are deeply intertwined with socio-economic patterns and operate in uncertain and non-linear ways, collaborative networks can promote learning by enabling informal problem-oriented dialogue, and integration across diverse forms of knowledge (Innes & Booher, 2010, Weber & Khademian, 2008, Lejano & Ingram, 2009). Through interactions between scientists and stakeholders, collaborative arrangements often excel at building understanding of problems in context, enabling new approaches to management. As Karkkainen (2002, p. 223) puts it:

By bringing these parties together, then, the regional collaborative institution is pooling a richly diverse mix of policy-relevant information derived from various angles of vision, and reflecting varying degrees of resolution. Information about the broad, diffuse benefits and concentrated, localized costs, as well as the relevant science, is pooled around a single table. Parties are in a position to exchange information, to learn from each other, to build a richer collective understanding of the multiple dimensions of the problem than any of the parties acting alone might be able to generate, and thus potentially to establish the basis for better-informed practical deliberation and problem-solving.

Karkkainen and others have also noted some of the challenges involved if collaborative governance is to provide a sustained and effective platform for managing environmental problems. To enable in person, problem-oriented dialogue, collaborative processes are mostly carried out at local and regional scales. Conditions in these localized settings are influenced by, and have their own influences on, socio-ecological systems at larger scales. In California, for example, the dynamics of the Sacramento-San Joaquin Delta ecosystem are profoundly influenced by infrastructure and management activities upstream, and by water demands downstream. In turn, the condition of the Delta ecosystem has ripple effects for water managers across the state, such as through pumping restrictions intended to protect fish populations (Hanak et al., 2011). In addition, climate change is altering global climate patterns in ways that deeply affect the management of local water systems across California, and indeed the globe (DWR, 2015a, Milly et al., 2008).

Attending to such cross-scale dynamics inevitably brings collaborative processes into contact with state or national-level governance structures, whose orientation toward rule compliance often conflicts with the informal and sometimes messy dynamics of collaboration, and can constrain learning. In order to address multi-scalar problems, learning and coordination must take place vertically as well as horizontally (Cash et al., 2006, Pahl-Wostl, 2009). Ultimately, as described by Karkkainen (2002, p. 243), the challenge is to “move from a series of discrete local experiments to a larger and more robust coordinated system of collaborative ecosystem governance institutions without

losing the local, participatory, and experimental character that appears to be so critical to their success.”

California’s Integrated Regional Water Management process embodies these challenges. It was designed to encourage local agencies to build collective understanding of water management problems at regional scales, and to define their own priorities and strategies to address them. At the same time, the state government also uses the program to advance its priorities, such as promoting environmental stewardship, planning for climate change, and addressing the needs of low-income communities. The \$1.5 billion in state funding dedicated to the program has created a strong drive toward accountability. As the agency responsible for managing the IRWM process, DWR has instituted detailed requirements to ensure that public funding is spent according to the legislative mandates. Regions face a significant challenge in complying with such requirements while also developing and maintaining dynamic collaborative arrangements in which learning can flourish. Regions must engage with state government officials who are sometimes, as one former state government official put it, “trying to stop bad things from happening, rather than trying to make good things happen.”

Below, I summarize my key findings and contributions regarding how hybrid governance forms work to manage complex environmental problems, and identify key areas for future research. I discuss these under four headings: 1) network managers as catalysts for learning in hybrid governance arrangements; 2) defining scales of collaboration in the context of water management; 3) the role of government in “meta-governing” networks; and 4) building capacity for learning across scales. Finally, I offer thoughts regarding the future of the IRWM process, particularly in the context of the on-going drought and the re-negotiation of state and local roles that it has initiated.

Network managers as catalysts for learning in hybrid governance arrangements

A central finding of this dissertation is that the IRWM process, with all of its rules and requirements, has nonetheless generated learning among water stakeholders in California. During my research, I met many observers and participants with cynical views of the IRWM process, and heard many references to the joke that “IRWMP” stands for “I Really Want My Project,” or “I Really Want Money Please.” However, I also encountered many participants who, while acknowledging the program’s frustrations and imperfections, spoke about the new perspectives and relationships they had gained through the process. I have demonstrated in my analysis of the Kings Basin region that the IRWM process has generated learning in terms of building a shared understanding of problems, new relationships between stakeholders, and new routines of interaction that provide opportunities for joint problem solving.

In seeking to explain why the IRWM program produces learning in some settings and not in others, I have focused on the capacity for network management at the regional scale.

