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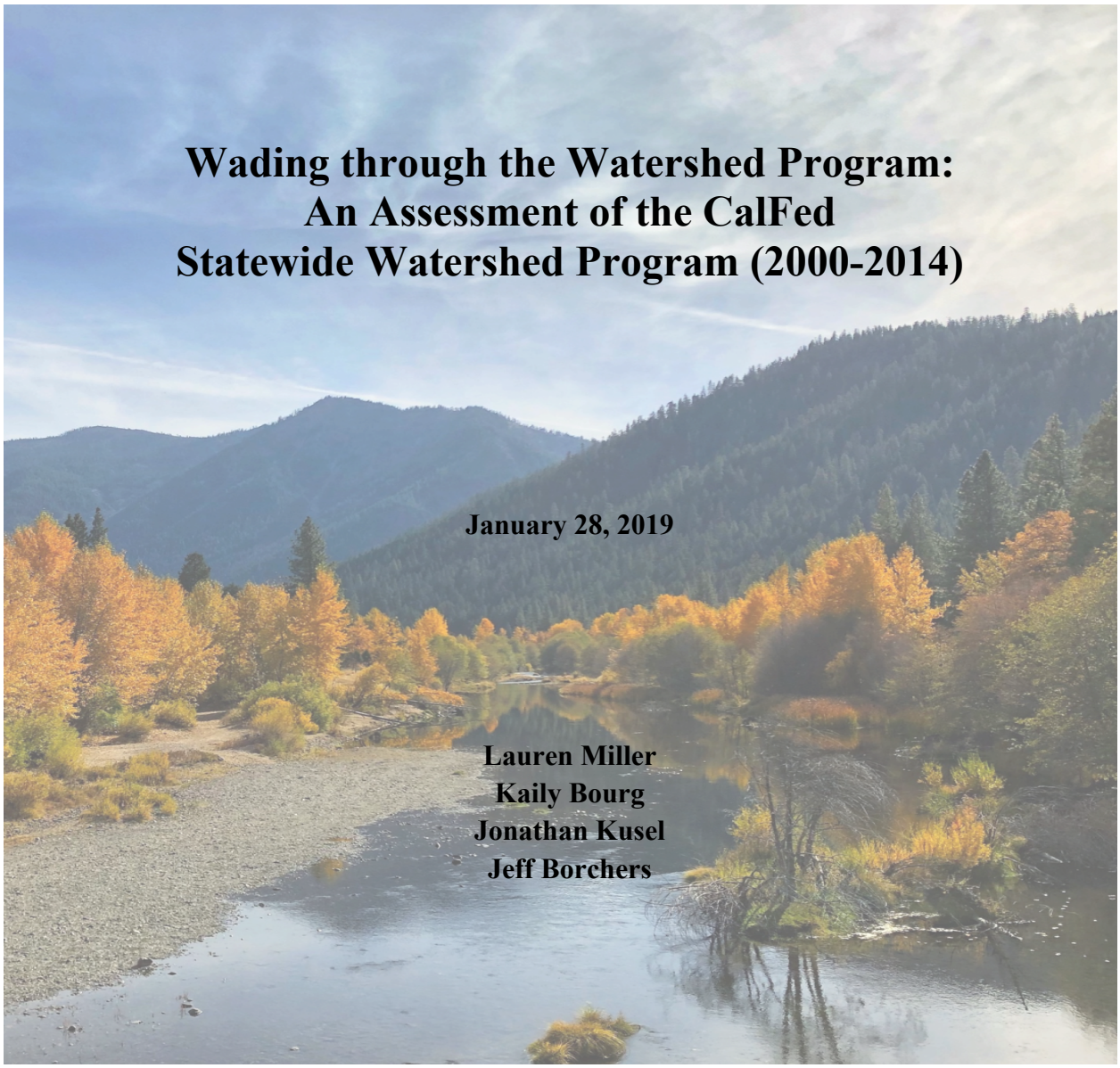

Wading through the Watershed Program: An Assessment of the CalFed Statewide Watershed Program (2000-2014)

January 28, 2019

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Produced with support from the Department of Conservation

Acknowledgements

This assessment of the CalFed Statewide Watershed Program (2000-2014) is made possible by support from the California Department of Conservation (DOC). This research has benefitted greatly from contributions from a former Sierra Institute research assistant, John Owen, as well as the feedback and assistance provided by our advisory committee- Liz Mansfield, Lynn Rodriguez, Todd Sloat, and Martha Davis. A special thanks to Lauren Burton and Valerie Hurst for their mapping work. We particularly appreciate the staff at DOC for taking an active interest in this research, especially David Bunn and Bruce Gwynne, and John Lowrie for his commitment to launching the study.

The entire research team extends our deepest appreciation to the many people across the state who took the time and energy to participate in this study and provide feedback on case study reports. Without your knowledge, experience, and willingness to engage, this research would not have been possible.

Preface

California's watersheds and their ecosystems provide vital clean water, abundant timber resources, habitat for thousands of species, and scenic beauty for all to enjoy. These natural systems of forests, snowpack, lakes, rivers, meadows, and groundwater store and deliver critical water supplies throughout the state.

Between 2000-2014, California funded local organizations to hire watershed coordinators as part of a strategy to facilitate collaborative efforts of multiple state, federal and local agencies, nonprofit organizations, and business to provide better conservation stewardship of forests and fresh waters of the state. As this report identifies, the watershed coordinators were exceedingly effective at generating local support and leveraging additional funds, averaging a sevenfold return on the initial investment. Several of these watershed coordinator efforts even achieved long-term prominence and continue to function under a variety of funding strategies.

This report was commissioned by the Department of Conservation to quantify the outcomes of the program and explore the strategies that led to those successes. Further, this report is timely as it will help the Department inform the development of its new Forest Health Watershed Coordinator Program in 2019, and, it presents important data to support the consideration of continuing this program going forward.

The landscape-scale management of natural resources is very challenging. Catastrophic wildfire now occurs with greater frequency, and large coordinated field projects must be organized to improve forest health. The state has adopted a Forest Carbon Plan that gives clear guidance on what must be done to improve forest health and forest community well-being and it doubled its commitment to fund the treatment of 500,000 acres forest lands annually. Watershed coordinators will serve a critical role in turning statewide investments into coordinated and effective local actions consistent with the recommendations of the California Forest Carbon Plan.

Watershed coordinator activities can connect the needs and contributions of the counties from which water flows to the downstream beneficiaries -- the cities and irrigators that rely on the long-term, resilient functioning of those watersheds. Watershed coordinators continue to be an important aspect of achieving this cooperative conservation in its many forms.

Looking forward, solutions for climate resilience, mitigation, and adaptation in California need to occur across the landscape at a scale greater than seen for many generations. To meet these needs, state efforts must be partnered with local knowledge and initiative so that their benefits can be multiplied and shared by communities in the watersheds and statewide.

We all benefit from healthy watersheds. Strengthening the Watershed Coordinator Program will improve the stewardship of these vital natural resources and help us meet these critical goals.

David Bunn, Director
Department of Conservation

Executive Summary

This report describes the results of an assessment of California's $92 million investment in community-based watershed initiatives between 2000-2014. With support from the Department of Conservation (DOC), this assessment evaluated the social and ecological outcomes and identified lessons from the CalFed Bay-Delta Watershed Program funded projects. Consisting of two distinct grant programs, watershed project grants and watershed coordinator grants, the Watershed Program emerged as part of a long-term planning process initiated in 1994 by CalFed, the collaboration of California state and federal agencies for restoring, conserving, and managing the Bay-Delta, one of state's most valued resources. The Watershed Program, one of eleven elements CalFed instituted to address the state's water quality crisis, advanced novel community-based approaches to water management by supporting initiatives and project implementation at the local watershed scale, and leveraged what amounted to unprecedented support for upstream projects.

After CalFed dissolved in 2005, the State of California assigned the Watershed Program to the Department of Conservation (DOC) where it was merged with the Watershed Coordinator Grant Program (WCGP) and named the Statewide Watershed Program.

One of the key challenges for Watershed Program administrators was demonstrating the value of investing in local capacity building, particularly in the upper watersheds, and how this work contributed to improving ecological conditions and water quality in the Bay-Delta. Failure to fully address this challenge combined with a major recession, budget deficits, state bond freeze, and lack of a political champion, contributed to the Statewide Watershed Program's cease of operations in 2014. Nonetheless, the Watershed Program sparked an "institutional evolution," increasing public interest and investment in upper watersheds. Adaptive management and inclusivity, core characteristics of the program, have endured and remain relevant today.