Previous research has demonstrated the importance of network management in promoting dialogue and creating opportunities for practical problem solving as avenues for learning (Klijn, Steijn, & Edelenbos, 2010, Koppenjan & Klijn, 2004). I build upon this work by highlighting the important function of network managers in serving as a bridge between collaboration and hierarchy. This role is similar to that of “bridging organizations,” which have been described as mediating and translating scientific knowledge to support policy actions, as well as supporting the development of horizontal as well as vertical interactions (Hahn et al., 2006, Crona & Parker, 2012, Folke et al., 2005, Cash et al., 2006). My study provides empirical evidence that bridging organizations can play a role in balancing the demands of accountability to state mandates with the need for informal dynamics that promote learning.

My research also helps to characterize the elements of network management capacity that matter for learning in hybrid governance settings. Most network literature has focused either on network structure or on the agency of network managers as explanatory variables for network effectiveness and learning (Williams, 2002, Newig et al., 2010, Weber & Khademanian, 2008, Provan & Milward, 1995). I argue that these two elements are closely inter-linked. The skills and dedication of individual network managers are crucial for supporting learning in a network. However, these skills are unlikely to be sustained without an organizational structure that enables staff to specialize in these activities. Furthermore, when networks must comply with externally imposed rules, administrative capacity becomes even more important, and this requires a stable organizational presence.

My study indicates that centralized network structures – managed either by a lead agency or a network administrative organization – are associated with more staff time dedicated to network management activities. Such centralized structures enable staff members to focus on managing the network, and build knowledge, skills, and relationships over time. These qualities are crucial if regions are to build deliberative processes that comply with state requirements, but are not constrained by them. The comparison of the experiences of the Kings Basin and Westside Sacramento regions suggests that hiring consultants to prepare an IRWM plan may help ensure that it complies with requirements, but is unlikely to generate strong engagement from regional participants. Leadership from public agencies is still needed. Some tasks, particularly vision-setting and brokering across state and local interests, cannot be effectively contracted out. Yet, in today’s “hollow” state, staffing at public agencies has become thinner as consultants take on larger roles (Milward & Provan, 2000, Terry, 2005).

Network management capacity alone does not guarantee learning. If stakeholders view themselves as interdependent with one another and perceive problems as severe, they may be more motivated to contribute their time and knowledge to the process. In the Kings Basin, common dependence on a single groundwater basin combined with the severity of groundwater overdraft and nitrate contamination problems produced a strong motivation for stakeholders to engage. In contrast, the diversity of water sources and less severe water supply and quality issues in the Westside Sacramento region may be partly

responsible for the limited stakeholder engagement observed. The large size of Westside Sacramento has also made it more difficult for stakeholders to interact in person.

Rather than considering network management capacity as a separate variable, I find that it is closely intertwined with these other factors. The history of intense conflict over water in the Kings Basin led to the creation of the Kings River Conservation District as an entity that could engage with state government on behalf of water users in the region. The fractured history of the Westside Sacramento region, on the other hand, helps to explain its lack of a regional entity spanning the four counties involved. At the same time, the presence of an organization with capacity for regional-scale coordination is not only the result of an awareness of significant water problems, but it also can help stakeholders recognize that such problems exist in the first place. For example, KRCD has played an active role in shaping perspectives on water issues in the region, for example by helping stakeholders to recognize the urgency of the dual water supply and quality issues in the region.

This study lays the groundwork for further research on how capacity for network management affects learning in collaborative settings that are influenced by hierarchical rules. My research is based on a comparison of two case studies, and the investigation of additional cases would make my findings more robust. A larger number of cases could help to better identify the role of other factors aside from network management capacity, and gain a greater understanding of how they interact with one another. Abers and Keck (2013)'s study of the creation of river basin committees in Brazil provides some insight into these dynamics. They found that no single set of variables could explain the patterns they observed in the development and operation of these committees. Instead, it was the process through which committee members sought to utilize resources, relationships and ideas that mattered. While they acknowledge the need for an organization to support stakeholder interactions, Abers and Keck place particular importance on individual agency in shaping outcomes. In contrast, my study emphasizes the need for a centralized network structure to support network management activities. A deeper comparison of the experiences in California and Brazil could yield interesting lessons regarding the role of network management and the specific kinds of capacity required to support regional planning.⁴²

Defining scales of collaboration in the context of water management

Literature on integrated water management has long emphasized the need to organize governance along biophysical boundaries, such as watersheds (Schlager & Blomquist,

⁴² One potentially relevant difference between the two settings is that in Brazil, national and state policies appear to have played a smaller role shaping the actual implementation of regional planning, as compared with California. If IRWM regions face higher demands in terms of compliance than do the river basin committees in Brazil, Network structure may be more important since it helps ensure administrative consistency in complying with state guidelines. However, further research is needed to explore this hypothesis.

2000, Mitchell, 1990). However, noting that jurisdictional boundaries rarely match biophysical ones, some scholars have questioned whether imposing a new governance arrangement based upon physical boundaries will yield the necessary coordination across existing jurisdictions (Lundqvist, 2004, Moss, 2006, Meadowcroft, 2002). My analysis suggests that it is possible to build legitimacy around a new collaborative process at a hydrologic scale that encompasses multiple jurisdictions, but it requires a deliberative process that engages stakeholders, identifies shared interests, and develops new norms supporting routine interaction. These new processes must operate within the context of existing institutional structures, and account for socio-economic and political forms of interdependence as well as hydrologic ones.

My study shows that the scale at which capacity for network management currently exists is important in determining the appropriate scale for initiating collaboration. DWR tried to encourage collaboration at the scale of 11 Funding Areas that roughly match hydrologic regions in the state. However, only three IRWM regions chose to form at this scale. Most organized themselves at much smaller scales, and followed a combination of hydrologic and jurisdictional boundaries. In addition to conforming to socio-economic or political forms of interdependence, the scale of IRWM regions may also reflect a lack of pre-existing capacity for convening and managing a collaborative process at hydrologic scales. Such capacity takes time to develop, and may only emerge as dialogue within and across the current set of IRWM regions continues. Given California's long tradition of local control over water resources, the development of regional visions of water resources, and the institutional arrangements to enable action at these scales, is likely to take place over multiple decades.

From the state's perspective, however, the hybrid and overlapping boundaries of the 48 IRWM regions seem messy. Only in a few cases do IRWM regional boundaries match those of the state's nine Regional Water Quality Control Boards, which are the primary scale at which state exercises its regulatory authority over water supply and quality. This has troubled some state officials and water policy experts. For example, the Public Policy Institute of California (PPIC) has argued that the IRWM process "has not yet served as an effective incentive for additional integration of multiple water management functions at the watershed scale," and suggested that the IRWM process should be replaced by "regional stewardship authorities" matching the scale of existing regional water quality control boards (Hanak et al., 2011, p. 365). However, this approach does not account for the challenges involved developing legitimacy around such watershed-scale authorities, particularly given the state's tradition of local control over water resources. The experience of Westside Sacramento, one of the few regions in the state whose boundaries were largely determined by DWR, indicates that without an entity in place to provide leadership and administrative capacity at that scale, it may be difficult to establish legitimate governing arrangements that support learning. My study highlights the importance of considering the institutional capacity needed to build viable governance arrangements at watershed scales.

The role of government in “meta-governing” networks

This study also provides insight into the role of government in supporting collaborative processes to manage water resources. Much of the literature on network meta-governance suggests that governments should step away from a rule-based approach, and instead engage in “soft” steering, providing broad guidance and technical assistance (Martin & Guarneros-Meza, 2013, Torfing et al., 2012, Sorensen & Torfing, 2009). DWR’s steering of the IRWM process appears to have “soft” and “hard” aspects. On the one hand, DWR allowed considerable flexibility in the formation of regions; the pressure placed on the Westside Sacramento region to follow watershed boundaries appears to have been the exception. On the other hand, DWR’s extensive requirements for the development of IRWM plans and its detailed grant proposal rules might be considered an example of “hard” steering.

This study suggests that these rules, particularly those requiring IRWM regions to engage a broad range of stakeholders in their planning processes, have had some positive effects in terms of learning in regions with adequate capacity for network management. Without DWR’s requirements, the irrigation districts that formed the Kings Basin IRWM region would probably not have reached out to include disadvantaged communities. However, the Kings River Conservation District played a crucial role in ensuring that these rules became meaningful to stakeholders. They did this by negotiating across diverse interests in the region, and finding ways to articulate a regional vision that accounted for the state’s interests as well as those of the region. Evidence from the Westside Sacramento region suggests that without capacity for leadership and negotiation on the part of a lead agency, DWR’s requirements led to a focus on compliance without sparking significant stakeholder engagement or building understanding of shared regional interests.

Further research is needed to understand how rules that help ensure accountability and consistency can still allow each network the flexibility to determine its own approach. One set of questions relates to the nature of the rules themselves. For example, some scholars have suggested that governments should provide broad guidelines and set targets for performance, but that networks should have flexibility in how they reach these targets, and even provide input in setting them (Ansell, 2011, Torfing et al., 2012, Sabel & Zeitlin, 2010). We need to develop a better understanding of how these approaches can be operationalized, and the degree to which they satisfy demands for public accountability, particularly for large government agencies that continue to follow hierarchical structures.