Between 2000 and 2008, CalFed funded approximately 175 project grants ($64 million) to advance ecosystem restoration, water quality, water reliability, and levee system integrity goals. Project grant activities included capacity building, research, watershed assessment, watershed management planning, large-scale monitoring and assessment, educational programs, and implementation of diverse restoration projects.

Between 2000 and 2014, an estimated total of $28 million (150 grants) was dedicated to supporting watershed coordinators. Watershed coordinator grants had the twin missions of deploying watershed coordinators to catalyze watershed restoration among diverse stakeholders and building the local capacity of host organizations to sustain watershed coordinator positions beyond the coordinator grants.

The scope of this study was to understand what worked, what did not work, and what lessons could be learned from watershed project and coordinator grants to inform present and future watershed initiatives. A mixed-methods approach was implemented in assessing a total of 30 project and 30 coordinator grants using semi-structured interviews, two surveys, and extensive analyses of grant-related documents. Examination of grant outcomes involved assessment of

project and watershed group origins, goals and objectives, partnerships, performance measures, challenges, and social, environmental, and community outcomes.

A primary driver of the research was to advance understanding of project *"success."* Owing to the multi-dimensional nature of this value-laden concept, definitions of success were not uniform. From measurable environmental impacts to harder-to-measure, more ambiguous outcomes such as increased collaborative learning and enhanced trust, there is no standardized or universal definition and measures of what constitutes success across diverse watershed studies. Some outcomes of watershed restoration success lie in the future.

Despite the ambiguities, various forms of success were identified in both project grants and coordinator grants. There are grants that resulted in numerous on-the-ground measurable outcomes along with enhancement of *soft infrastructure* such as increased social capital in the watershed. Another clear success of watershed coordinator grants involved leveraging on average seven times the initial grant funding.

Watershed coordinators played many roles, including administrator, champion, driver, connector, facilitator, and grant coordinator and fundraiser. Their duties involved sharing information; advancing collaboration among agencies, groups, and individuals; providing technical assistance; developing local capacity for improved watershed management; identifying best management practices; offering assistance and training for monitoring programs; developing educational programs; and raising additional money for watershed work.

Answering the question of *Who defines success?* prompted considerable reflection on how diverse stakeholders, practitioners, CalFed, DOC, taxpayers, local communities, and the research team itself delineate successful outcomes. Stakeholders who are invested in a collaborative process are, knowingly or unknowingly, also invested in a particular set of values-based criteria they use to define success. The goals and objectives tied to success by a granting agency may supersede other criteria for success, but a well-conceived grant program can beget diversely defined successes.

Key themes relevant to the effectiveness of watershed coordination efforts include: 1) advancing a clear vision of success; 2) watershed coordinators as third-party facilitators; 3) watershed coordinator training; 4) approaches to community-based strategies; 5) the clash of ecological and social issues and perceived effectiveness, particularly in urban settings; 6) who impacts and is affected by watershed restoration and the challenge to engage relevant stakeholders; and 7) maintenance of implementation projects and aging project sites; and 8) organizational capacity.

Recommendations:

- *Granting agencies should support flexible objectives and performance measures that allow for adaptive approaches and that can capture opportunities that emerge during grant work.*
- *Department of Conservation and grantees should work to: develop a balance between autonomy and narrow guidance with the grant; acknowledge and develop lessons from failures; and embrace beneficial opportunities that emerge outside the scope defined in an original work plan.*

Stakeholder *perceptions* of successful outcomes were examined through two surveys of watershed coordinators. Responses show considerable stakeholder support for watershed coordinators, but more importantly, they identified specific characteristics of coordinators that were critical to their success. Watershed coordinators built relationships and trust among stakeholders. They did so by being enthusiastic, committed, able to articulate a collective vision, organized, and by taking actions that encouraged diverse stakeholder participation and kept stakeholders informed.

Surveys also highlighted how watershed coordinators contributed to the development of soft infrastructure, the human, social, and cultural capital that helped build and maintain collaborative watershed groups and on-the-ground efforts. Building community among stakeholders, encouraging collaborative efforts, and educating the public on watershed issues all augmented soft infrastructure. The development of a culture of collaboration is generally less well understood, but one of the most powerful, unique, and important dimensions of the watershed coordinator program. Not surprisingly, watershed coordinator outcomes that had the highest level of respondent consensus included improved coordination among stakeholders, improved communication, and development of stronger relationships and new partnerships.

Sixty-five percent of survey respondents indicated that a watershed coordinator's tenure extended beyond the grant cycle. This and other changes in roles and geographic scope reduced the capacity of watershed coordinators to maintain productivity associated with Watershed Program funding. When grant funding ran out the first tasks cut involved partnership development and working with landowners and agencies. The halt of funding resulted in some watershed coordinators narrowing their scope and focusing primarily on funded projects, and a transition from a coordinator role to a manager of projects with a narrower scope.

Recommendation:

- *For future grant programs watershed coordinators should be funded full-time for a minimum of two years with the possibility of a two-year extension based on performance.*

Effectiveness of watershed coordinators hinged on facilitation skills. Survey respondents indicated that *clear communication*, *promotion of a watershed group/collaborative agenda*, and *ability to articulate a collective vision* are key facilitation attributes.

In some cases, watershed coordinators have coalesced contentious groups around watershed issues, enabling communities to actively participate in addressing pressing socio-ecological concerns and development of clear and collective goals for action. Many watershed coordinators facilitated forums in which technical information was interpreted and used as a launch point for addressing challenges and developing projects.

For watershed coordinators with limited facilitation skills, a two-day Watershed Program Partnership Seminar series was offered to build skills. A total of 114 individuals participated. The training enhanced the effectiveness of many community-based watershed management initiatives and, importantly, offered watershed coordinators from around the state an opportunity to network, share resources, and learn from one another.

Recommendations:

- *Provide training for watershed coordinators (e.g., facilitation and conflict resolution, grant writing, communication and outreach, and grant management).*
- *Encourage watershed coordinators in adjacent watersheds to coordinate and cooperate with each another in person and on line, as well as with others at regional and statewide levels as appropriate.*
- *Establish regional networks of watershed coordinators with financial and technical assistance from the granting agency to provide opportunities for mentoring, exchanging information, and sharing resources.*
- *Encourage watershed coordinators to work between and with state and local agencies to bridge gaps, take advantage of opportunities, and create a pipeline for efficient resource sharing.*

Identification of stakeholders to include and outreach and invitation to stakeholders in a collaborative watershed process are critical and sometimes overlooked tasks. Approaches used in the case studies can be summarized as a process of identifying distinct groups with which to share information and collaborate. Grant objectives, the scope of the issues in a proposal, and the role and relationship of an organization to the local community defined who was included. Outreach typically focused on water-related and planning professionals, self-identified stakeholders, and the public at large, a pattern that had, at times, serious shortcomings.

Across case studies, while there was a general push to advance projects collaboratively and inclusively, project planning and inclusion too often fell short by not including disadvantaged communities— underserved, underrepresented, and low capacity communities—including the homeless that were sometimes directly affected by a project. The lack of full stakeholder engagement typically stems not from a place of intention, but from a lack of knowledge about how to most appropriately engage diverse stakeholders, particularly those from disadvantaged, underserved or marginalized groups.

Critical lapses of truly inclusive stakeholder processes and differences in perceptions of what constitutes "success" can lead to serious unintended consequences. Failure to conduct clear stakeholder assessments and advance inclusive processes can lead to a clash of ecological and social values and project failures. Such "surprises" in project outcomes underscore the need for project leaders to consider differing stakeholder values and impacts, both ecological and social dimensions in project planning, and short- and long-term project outcomes.

Recommendations:

- *Provide leadership training and promote participatory learning through stakeholder analyses to increase understanding of local issues during initial project phases; if collaborative groups are beyond initial phases, adaptive stakeholder analysis is still valuable to understand gaps in stakeholder participation and improve stakeholder representation and inclusion. Such work will increase the likelihood of project success.*
- *Ensure adequate resources are available to thoughtfully engage underserved communities in both planning and implementation of projects.*

Long-term maintenance of projects must be considered at the outset to avoid project failure resulting from misunderstanding of on-going and long-term project maintenance costs and reliance on those lacking capacity to maintain projects. Stakeholders agreed that creating and implementing maintenance plans for public projects is a challenge because: 1) grants do not generally fund long-term maintenance plans; 2) projects implemented through grants received by agencies may be considered "external" to an agency, and agency resources cannot be used for maintenance; and 3) projects that rely on citizen efforts for maintenance are contingent on local communities and residents that too often have not been consulted and may lack capacity.