Another set of questions relates to how meta-governors can encourage the development of network management capacity, which this study has shown can help networks survive in hierarchical environments. First, by providing networks with flexibility in defining the scale of their operations within broadly defined parameters, a meta-governor can allow networks to form around existing resources and capacity. DWR’s flexibility with regard to boundary formation enables this in many IRWM regions. Second, in resource-limited settings, meta-governors may be able to provide technical assistance or grants to support the development of capacity for network management. This can help enable networks to build meaningful stakeholder engagement while also maintaining rule compliance.

Building capacity for learning across scales

This project began as an exploration of what adaptive governance arrangements might look like in the context of water management. A crucial role of such governance structures is to enable learning across scales in the context of multi-scalar environmental problems (Cash et al., 2006, Pahl-Wostl, 2009). This study has focused on how regional-scale governance capacity can not only bring local stakeholders into conversation with one another, but also help them to engage with state interests. When networks are able to provide a space for stakeholders to interact collaboratively and engage in dialogue around what state rules actually mean in their own regional context, this enables learning across scales.

However, this study has not addressed several other dimensions of the challenges of governing complex problems across scales. Has learning occurred at the state level, among the staff at DWR or other state agencies involved in water management? What about learning between IRWM regions, and the beginnings of understanding and capacity for action at multi-regional scales? Such vertical and horizontal learning would build critical capacity for addressing problems beyond the scale of individual IRWM regions. My research has uncovered indications that both types of learning may be occurring, but further research is needed to explore these.

With regard to vertical learning, DWR's management of the IRWM process, while bureaucratic, has nonetheless provided numerous opportunities for interaction between its staff and participants in IRWM regions. Through frequent meetings to solicit feedback on IRWM requirements and ten workshops held as part of the DWR's IRWM strategic plan process, participants in IRWM regions have offered considerable feedback to DWR regarding their needs and the constraints that complex rules have imposed. Interview evidence, combined with changes that DWR has already made in response to this feedback, suggests that attitudes within DWR are evolving. This is particularly evident in the way the program functions to support disadvantaged communities. By 2012, DWR had simplified cost-benefit analysis requirements for projects addressing disadvantaged community needs. The DAC pilot studies funded by DWR in seven IRWM regions set the stage for several changes in 2015, including allowing project funds to be spent on project development, and setting aside funds to support DAC and tribal outreach and engagement. The types of projects that DAC funds can support have also been expanded beyond those addressing "critical drinking water supply and quality needs" to include the needs of urban DACs. Many of these changes emerged as a result of dialogue between DWR officials, IRWM regions and environmental justice advocates. For example, a workshop in December 2014 involving DWR and representatives of the seven DAC pilot studies generated a series of recommendations (Drew et al., 2015). At the 2015 IRWM conference, a DWR staff member and a representative of one of the NGOs involved in conducting a pilot study gave a joint presentation reporting on these recommendations and the steps DWR is taking to respond (Sparks & Antos, 2015).

Second, collaborations are emerging between IRWM regions. Relatively early in the history of the IRWM process, several IRWM regions took the lead in establishing an informal

network called the “Roundtable of Regions” (RoR). Facilitated through the volunteer efforts of a few IRWM regional coordinators, RoR serves as a forum in which IRWM regional representatives discuss challenges they face in implementing DWR’s requirements, and provides a way to interface with DWR with a united voice to advocate for improvements. The group holds monthly conference calls among IRWM regions and an annual conference, providing a forum for IRWM participants and DWR staff to interact outside of the setting of a formal public meeting. Another multi-regional collaboration is the Sierra Water Working Group (SWWG), a collection of ten IRWM regions in the Sierra Nevada. Initially supported through a grant from DWR, SWWG is a relatively informal effort that gained momentum through an annual conference at Lake Tahoe involving representatives of each of the ten IRWM regions. SWWG has become an important avenue for IRWM regions to share concerns specific to the Sierra Nevada, and also provides a platform for joint advocacy with the state regarding the needs of this larger region. SWWG is now evolving toward a more formalized organizational structure. Finally, there are several smaller collaborations among neighboring IRWM regions, such as the three regions located in the San Diego Funding Area, that have provided opportunities for discussion of issues that cross IRWM regional boundaries.

Further investigation of these vertical and horizontal learning processes could provide valuable insights into the dynamics of adaptive governance. Key questions include how interactions between IRWM regions and DWR are helping to transform the culture and management practices within DWR, and whether alternatives to rule compliance are emerging for ensuring accountability. Horizontal learning across IRWM regions may signal the emergence of new norms of interaction that extend beyond political jurisdictions, lending visibility to socio-ecological connections at new scales.