Success in watershed restoration—in terms of both soft and hard infrastructure—can be viewed through the lens of organizational capacity. Case studies suggest that there is a minimum capacity that a grant recipient organization should have if it is to sustain watershed coordination beyond the term of the grant(s). For lower capacity organizations, the boost from watershed coordinator funds proved only temporary as the coordinator role was discontinued at the end of a grant.

Based on case observations and analysis of the Watershed Program, to most effectively advance the novel vision set in motion by the creators of the CalFed Watershed Program and DOC Watershed Coordinator Grant Program, we recommend greater investment during project conceptualization and initiation in more thoughtful and inclusive planning processes. This includes a rigorous stakeholder analysis that could preclude a late-stage clash of contrasting values and encourage and incentivize long-term stewardship of watershed resources by all stakeholder groups.

At an institutional level, the Watershed Program has sown the seeds of the state's initial investment in a Statewide Watershed Program. The need for hard infrastructure investment is often self-evident, but increased investment in *soft infrastructure* is necessary to advance landscape-scale conversations and work that advances forest-watershed connections and landscape health in an era of anthropogenic climate change.

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I. Introduction

The CalFed Watershed Program was initiated in 1998 with the goal of restoring ecological health and improving water management through the support of community participation in local watershed projects that affect the Bay-Delta system. In the summer of 2000 the program was launched as part of the CalFed Bay-Delta Program to fund local watershed projects falling under seven general categories: organizational capacity building, watershed assessment, planning, education and outreach, implementation, monitoring, and research.

Early project funding focused more on capacity building, watershed assessments and planning, and after a few years shifted more towards projects focused on implementation. Projects varied considerably, with some improving watershed health by directly addressing current or legacy watershed damage, others focusing on education, outreach, and environmental justice issues, and still others launching citizen monitoring and developing watershed stewardship and management plans. These are just a few examples of the many and diverse projects.

Distinct from individual watershed projects, in 2000 the Department of Conservation launched the Watershed Coordinator Grant Program. The Department of Conservation supported watershed coordinators to promote watershed management and local watershed improvements through coordinated and collaborative approaches.

Reporting on these projects by the Department of Conservation is most comprehensive during the first six to eight years of the program. In July of 2008, the Department of Conservation produced a Watershed Coordinator Grant Program Report, identifying outcomes of coordinator grants. Included is documentation of partners involved with each coordinator grant, matching funding, and accomplishments both general and specific. The Department of Conservation required grantees to report on performance measures quarterly with staff conducting field visits to monitor progress. These are critical and important steps in identifying lessons and developing best practices for the watershed coordinator program. But "accomplishments" were based on grantee self-reports. While useful, self-reports more often than not focus on successes and how grantees fulfill grant obligations and specifically whether money was used appropriately. Grantees will sometimes discuss grant effectiveness and successful ingredients but rarely discuss practices that lead to failures.

Reporting on project failures and struggles can offer some of the best lessons, but grantees are typically reluctant to report on these, especially when there is a perception that future funding is at stake. There are, however, a few organizations that have provided encouragement and incentives to acknowledge and learn from major challenges and failures. In 2013, the presidents of the James Irvine Foundation and the Hewlett Foundation "pleaded with other foundations to be more candid about failure," recognizing that it is from failed projects that some of the best lessons are developed (Di Mento 2013).

Grantee project report information provided to DOC precludes comprehensive understanding of whether grants were successful or not and prevents identification of lessons learned and best practices. Department of Conservation offers detailed information on its website of funded projects, including information about how some of this work will benefit the CalFed system, but there are no published reports on individual project outcomes and lessons learned.

Identification of lessons, including what's working and what's not, as well as extrapolating system lessons, are best accomplished through independent science assessment. This work is needed to ensure adaptive project as well as general program development and improvement. Adaptive management is called out in the July 2000 Watershed Program Plan (p. 4-1): "The Watershed Program will use the principles of adaptive management in managing those actions and projects implemented by or on behalf of the program and in managing the overall program." Adaptive management requires that one learns from ongoing work in order to extract lessons that will improve future work. It is of course too late to inform completed CalFed watershed coordinator and project grants, but there remains much work in California's watersheds that can benefit from study of past CalFed funded projects.

The purpose of this study is to evaluate the CalFed Watershed Program to identify what worked, what didn't, the effectiveness of community-based approaches in the Bay-Delta System, and developing lessons learned for project leaders, watershed coordinators, and Department of Conservation and others responsible for managing and implementing watershed programs. To accomplish this task, the Sierra Institute for Community and Environment separately studied the two project types: watershed coordinators and watershed projects.

Coordinator and individual project assessment also involved identification of:

a) local government, non-profits, special districts, or other entities responsible for the grant;
b) state and federal agencies involved with or with jurisdiction in a project area;
c) other entities such as watershed councils, Integrated Regional Water Management Planning groups, and others not directly responsible for a grant but with interests in the area or project outcomes.

All of these agencies can influence outcomes in a myriad of ways.

Independent science assessment does not compel a focus on failures, nor does it require finding fault with grantees or administrators. The purpose is to develop an understanding of projects, including what worked and what didn't, in order to identify programmatic lessons to improve practices and develop more effective projects in the future.

The Sierra Institute for Community and the Environment assessment sought to understand both individual projects and watershed coordination through case studies. To further examine issues that emerged from stakeholder interviews and case studies, we conducted a watershed coordination survey and follow-up survey. The follow-up survey helped us reduce some of the uncertainties regarding watershed coordination longevity and retention.

The Watershed Program was in operation for approximately 14 years, and there is a wealth of work and experience from which to learn. Lessons from this work can be of great help for the next generation of coordinators and project leaders, as well as help the Department of Conservation be more effective stewards of the State of California's resources.

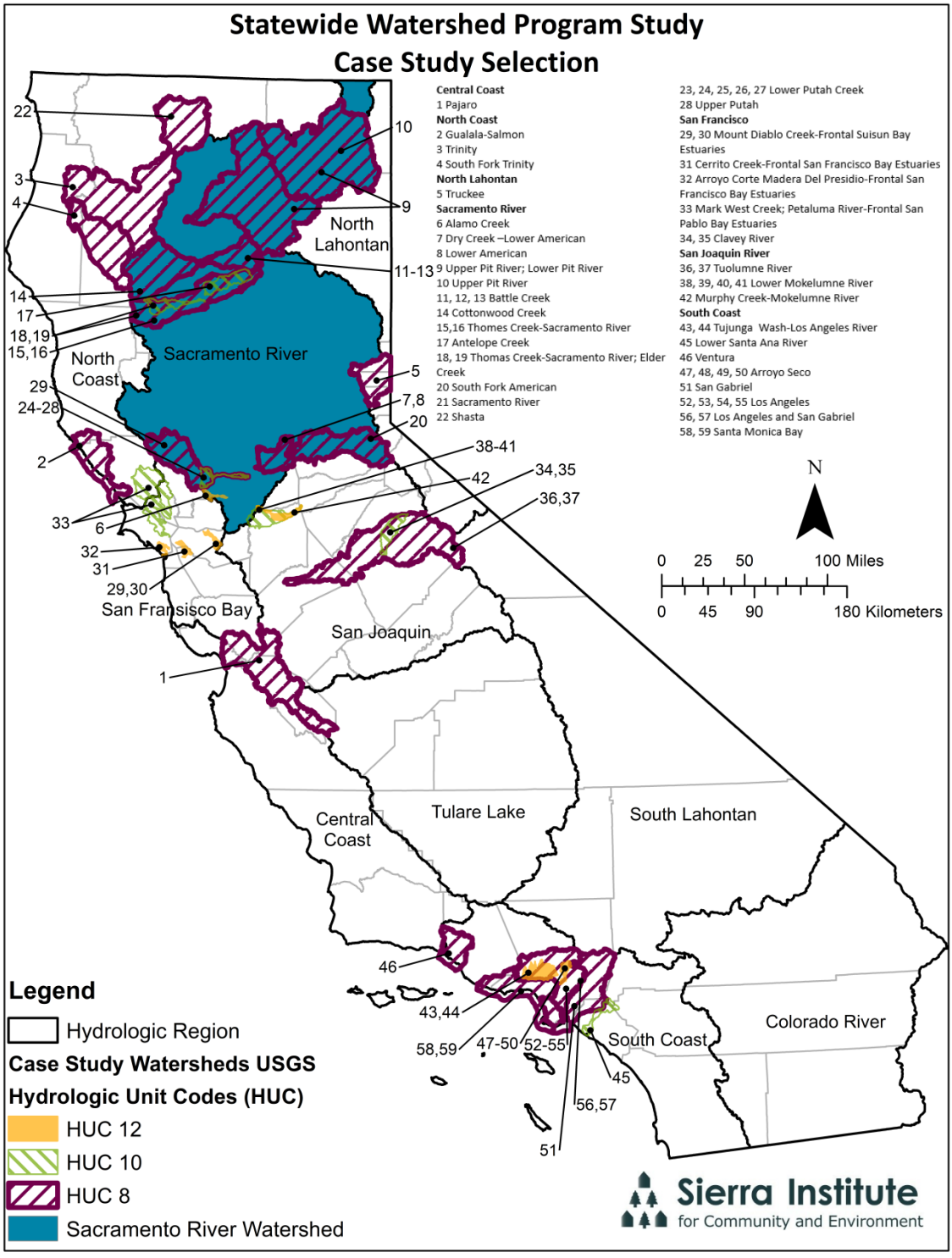
We begin this study with a review of the (II) Institutional Framework that gave rise to the CalFed Bay-Delta program and watershed project and coordinator grants. It's a tangled and fascinating story, one detailing the varied and changing objectives that informed project and coordinator funding. We then describe the (III) Watershed Project Grants, which include capacity building, large-scale monitoring and assessment, watershed assessments and management plans, research and planning, education, and implementation. This is followed by a discussion of (IV) Watershed Coordinator Grants describing the variations between the Watershed Coordinator Pilot Program, grants from 2004-2011, and CalFed grants from 2011 to 2014, as well as an analysis of the key roles of watershed coordinators (e.g., administrator, champion, driver, connector, facilitator) and important attributes associated with each. We also briefly highlight the North Coast Watershed Coordinator Team as a unique and powerful example of how coordinators themselves networked with each other to advance learning.