The future of the IRWM process

While this research was being conducted, the future of the IRWM process was uncertain. In 2012, state officials and IRWM participants were beginning to anticipate the depletion of the \$1 billion allocated in 2006 for IRWM funding through Proposition 84. California was in the midst of a serious budget crisis, and many doubted that voters would be willing to support another major water bond. Participants and observers wondered whether IRWM regions would continue to function when the funding ran out. Was the IRWM process really just about the money? Or had local agencies become invested in relationships and regional collaboration in a way that would survive the disappearance of project funds?

Most of those who had been involved in designing the IRWM program believed that the IRWM program should be generating value outside of project funding. By working together, they argued, local entities should see the value in avoiding duplicative planning, and in aligning their programs and spending in more efficient ways. One former state official commented, “Everyone is going to the IRWM program saying they will get money. Really, it should be about saving money as a result of coordinating with [each other]. The state is not going to be funding [IRWM regions] forever.” A conservation advocate who had helped create the program commented that the purpose of IRWM is “to give the resources to

attempt to not do business as usual. It is certainly not [to provide] funding for projects that probably would be done anyway. These guys have tens of billions of capital outlay. The point was to eventually re-direct some of that.”

The question of whether or not the IRWM process is generating benefits beyond project funding has been central to this study. While it depends upon the region, my findings indicate that in many regions the answer is yes. The experience of the Kings Basin region shows that in a setting with a long history of water conflict and some of the most severe water quality and groundwater overdraft problems in the state, the IRWM program has led to a new understanding of problems on the part of key stakeholders, and new relationships that hold promise for collaboration beyond IRWM grant funding. Critical to this success has been the role of the Kings River Conservation District, not only in mediating across the diverse interests represented in the region, but also reconciling these interests with those of the state.

Conditions in the Kings Basin may have been particularly well suited to successful implementation of the IRWM process. These do not exist everywhere in the state, as my findings regarding the Westside Sacramento region confirm. More research is needed to fully assess the experiences of the other IRWM regions included in this study, but my analysis of the 17 other sample regions indicates that learning is likely occurring in some of them. I have argued that network management capacity supported by a centralized network structure is one important ingredient for supporting learning. Aside from the Kings Basin, nine out of the 19 regions studied have a centralized structure (lead agency or NAO), and invest at least 50% FTE of staff time in network management.

In addition, numerous comments made by coordinators in the 19 IRWM regions suggest that the Kings Basin is not alone in generating broader outcomes of the IRWM process. A consultant who has worked with several IRWM regions commented on the collective mindset that emerges:

In some cases, it’s a collective ethos that develops...I have seen astounding altruism...Project sponsors with a perfectly competitive project, stepping aside to let someone else who needs [funding] more go forward...I have also seen the bloodthirsty, the survival of the fittest. But in the good ones, this interesting spirit comes about.

Others have noted similar transformations in attitudes. Another consultant with a long history of involvement in IRWM planning referred to this not as altruism, but as a “pragmatic” approach in which participants begin to recognize why it is in their interest to help other agencies succeed. As one architect of the IRWM program put it, IRWM is about “getting people think in ways that are in their self interest, but are not always easy to see.”

Learning, of course, does not guarantee improved resource management outcomes. For example, the Kings groundwater basin is still in critical overdraft. The IRWM process, while it has led to projects to expand groundwater recharge and improve water use efficiency, has not yielded agreements to curtail pumping. Many small communities still suffer from

contaminated groundwater. These problems cannot be solved through the IRWM process alone; this will require far more resources than IRWM grants can offer, and probably more regulatory pressure from the state. However, the IRWM process has arguably laid the groundwork for solutions through the shared understanding of problems and new relationships that have emerged. As one of the creators of the IRWM program commented, “Changing peoples’ relationships is the most difficult thing to do, but it has lasting results.”

The state’s role in building capacity for network management

Perhaps the most important policy implication of this research is that in order for the IRWM process to generate learning, adequate resources need to be invested to support management of the collaborative process at regional scales. Almost all regions received some initial funding to support coordination activities during the process of developing an IRWM plan, but now that their plans have been completed, participants must find own resources to sustain the process. Within California’s highly fragmented institutional environment for water management, this can be challenging for several reasons.

In most urban areas of the state, water agencies have substantial budgets with income from multiple sources, which gives them the flexibility to dedicating funding and staff time to engage in collaboration outside of their service area boundaries. Some of these agencies have been involved in regional-scale planning for a number of years, and have recognized its value, particularly in southern California where water resources are more scarce. The challenge in these settings is for the IRWM process to find a niche within these on-going efforts, such that agencies see it as worthy of investment. In many parts of the state, however, water agencies have more limited resources, and less flexibility. In 1996, Proposition 218 amended California’s constitution to require that fees charged for property-related services, including those related to water, cannot exceed the cost of providing the service. Further, any fee increases are subject to a public hearing and some must receive voter approval (Hanak et al., 2014). For water agencies that rely almost solely on ratepayers for their revenue, this places significant constraints on utilizing funds for activities that are difficult to trace directly to service delivery.⁴³ In addition to this legal constraint, rural water agencies have a relatively small number of ratepayers, and limited budgets.

Under these conditions, finding local resources to support on-going regional-scale collaboration can be difficult, particularly in rural areas. Based on the range of investment levels currently being made by IRWM regions in network management activities, support for coordination does not require a massive investment. Of the 19 regions included in this study, the three members of the San Diego IRWM region probably make the largest annual

⁴³ Proposition 218 also poses significant challenges for larger urban water agencies seeking to implement tiered rate structures with higher charges for using larger amounts of water. In April 2015, a state appeals court ruled that the tiered rates of the city of San Juan Capistrano violated Proposition 218, causing concern for many water agencies who are seeking to use tiered rate structures to achieve mandatory water conservation targets during the current drought (Stevens, 2015b). The California Supreme Court upheld this ruling in July 2015.

contributions to support their regional process, at \$100,000 each per year. Smaller IRWM regions in rural parts of the state could likely function at lower levels of funding. One consultant interviewed for this study speculated that \$50,000 - \$70,000 might be adequate in some settings. Compared to the \$1.5 billion already expended on the IRWM process, supporting network management activities would be a small investment, with potentially significant payoffs.

The need for funding to support IRWM regional operations is reflected in the recommendations emerging from DWR's strategic planning process for the future of the IRWM program. Undertaken between 2012-2014, the process involved ten workshops held across the state to gather input from IRWM participants regarding the vision and goals of the program as well as ways to improve implementation. Based upon feedback received during these workshops, DWR's draft strategic plan recommends that the state "provide noncompetitive base-level funding, subject to State accountability requirements, for individual IRWM regions to help support key operations." DWR suggests that \$250,000 be allocated per year to each of the 48 IRWM regions, representing a total investment of \$12 million per year. These funds would be intended to support "stakeholder engagement, coordination and collaboration, IRWM plan updates, and participation of underrepresented groups such as DACs and local agencies with budget constraints," (DWR, 2015e, p. 7).

To implement this recommendation, funds would need to be appropriated by the legislature, and achieving this could be an uphill battle. Several current or former state officials suggested during interviews that the legislature is typically reluctant to allocate funding for staff to perform coordinating functions, because it is difficult to trace the outcomes of such investments. Language in the recommendation itself – "subject to State accountability requirements" – hints at this challenge. The Department of Conservation's Watershed Coordinator Program obtained funding for approximately 50 watershed coordinators by tying their activities to the development of watershed assessments. A 2008 report on the activities of watershed coordinators demonstrates that in addition to facilitating these assessments, the partnerships that these coordinators developed helped local agencies access additional state and local grant funds (DOC, 2008). Many have also become deeply engaged in IRWM processes, and some have even served as coordinators for IRWM regions. However, funding for all watershed coordinators ended in 2014, as other funding priorities have taken precedence.

By November 2014, the California economy had recovered, and the state was in the grips of one of the most severe droughts on record. Voters approved Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act, containing \$7.5 billion to improve water management in the state. The bond included \$510 million to for the IRWM process, as well as several hundred million dollars in additional funding targeted for water conservation, water recycling, and flood management that could also be accessed by IRWM regions. Proposition 1 does not include funding to support the overall operations of IRWM regions. However, it does reflect some of the lessons learned through the first decade of IRWM funding, particularly with regard to the needs of disadvantaged communities. The bond allocates 10% of all project funds to support disadvantaged community needs, and

unlike under Proposition 84, these funds can be used to develop projects as well as implement them. Ten percent of all planning grant funds must go toward DAC outreach, which may encourage IRWM regions to do more in this area. DWR has also taken steps to organize a Stakeholder Engagement Advisory Committee, which will provide input into the design of proposal solicitation guidelines (Billington, 2015).

For now, access to grant funds will remain an incentive to participate in the IRWM process. For regions that have already developed significant institutional capacity for collaboration, the continued bond funding may help them begin to develop projects that address problems at regional scales, rather than simply requesting funds for multiple smaller-scale projects. Participants in the Kings Basin suggested during interviews that they see this as the next step for their region. Regions that began with more limited capacity for regional-scale collaboration may begin to develop stronger relationships and routines of interaction over the next few years. To enable this, DWR staff will need to help regions make the most of new opportunities for grants and technical assistance.