In the section (V) Themes and Lessons Learned, we highlight key program successes and discuss important challenges faced by project proponents. This information was drawn from case studies and surveys.

We conclude the study with (VI) Recommendations for Best Practices, which focuses on structural and institutional recommendations, and (VII) Case Studies. Six case studies are offered to provide a variety of examples from which data were drawn for this study. In the Appendices that follow we share the Literature cited; Methods used for this study; CalFed Institutional Framework Charts that illustrate the CalFed Principles of Participation, Hydrologic Regions, CalFed Governance Structure, and CalFed Watershed Program Governance Structure; and links to all case studies assessed for this research.

It is our hope that this assessment develops and advances ideas that contribute to learning and improved future watershed work in the State of California.

Figure 1.1. Project and Coordinator Grant Case Studies



II. Institutional Framework

Introduction and Background

Pioneering efforts to collaboratively address the water quality crisis and habitat decline in California's Bay-Delta watershed in 1994, the State of California and federal agencies with authority in the Bay-Delta initiated a long-term solution planning process for restoring, conserving, and managing one of California's most valued resources, the Bay-Delta. The collaboration, officially termed CalFed, resulted in the development of the Bay-Delta Program, which outlined an approach to address the myriad of water issues in the Bay-Delta through eleven program elements. Among the eleven elements, the Watershed Program distinctively approached Bay-Delta issues using a watershed approach and supported community-based initiatives supported by a robust grant program.

In 2005, CalFed began to disband as numerous water interests in the state grew dissatisfied with outcomes, particularly water conveyance, and political discord deepened CalFed's deficits, resulting in suspension of the Bay-Delta program. Some elements of the program were laid to rest with CalFed, while others were dispersed among state agencies tasked with administering CalFed's remaining proposition funds. The Watershed Program element, including the Watershed Coordinator Program, continued with residual CalFed funds managed by the California Department of Conservation (DOC).[1] The transition from CalFed to DOC resulted in the statewide expansion of the Watershed Program, which replaced the program's previous focus on the Bay-Delta "Solution Area" during CalFed years. "Solution Area" referred to watersheds that provide water to or receive water from the Bay-Delta's water system. The transition aptly generated a new name for the program by 2010—the Statewide Watershed Program. When residual CalFed funding for grants ran dry in 2014, the Statewide Watershed Program halted and, as a result, numerous local watershed initiatives lost financial support and ceased.

Geographic History and Context of the California Bay-Delta

The California Bay-Delta System, also referred to as the Sacramento-San Joaquin Delta, formed approximately 18,000 years ago at the end of the last Ice Age. Carved by glaciers and back-filled with rising ocean waters and sediments from inland streams, the Bay-Delta existed as rich, biologically-diverse swampland both prehistorically and throughout the settlements of aboriginal peoples (Little Hoover Commission, 2005). Humans relied on the rich resources of the Bay-

[1] The CalFed Watershed Program funded both project grants and watershed coordinator grants. During CalFed's active days, CalFed implementing agencies, California Department of Water Resources (DWR) and the State Water Regional Control Board (SWRCB), administered and managed project grants and oversaw the California Department of Conservation's (DOC) administration of watershed coordinator grants. When CalFed dissolved in 2005, DOC assumed management of both grant types and oversaw DWR and SWRCB's administration of the remaining project grants.

Delta with little impact until the 18th century, when Euro-American settlers introduced trapping and fur trade. This was followed by a flux of mining activities during the Gold Rush Era, resulting in dramatic alterations to the Bay-Delta ecosystem. By the turn of the 19th century, and under new reclamation laws enacted by Congress, miners began to convert the Delta swampland into fertile farmland by constructing levees. By 1900, miner-turned-farmers utilizing Chinese laborers transformed 250,000 acres of marsh land into rich farmland (Little Hoover Commission, 2005).

Rapid industrial and agricultural growth in the state during the 18th century continued to encourage population growth, exponentially increasing human reliance on the Bay-Delta's resources. Some CalFed officials argue that the Bay-Delta is the most complex and critical watershed in the American West, supporting approximately 750 species of wildlife, supplying drinking water to over 22 million Californians, and irrigating over five-million acres of California's farmlands (Little Hoover Commission, 2005). Increasing reliance on the Bay-Delta changed the dynamics of natural resource management in the state and accentuated California's three major water imbalances: 1) heightened precipitation during winter months and heightened water demand during summer months, 2) greater precipitation in the north and higher water demands in the south, and 3) polarizing climatic patterns with bouts of extreme flooding followed by periods of prolonged drought (CalFed Bay-Delta Program, archived website). In an effort to address these imbalances, state and federal officials began construction of several large water diversion projects, including Mokelumne Aqueduct, Central Valley Project, and the State Water Project. With a primary intention to move water through the Bay-Delta watershed system to areas of high demand, the diversion projects exacerbated contention among agricultural interests, environmental activists, and urban water users, and instigated tensions between water providers upstream of the Bay-Delta and water users south of the Bay-Delta. Unresolved contention and power imbalances over water supplies resulted in decades of "water wars," ultimately plunging the State of California into a water crisis towards the end of the 20th century and forcing state and federal agencies to rethink water management.

CalFed

Formation of CalFed

A prolonged drought between 1987-1992 combined with tensions resulting from decades of "water wars" between California's diverse water interests plunged the state into a water crisis by the end of the 20th century. During the peak of the six-year drought, the Sacramento River flowed at 56 percent of its average levels and the San Joaquin at just 47 percent its average (Little Hoover Commission, 2005). By 1991, the State Water Project met only 10 percent of urban water demands. Decreased water flows diminished water quality in the Bay-Delta, causing two fish species, the delta smelt and winter run Chinook salmon, to dwindle to near extinction. In 1993, two years of litigation from the environmental community won "threatened" status for the

two species under the Endangered Species Act (Little Hoover Commission, 2005; Record of Decision, 2000).

In response to deteriorating water quality, in 1988 the U.S. EPA warned the State of California that water quality in the Bay-Delta violated federal standards, prompting California Governor Pete Wilson and his Administration to work with the State Water Resources Control Board for the next five years to draft new water quality standards. After years of discord over water quality standards and continued impacts from water diversions, the U.S. EPA rejected the Wilson Administration's proposed standards and threatened stricter regulations for water exports in the state under authority of the Clean Water Act. During these years, four federal agencies—U.S. Environmental Protection Agency, Fish and Wildlife Service, Bureau of Reclamation, and National Marine Fisheries Services—joined forces to address the lack of coordination of Bay-Delta resources, officially known as "Club Fed" (Little Hoover Commission, 2005; Record of Decision, 2000). The U.S. EPA's rejection of the Wilson Administration's proposal prompted the governor to collaborate with U.S. Department of Interior Secretary, Bruce Babbitt and Club Fed agencies to develop an alternative. The collaboration of state and federal agencies addressing water quality in California became the official entity, CalFed. Federal agency representation included Club Fed members and the Army Corps of Engineers, and state agency members included Department of Water Resources (DWR), Department of Fish and Wildlife (CADFW), Environmental Protection Agency (CAEPA), and State Water Resources Control Board (SWRCB).