In the long-term, however, funding for the IRWM program is still uncertain. Bonds are a time-limited and intermittent funding source, and are not the most reliable way to support ongoing program management. A statewide public good charge on water would provide a more stable funding source, but such proposals face strong opposition from water agencies. Funding IRWM regions through local fees is currently difficult due to constraints imposed by Proposition 218, although there is now discussion at the state level of the need for reform.⁴⁴ In the long run, a combination of local and state funding sources may be the most effective and sustainable approach. Moving toward local funding sources could relieve some of the pressure to demonstrate accountability at the state level, potentially allowing for greater flexibility. At the same time, some level of continued state funding would help ensure that regions undertake projects with broader public benefits that extend beyond their own boundaries (DWR, 2014a). For example, the state could target state funding to support inter-regional collaboration and to ensure adequate participation by communities with limited resources.

Future challenges: The drought and re-negotiating state-local relationships

The IRWM program faces new challenges and opportunities in the coming years. The severe drought underway since 2012 has brought into stark relief the need for significant changes in the highly decentralized approach to water management in the state. In 2014, California Governor Edmund Brown Jr. issued an executive order calling for urban water agencies to voluntarily reduce water use by 20%. When agencies failed to meet this target and winter rains were paltry once again, in the spring of 2015 the governor issued mandatory water reductions of 25% for urban suppliers (SWRCB, 2015a). This was followed by the SWRCB's even more radical step of ordering agricultural users with senior

⁴⁴ The California Water Action Plan developed by three state agencies in 2014 includes a recommendation to review Proposition 218's provisions and propose legislation to amend it if necessary (CNRA et al., 2014, p. 19).

water rights, including those pre-dating 1914, to reduce their water use, and issuing significant fines for non-compliance (SWRCB, 2015b, Stevens, 2015a).

These unprecedented assertions of state authority over water use could have a positive influence on collaborative processes in the context of the IRWM program. Some scholars have suggested that the threat of state interference – sometimes referred to as the “shadow” of hierarchy – is a powerful motivator for collaboration (Héretier & Lehmkuhl, 2008, Karkkainen, 2002). Within the IWRM process, this threat could motivate local agencies to find new ways of working together toward conservation and improved drought resilience. This could include formal and informal arrangements to support for one another during drought periods, or long-term projects to improve water supply reliability, such as building capacity for water recycling. Further research is needed on whether IRWM regions have become a forum for developing drought response efforts, and to understand whether these collaborative processes have indeed helped to build resilience to drought and other shocks, as anticipated by some scholars (Folke et al., 2005).⁴⁵

Perhaps the most dramatic example of how the drought is affecting the relationship between state and local agencies was the passage of the Sustainable Groundwater Management Act (SGMA) in September 2014. Never before in California’s history has the state exercised any significant authority over groundwater management.⁴⁶ Multiple previous attempts on the part of the state to intervene to reverse increasing groundwater overdraft had been rebuffed by opposition from local water agencies. However, in 2014 the Association of California Water Agencies (ACWA) reversed its century-old position, and agreed to support a compromise granting the state authority to step in if local agencies fail to develop and implement plans for managing groundwater basins sustainably. SGMA still allows local agencies significant scope for developing their own plans for managing groundwater, and a long timeframe within which to do so.⁴⁷ However, it nonetheless creates a new role for the state in establishing guidelines for newly required Groundwater Sustainability Plans, and the threat of state intervention if local efforts fall short of these requirements.

The groundwater legislation represents a significant challenge, as well as an opportunity, for the further institutionalization of the IRWM process. SGMA calls for the creation of new

⁴⁵ The state has already used the IRWM program as an avenue for emergency drought relief, but in a manner that seems unlikely to promote greater resilience. In 2013, under orders from the governor, a portion of the funding originally intended for IRWM projects was re-purposed as drought relief, and DWR fast-tracked a call for proposals to IRWM regions for shovel-ready projects. Instead of encouraging local agencies to develop new and creative ways of working together that would yield long-term benefits at regional scales, this funding round focused on projects that were already planned and could produce immediate results.

⁴⁶ Before the passage of SGMA, California had the fewest requirements in place for groundwater management of any state in the western United States (Taylor, 2010).

⁴⁷ SGMA requires that Groundwater Sustainability Plans be developed by either 2020 or 2022, depending upon basin conditions, and that the “groundwater sustainability goals” of these plans be achieved by either 2040 or 2042 (ACWA, 2014a).