CalFed officials sought to collaboratively draft a set of water quality standards, develop a long-term program that would, as simply put by several stakeholders, "keep people from fighting." At the signing of the "Principles for Agreement on Bay Delta Standards between the State of California and the Federal Government" (hereinafter and commonly referred to as the "Bay-Delta Accord") in December 1994, CalFed became the official collaboration to begin the long-term planning process for addressing the California Bay-Delta's water issues. Agency representatives and other stakeholders composed several committees and workgroups, making up CalFed's governance structure, see Figure 2.1 and Appendix II-A. Within the first six months of signing the Bay-Delta Accord, the state adopted new water quality standards and began the process to "develop a long-term comprehensive plan to restore ecological health and improve water management for beneficial uses of the Bay-Delta system" (Record of Decision, 2000). Planning led to the adoption of the Record of Decision, final Programmatic EIS/EIR, and CalFed framework—the Bay-Delta Program.

Figure 2.1. CalFed Governing Bodies

Bay-Delta Advisory Committee (BDAC)

BDAC formed in 1995 and was composed of 30 stakeholders appointed by Interior Secretary Bruce Babbitt. It was established to provide stakeholder input to the CalFed Bay-Delta Program. BDAC participated in 38 meetings over the five-year period, gathered public comments, and advised the policy group and implementing agencies for phase I and beginning of Phase II of the Bay-Delta Program.

Bay-Delta Public Advisory Committee (BDPAC)

BDPAC formed in 2001 and replaced the BDAC. Maintaining 30 members, BDPAC's primary role was to advise the CBDA. BDPAC was composed of nine subcommittees including: Delta Levee Habitat, Drinking Water Quality, Ecosystem, Environmental Justice, Steering Committee, Water Use Efficiency, Watershed, Water Supply, and Working Landscapes.

California Bay-Delta Authority (CBDA)

CBDA was established under the California Bay-Delta Act in 2003 as an oversight body. CBDA was responsible for tracking CalFed progress in achieving goals and objectives. This body was responsible for securing funding to support the CalFed Bay-Delta Program and modified timelines and budgets.

Independent Science Board (ISB)

The ISB advised the CBDA on science issues, providing independent reviews of the quality and effectiveness of the Bay-Delta program.

Policy Group

The Policy Group included state and federal agencies to ensure that decisions made were consistent with CalFed goals and objectives.

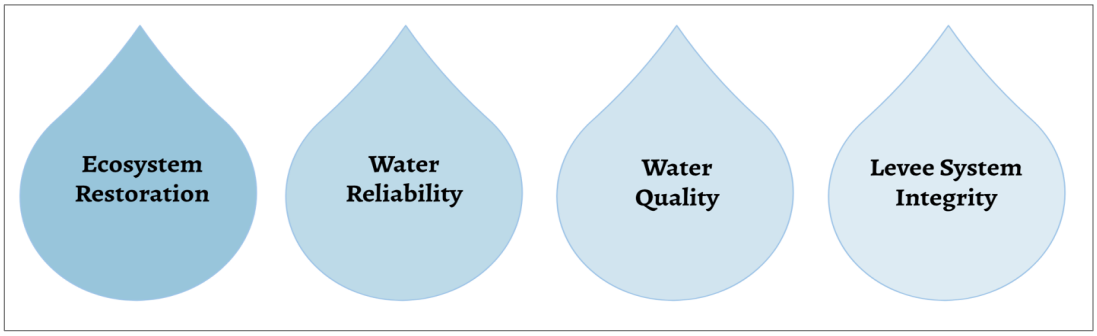
Assurances Workgroup

The Assurances Workgroup's role was to monitor and assure that the program's objectives concerning water availability for ecosystem and water reliability for agricultural and municipal use were met.

CalFed Bay-Delta Program

The cooperative, interagency effort of state and federal agencies and representatives of agricultural, urban, environmental, fishery and business interests, Tribal and rural counties to build a framework for managing California's water officially became known as the CalFed Bay-Delta Program (Record of Decision, 2000). The Bay-Delta Program identifies four core goal areas for addressing water issues: 1) restore ecological health of fragile and depleted Bay-Delta Estuary; 2) improve the water supply reliability for the State's farms and growing cities; 3) protect drinking water quality; and 4) protect Delta levees that ensure its integrity, Figure 2.2.

Figure 2.2 CalFed Bay-Delta Program Goals



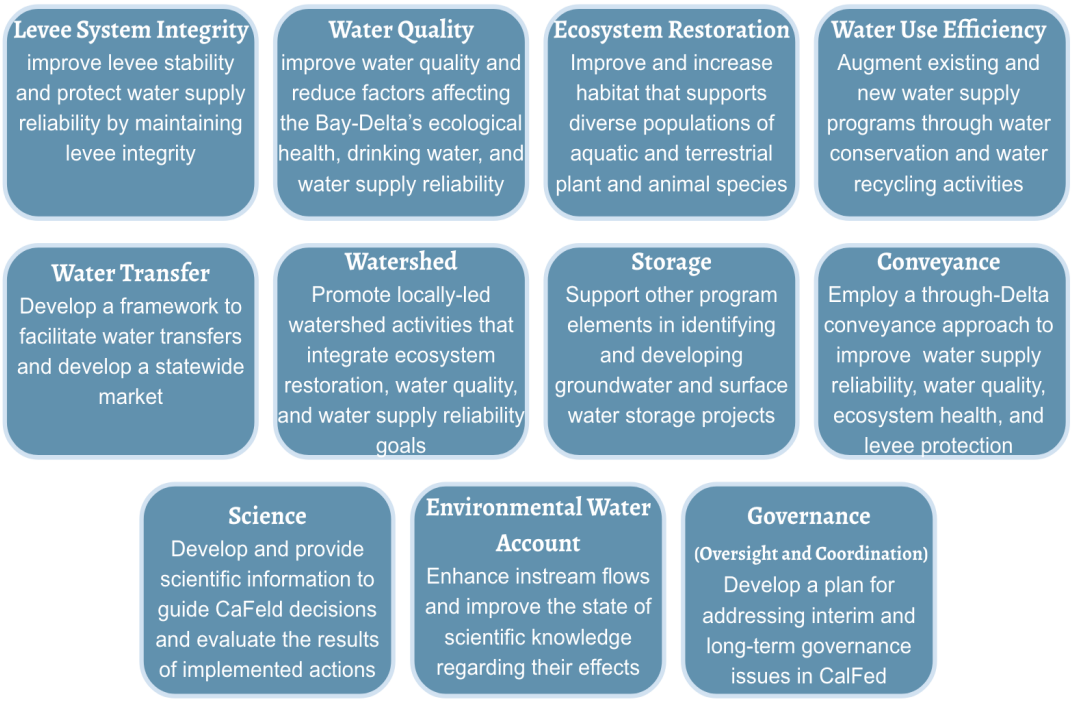
The CalFed Bay-Delta Program was implemented in three phases. In Phase I, participants identified the problem area, the Bay-Delta itself, and the solution area, priority watersheds upstream and downstream which impact the ecological health of the Bay-Delta. The problem area, the Bay-Delta itself, was defined as areas that contribute to the issues in the Bay-Delta and impacted by the ecological health of the Bay-Delta or areas that contribute to the problem. Participants also developed a mission statement and guiding principles and identification of program alternatives for advancing a long-term solution plan. During these initial activities, CalFed entities also considered strategies for meeting the regulatory requirements of the State Water Project and the Central Valley Project. Phase I concluded in 1996 with the completion of a "Notice of Intent and Preparation," which formally identified problems facing the Bay-Delta.

Phase II entailed ensuring that proposed solutions met National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) standards. Through the development of the framework document, "California's Water Future: A Framework for Action," CalFed reached agreements on a "Final Programmatic Environmental Impact Statement (EIS)/Environmental Impact Report (EIR)," which was published in July 2000 and defined alternative long-term solutions. Among alternatives developed for the program, the "Preferred Program Alternative" outlined the first seven years of the program's implementation. In August 2000, the Record of Decision (ROD) was formally adopted, providing a 30-year blueprint for the program.

Phase III began with the formal adoption of the ROD and Final Programmatic EIS/EIR in 2000, which marked the beginning of implementation of the Bay-Delta program. In addition to the four core goals the Bay-Delta Program, CalFed identified eleven program elements as an implementation framework, see figure 2.3.[2] At the signing of an Implementing Memorandum of Understanding (IMOU), CalFed agencies further clarified the roles and responsibilities of each of the agencies and set in motion the implementation the CalFed Bay-Delta Program.

[2] CalFed elements varied slightly from year to year on Program documents. Represented here are a combination of program elements retrieved from multiple documents.

Figure 2.3. CalFed Bay-Delta Program Elements and Goals



CalFed Bay-Delta Problem and Solution Areas

CalFed supported activities in regions that affected what the Bay-Delta program defined as problem and solution areas, providing targets for implementing program elements in a way that leaders could most effectively achieve CalFed's overarching objectives. The problem area consisted of the legally defined Bay-Delta and the Suisun Bay and Marsh that needed critical repair. The solution area was identified as any area that contributed to or imported water to the Bay-Delta, extending both upstream and downstream of the Bay-Delta watershed. The solution area included the Central Valley's watershed, southern California, San Pablo Bay, San Francisco Bay, Trinity river watershed, and portions of the Pacific Ocean from the Farallon Islands to the Oregon border, see Figure 2.4 (CalFed Final Programmatic EIS/EIR, 2000).

CalFed Watershed Program: Purpose, goals, principles, and areas of impact

The Watershed Program was one of eleven elements in the overarching CalFed program. Interview participants pointed out that the Watershed Program was not included in the original configuration of the Bay-Delta Program – it was included as a response to stakeholders who recognized gaps in CalFed's approach and the absence of integrating local solutions to achieve overarching objectives. Distinct from other Bay-Delta elements, the Watershed Program

functioned as a way to implement local community-based strategies to maintain and improve the Bay-Delta through a "watershed approach" that advanced watershed management holistically, and meaning that attention was not only to the lower watersheds but also the upper watersheds (i.e., the streams and rivers "above the dams"). Early in the program, Watershed Program developers were challenged with demonstrating the value and benefit of investing in local capacity building, particularly in the upper watersheds, and how this work contributed to improving the ecological and water quality in the Bay-Delta. This challenge persisted throughout the execution of the program. Despite varying levels of support from CalFed's governing bodies, the Watershed Program maintained strong support from watershed communities.

Figure 2.4. Map of the CalFed Problem and Solution Areas (source: Annual Report, 2006)

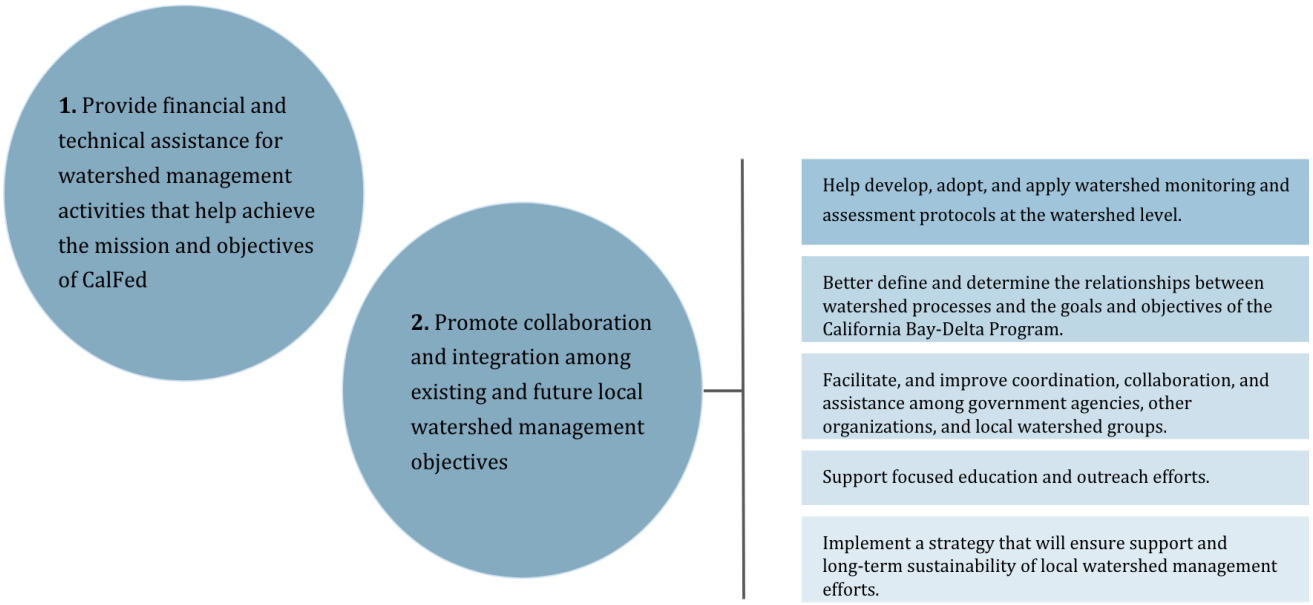
The strength of the program stemmed from its grassroots origins, as it was built through the efforts of many outside stakeholders who promoted the value and importance of investing in upper watersheds. Many of the same individuals who initiated and promoted the watershed approach also took on positions within the program's governance structure.

The Bay-Delta Public Advisory Committee (BDPAC) Watershed Subcommittee, composed of non-agency participants, completed planning for the program and coordinated with implementing agencies to execute grant solicitation cycles, see Appendix II-B. The Subcommittee met on average once a month, drawing participation from approximately 60-70 individuals and various groups, with representatives from both rural and urban watersheds. Agency stakeholders participated in the Watershed Program as part of an Interagency Watershed Advisory Team (IWAT).[3] IWAT was formed through a Memorandum of Understanding (MOU), which designated the team as an oversight entity for the implementation of the Watershed Program through policy-level discussions. It's role also included ensuring that regular communication occurred between agencies and the BDPAC Watershed Subcommittee. A Watershed Workgroup formed under the BDPAC (previously BDAC) in 1998 to advise the Watershed Subcommittee and IWAT. The workgroup was open to everyone and included participation from approximately 300 stakeholders. Each group within the governance structure filled a crucial role in implementing the goals of the Watershed Program.

In the Record of Decision (2000) CalFed proposed a $300 million investment into the Watershed Program to support local implementation of projects through grant funding, coordination, and technical assistance. Through an extensive stakeholder assessment and survey, the BDPAC Watershed Subcommittee and CalFed staff developed a Watershed Program Plan, informed by representatives from each of California's hydrologic regions, see Appendix II-C. Stakeholder input informed seven principles that guided decisions for supporting watershed activities, see Appendix II-D. To evaluate the effectiveness of the program, program officials identified performance measurements to assess how well the program utilized the seven principles and promoted improvements in community capacity for watershed management. The 2004 Watershed Program Performance Measurement document defines community capacity as consisting of "resources, networks, organization (including local governance), attitudes, leadership and skills that allow communities to manage and sustain healthy functioning watersheds."

[3] Agency participants in IWAT included: Department of Water Resources (DWR), State Water Resources Control Board (SWRCB), California Department of Fish and Wildlife (CADFW), California Resources Agency (CRA), Natural Resources Conservation Service (NRCS), United States Fish and Wildlife Service (USFWS), and United States Environmental Protection Agency (USEPA).

Figure 2.5 Primary Goals of the Watershed Program



Following the adoption of the CalFed Bay-Delta plan in 2000, the Proposition 50 water bond passed and included approximately $120 million for implementation of the Watershed Program. The BDPAC Watershed Subcommittee identified three areas in which the Watershed Program aimed to affect: 1) supporting the CalFed Bay-Delta Program as a whole; 2) increasing management capacity in local and regional watershed communities, and 3) creating measurable change in the physical, biological, and chemical characteristics of the Bay-Delta. A first grant solicitation cycle was issued in 2000, awarding a total of 53 grants. Between 2000 and 2008, 176 project-based grants were awarded through the CalFed Watershed Program, and between 2002-2014, 149 grants supporting watershed coordinator positions were funded.