Groundwater Sustainability Agencies (GSAs) responsible for the management of groundwater basins subject to the new law.⁴⁸ Local agencies have considerable flexibility in determining the boundaries of GSAs, which are likely to differ significantly from those of existing IRWM regions. While the intent of the legislation is to develop plans to manage entire groundwater basins, the law allows multiple GSAs to form within a single basin, as long as they coordinate with one another in planning for the whole basin.⁴⁹ Although the process is only just getting underway, the notifications that DWR has received so far regarding the establishment of GSAs include numerous examples of GSAs covering only a portion of a groundwater basin. So far, there are no examples of IRWM regional governance bodies serving as GSAs.⁵⁰ Even in the case of the Kings Basin, one of few IRWM regions whose boundaries match those of the groundwater basin, it looks likely that multiple GSAs will be established within the basin instead of the Kings Basin Water Authority assuming this role.⁵¹

The activities of the new GSAs will also overlap with those of IRWM regions. The new Groundwater Sustainability Plans (GSPs) required by SGMA will need to be developed with broad stakeholder engagement, including many of the same interests that are involved in the IRWM process. Since IRWM plans also discuss groundwater management issues, the content of these plans will overlap. However, in contrast to the voluntary IRWM process, GSAs hold significant new groundwater management authority. SGMA empowers GSAs to assess fees to support groundwater management, require well registration and the use of water-measuring devices, reporting on groundwater extractions, and regulating the level of extractions (ACWA, 2014b).

State and local water management agencies are only just beginning to grapple with the challenge of coordinating these two overlapping processes. During the 2015 IRWM conference, participants expressed concern that if the creation of GSAs and the development of GSPs are conducted separately from this IRWM process, this may drain the energy of stakeholders for participating in each. However, combining the two processes will be challenging, not only due to their differing requirements, but also because the groundwater management process is regulatory rather than voluntary. Several participants

⁴⁸ Groundwater basins that are designated as “High” or “Medium” priority by DWR are subject to SGMA. Priority is assigned based on multiple factors, such as the degree of reliance on a basin for water supplies and whether or not the basin is subject to overdraft, salt-water intrusion, subsidence or other impacts. There are 127 High or Medium Priority basins in California, which account for 96% of annual groundwater use (DWR, 2015b).

⁴⁹ Under SGMA, GSAs that are sharing management of a basin can either jointly develop a single Groundwater Sustainability Plan (GSP), or create separate plans as long as they demonstrate how they will work together to achieve sustainability.

⁵⁰ This assessment is based upon a review of notifications received by DWR for the establishment of GSAs by July 9, 2015. For example, so far, nine different entities have submitted notifications regarding management of the Colusa basin in the Sacramento River Valley. Notifications are available at: http://www.water.ca.gov/groundwater/sgm/gsa_table.cfm

⁵¹ This assessment is based on comments by the director of the Kings River Conservation District at the 2015 IRWM conference in San Diego, May 21-22, 2015.

commented that the regulatory responsibility changes the tone of the process to further emphasize compliance, rather than encouraging flexibility for collaboration.

This study's findings hold some lessons for SGMA's implementation. Like the IRWM process, SGMA requires that GSPs be developed with input from a broad range of stakeholders. My analysis indicates that accomplishing this requires a significant, on-going investment of staff time and resources. DWR is taking steps toward this by offering facilitation services to local agencies seeking to form GSAs and develop GSPs. However, GSAs will need robust governance structures and paid staff members who can continue to build relationships with stakeholders over time. My research also suggests that the intersection between the IRWM process and SGMA implementation will play out differently depending upon the local context. It is unlikely that many GSAs will form at the scale of IRWM regions, but the relationships developed in some of the more robust IRWM regions may serve to reduce conflicts and perhaps encourage more cooperation in the creation of GSAs. On the other hand, in regions where the IRWM process has had only a limited impact on relationships between participants, SGMA compliance may represent a continuation of the status quo, with multiple local agencies declaring themselves to be GSAs over the portion of the groundwater basin falling within their jurisdiction. The implementation of SGMA and its relationship with the IRWM process will be a key area of research following this dissertation.

The next several years will be critical ones for the IRWM process, perhaps determining whether integration at regional scales truly becomes the new framework for water management in California, as its creators had envisioned. Evidence is growing that the severe drought that California has recently experienced is likely to become a more frequent occurrence due to climate change (Diffenbaugh et al., 2015). At the same time, current El Niño forecasts indicate the possibility of heavy precipitation during the coming rainy season, a reminder that California must be prepared for extreme flooding as well as drought (Rocha, 2015). The learning that IRWM program has the potential to generate is needed more than ever before as California faces greater extremes than it has in the past. Experience to date in the IRWM process holds important lessons for how this learning can be encouraged, even as hierarchical governance modes continue to play an important role. The coming years may offer even greater insights into the operation of hybrid governance arrangements that are so critical to managing the complex, multi-scalar environmental problems that confront policymakers in many parts of the world today.

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