Initial criteria for selecting proposals were for projects that contained: 1) a balance of diverse activities that could improve the Bay-Delta system; 2) integrated application of CalFed objectives—those favored emphasized water supply reliability, water quality, and levee stability; 3) representation of diverse landscapes (e.g., forests, agricultural lands, urban, mixed, etc.); 4) geographical distribution throughout the CalFed solution area; and 5) consideration of project costs balanced with anticipated results (Record of Decision, 2000). Project proposals awarded included those with emphasis on (Record of Decision, 2000):

- building local community capacity
- developing local watershed assessment and management plans
- funding development and implementation of specific watershed conservation and restoration actions

- facilitating and improving coordination and assistance among government agencies and local organizations
- developing performance measures and monitoring protocols consistent with CalFed objectives
- supporting watershed education at the local level
- providing organizational and administrative capacity to watershed programs
- providing examples of watershed activities, functions, and/or processes relevant to CalFed goals and objectives for adaptive improvement

Watershed Coordinator Program

The CalFed Watershed Program began to fund watershed coordinator grants in 2002. What numerous stakeholders considered a novel investment in conservation programming, the Watershed Coordinator Program strategically hired and supported coordinators at the watershed level to increase local capacity to participate in local and regional watershed improvement efforts. The Program, originally developed exclusively for California's Resource Conservation Districts (RCDs) through the administration of DOC, neatly aligned with the objectives of the CalFed Watershed Program. When funding for the DOC Watershed Coordinator program dried up in 2002, the CalFed Watershed Program absorbed the program and began to fund watershed coordinator grants under the CalFed umbrella. The transition was not seamless, nevertheless, participants reported that partnerships between local watershed communities and decision-makers for implementing the Watershed Program improved (February 2004 BDAC Watershed Subcommittee meeting notes).

Watershed coordinator grant origins

The Watershed Coordinator Grant Program originated in 1998 with a push from the California Association of Resource Conservation Districts (CARCD) to have the state fund the enhancement of technical assistance and community capacity through funding coordinators at the watershed level to be housed in Resource Conservation Districts (RCDs) across the state. Following a series of discussions, the CARCD successfully urged the state for a one-time general fund appropriation in the Budget Act of 2000 for watershed coordination. The Department of Conservation assumed administration of the program because it had a close working relationship with RCDs.[4] In 2000, DOC administered a two-year pilot program, awarding $2 million to be divided among 30 watershed coordinators. Following the pilot program, DOC produced a legislative report (2002), which generally supported the claim that the watershed coordinator program was an effective tool for RCDs throughout the state. Findings from the 2002 DOC

[4] Conservation districts were established nationwide through a federal initiative to provide assistance at the local level in 1935 during the dustbowl era. In California, individual RCDs established themselves as local leaders for soil and water conservation. The DOC developed and evolved as the state conservation agency, upholding a statutory responsibility to support and aid RCDs and engage local people and landowners.

report to legislature following the pilot program concluded that: 1) watershed coordinators are crucial for the success of watershed improvements, 2) advanced administrative training is needed and more administrative support should be considered, 3) program success resulted in independent funding, 4) coordinating the coordinators could result in better program effectiveness, 5) any future program will need to address RCD cash flow issues and invoicing problems, 6) use of expedited contract process resulted in significant time savings, 7) workshops were helpful in design of administrative aspects of the program, and 8) the program could benefit by expanding allowable costs beyond salaries to include costs associated with coordinating salaries. Despite the reported success, no subsequent funding was immediately made available by the state to RCDs to continue the watershed coordinator program.

Following the passage of the Proposition 50 water bond, California Resources Agency Secretary, Mary Nichols, requested that CalFed become the funding entity for the continuation of the DOC Watershed Coordinator Program. Through an agreement involving programmatic modifications, the Watershed Coordinator Program was incorporated into the CalFed Watershed Program, syncing well with the Watershed Program's local capacity building objectives. While DOC continued to administer the grants, the program was nested within the CalFed Watershed Program and with oversight from CalFed's implementing agencies (i.e., DWR and SWRBC). CalFed oversight resulted in a transformation of the watershed coordinator program to fit within CalFed goals and objectives and extended the opportunity to a wider range of applicants. The program shifted from solely funding RCDs statewide to funding RCDs, agencies, nonprofit organizations, universities in watersheds in the CalFed solution area—those watersheds that provide water to or receive water from the Bay-Delta system.

CalFed Dissolves

In 2005, state entities began to grow dissatisfied with the pace and progress of components of the CalFed Bay-Delta Program concerning water reliability and called for a third-party review of CalFed from the Little Hoover Commission. The Commission report begins:

> CalFed was forged from a crisis, and to a crisis CalFed has returned. …For years, the 'CalFed way' referred to coordinated government, collaborative decision-making, and balanced progress that kept conservancies from pursuing unilateral initiative. To a new generation of officials, CalFed is costly, underperforming, unfocused and unaccountable.

Some stakeholders claim that agricultural and urban water interests had gained more influence over the CalFed Program; their dissatisfaction with water supplies resulted in the dismantling of the program. Others point to the lack of authority from implementing agencies and low funding from federal government as an impetus of the program's disbandment. Lubell et al. (2012) highlights an aggregate of key factors that might have contributed, including: 1) CBDA funding bond was coming to an end; 2) state revenues were on decline; 3) outcomes were being

questioned with Delta Smelt and other species' population levels recorded at an all-time low in the Delta; 4) the institutional design of CalFed was flawed, and lacked independent funding sources and the authority to ensure state and federal agencies complied with CalFed goals and objectives; 5) continued conflicts throughout CalFed's lifespan that were never quite resolved; and 6) with instability plaguing CalFed, agencies and stakeholders that were dissatisfied pushed for a way out and labeled CalFed a failure. While some agencies and stakeholders were quick to label CalFed a failed effort, Lubell et al. (2012:72) emphasized, "Despite failing to achieve the promised ecological outcomes, CalFed may have succeeded in changing the processes, ways of thinking, and communication patterns among stakeholders to set up the next stage of institutional evolution."

With the end of CalFed, each of the elements that had remaining funding were dispersed among agencies to continue the program as long as funds allowed. In 2005-2006 the state assigned residual Watershed Program responsibilities to DOC. In addition to administering remaining funds through subsequent grant solicitation cycles, DOC worked with stakeholders to establish a program similar to the CalFed Watershed Program with an expanded statewide scope. In 2007, the Resources Agency Secretary authorized the formation of a State Watershed Advisory Committee to advise the Resources Agency and DOC in developing a strategy to transition the current CalFed Watershed Program toward an official statewide program that would uphold CalFed Bay-Delta objectives, as well as serve the broader needs of watersheds throughout the state (Watershed Program Plan Year 8 report, 2007). Complications passing a new statewide program arose in the California's Senate finance committee as California grappled with a massive deficit in 2008 that resulted in a state bond freeze.[5] Efforts to build a statewide program fizzled, and the last round of funding for watershed coordinators began in 2011, lasting through 2014.

Defining Characteristics of the Watershed Program

Each of the CalFed Bay-Delta Program elements upheld common objectives to advance the overarching mission and goals of CalFed: restore the Bay-Delta's ecological health and improve water reliability of the Bay-Delta watershed. To achieve these objectives, stakeholders characterize the Watershed Program's approach as being unique compared to other elements. Some defining characteristics of the Watershed Program included the practice of adaptive management, integration of CalFed elements, challenges with performance measurement, investment in the upper watersheds, inclusivity, and the commitment of individuals involved with the program.

[5] On December 19, 2008, the state of California suspended state bonds funding, affecting most of the CalFed programs.

Adaptive management

The Watershed Program acknowledged that watersheds and their human denizens evolve and change over time; to achieve desired conditions in a watershed, management of resources should be adaptable (Watershed Program Performance Measurement, 2004). Given the fluidity of watershed conditions and challenges associated with measuring management performance, the Watershed Program promoted adaptive practices on both a program and a project level. For the Watershed Program, adaptive management involved tracking changes and adapting policies and activities to accommodate changes through management feedback loops. In practice, managers utilize feedback loops to assess and advance how policy decisions affect physical outcomes and processes. Once performance is assessed, results are compared with original objectives and management activities are adapted accordingly.

Integration of CalFed elements

From a programmatic perspective, Watershed Program officials predicted that integration of the Watershed Program with the other ten CalFed elements would most effectively contribute to achieving overarching CalFed objectives and would be an essential component in maintaining continued state and federal support of watershed initiatives. In a concern raised from BDAPC Watershed Subcommittee discussions, the Watershed Program was one of the only grant programs in the state that offered support to watershed planning projects (BDAC Watershed Subcommittee Meeting, June 2004). While Program participants also identified a need for supporting implementation projects, designers of the Watershed Program believed that increased coordination of CalFed elements would present opportunities for linked progress. Planning and watershed assessments could be funded through the Watershed Program and implementation could receive funding from other elements, such as the Ecosystem Restoration Program. Additionally, the Memorandum of Understanding (2000) explicitly states that integrating CalFed elements would be critical to the success of the Watershed Program (2000). While numerous documents indicate that integration was a significant component of the Watershed Program's role in CalFed, stakeholders reported that it did not occur to the extent needed to cultivate synergy among the CalFed implementing agencies and the eleven program elements. Instead, it reflected the CalFed elements' fragmented execution and dispersal that contributed to CalFed imploding in 2005.

From a local watershed perspective, the theme of integration guided watershed management activities among local entities. Watershed Program officials and participants envisioned that the Watershed Program would encourage stakeholders to perceive watershed management as "part of everyday life," meaning that watershed management would be most effective if integrated into local governance structures, especially considering the uncertainty with state funding (BDPAC Watershed Subcommittee January 2004 meeting notes). Integration of watershed management

into local practice became a goal in many watersheds; however, stakeholders reported varying levels of achievement.

Performance measurement

A persistent challenge with the Watershed Program involved difficulty with measuring and quantifying capacity building benefits and their relationship to Bay-Delta outcomes. Several Watershed Program participants described the challenge with identifying metrics to define success in terms of linking water quality improvements to drinking water benefits as results of the Watershed Program. Continued fiscal support from CalFed was contingent on the Watershed Program's ability to demonstrate direct linkages and benefits to CalFed goals. Stakeholders noted that all other CalFed elements were quantitative in nature, and a stark contrast to the qualitative results of Watershed Program. This contributed to CalFed officials' tenuous understanding of the benefit of local watershed investments. Stakeholders also pointed to the ecological complexity of the Bay-Delta system as further clouding linkages of project outcomes to large-scale water quality improvement.

Investment "above the dams"

According to stakeholders, investments in upper watersheds were not typically part of CalFed's strategy to improve the ecological health and water quality of the downstream Bay-Delta. The common interpretation of watershed connectivity among numerous CalFed officials indicated that dams divided the watersheds, and work in the upper watersheds would not have a significant impact downstream. Contrary to CalFed's logic of the upstream – downstream relationship, the Watershed Program advocated that work in the upper watersheds has everything to do with water quality downstream, and that investment is essential for positive long-term Bay-Delta outcomes.

Watershed Program interview participants indicated that a breakthrough in CalFed's investment in upper watersheds was achieved when the Ecosystem Restoration program provided financial support for the eradication of the invasive Northern Pike in Lake Davis and its tributaries. Located in the Upper Feather River watershed, the Lake Davis Pike Eradication Project, which proved to be a controversial endeavor, used a chemical treatment to eliminate invasive northern pike coupled with objectives to restore the trout fishery in Lake Davis and prevent downstream ecological damage in the Delta. Local residents, skeptical of the eradication effort, feared that use of chemical treatment would negatively affect human health, local tourism and real-estate values. Some stakeholders pointed to the seeming inconsistency in CalFed's hesitancy to support work in upper watersheds and also fund a project in the upper watershed out of concern that the northern pike might affect the Bay-Delta system further downstream.

Inclusivity

According to multiple stakeholders, the Watershed Program had a large constituency, in part due to the program's inclusivity in meetings and decision-making processes. As characterized by one stakeholder, the Watershed Program "invited everyone in and closed the door on no one," resulting in meetings of 75-100 attendees. As leaders in the Watershed Program recalled, operating with inclusivity attracted innovative-minded individuals who helped advance large-scale solutions through local initiatives. Among welcomed participants were environmental justice advocates, which quickly resulted in environmental justice becaming a core principle of the Watershed Program. It was appropriate for the Watershed Program to serve as a forum for expressing environmental justice concerns considering the program's goals of improving the conditions of local watersheds. Once state and federal officials realized its relevance and considered each of the CalFed element's impact on local communities and environmental justice issues, environmental justice was established as a separate program with the CalFed structure.

Committed individuals

A key component of the Watershed Program involved the drive and passions of the individuals involved. As interviewees reflected, the commitment, intellect, vision, and wit of the people involved in the Watershed Program made the program unique and contributed to its popularity among constituents. Watershed Program leaders were of diverse backgrounds, connecting to both urban and rural issues. By embracing the holistic vision of the watershed approach, and engaging stakeholders with an "open door" philosophy, the Watershed Program became a diverse entity and forum in which diverse water-related challenges could be expressed and addressed. Program leaders took risks to advance the watershed mission despite resistance from CalFed officials coupled with and tied to the challenges of connecting performance measures to Watershed Program work.

Conclusion

The institutional framework highlights the complexity of the CalFed process that gave rise to the watershed coordinator and project grants that are the focus of this study. The diverse agencies and their programs, the many and diverse goals and elements and the challenge of integrating these, the tension between activities above and below the dams and their impact on the Bay-Delta system, along with the challenge of measuring outcomes offer a potent backdrop against which the watershed coordinator and project grants are assessed.

Embracing many of the challenges identified by CalFed agencies and the program itself, such as unpacking and understanding efforts to improve community capacity, integrating complex goals and elements, and utilizing both qualitative and quantitative measures, this project identifies outcomes of funded watershed coordinator and project grants. This study does not fully answer

the question of the effectiveness of investment on the Bay-Delta system as a whole, but it does go a long way in identifying “best practices” and the effectiveness of the many watershed coordinator and project investments made as a result of the CalFed program.

III. Watershed Project Grants

The Statewide Watershed Program issued approximately 175 project grants for a variety of project types between 2000 and 2008, including funding for: 1) capacity building, 2) project research and planning, 3) watershed assessment, 4) watershed management planning, 5) large-scale monitoring and assessment, 6) education, and 7) project implementation; see Figure 3.1 below. The intention behind these grants was to support planning, stakeholder engagement, and on-the-ground implementation activities to advance CalFed's four primary objectives: ecosystem restoration, water quality, water reliability, and levee system integrity. Activities associated with the seven project types listed above are distinct, and the majority of project grants align with a single type. That is not, however, to suggest that grants within a single type are the same. Major differences include scope of work, level of public involvement, challenges, successes, outcomes, and lessons learned, see Table 3.1.

Figure 3.1. Watershed Project Grants Program Funding Distribution

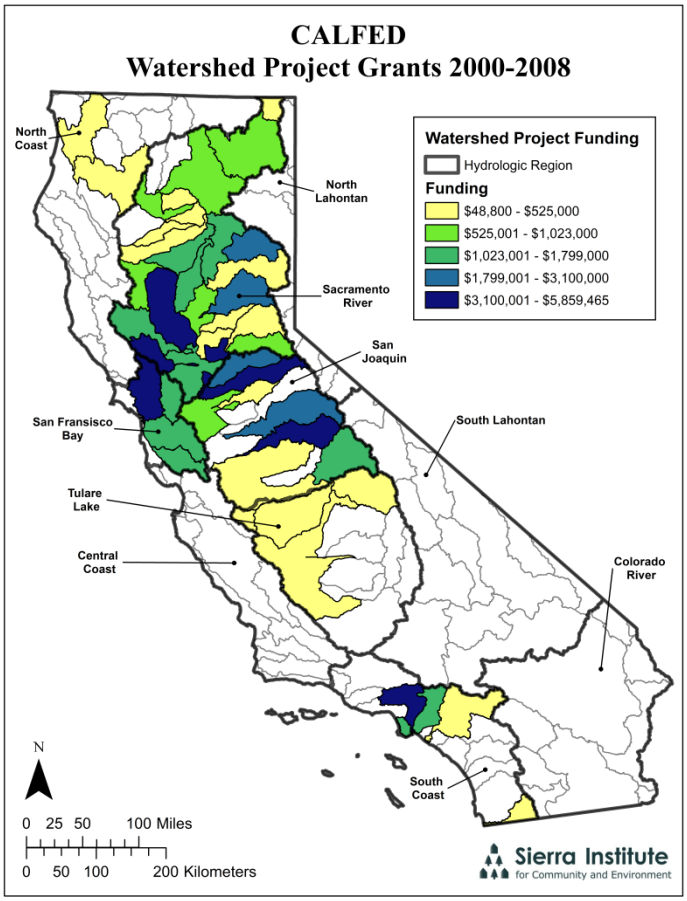


Table 3. 1. CalFed Watershed Program Project Grants (2000-2009)*

Year	Number of Projects	Funding Proposition	Total Amount of Funding	Administering Agency
2000-2001	53	Prop 53	$17,544,714	Department of Water Resources
2002-2003	29	Prop 13	$10,600,000	State Water Resources Control Board
2003-2004	34	Prop 13	$11,000,000	State Water Resources Control Board
2006-2007	55	Prop 50	$18,985,339	Department of Water Resources
2008-2009	4	Prop 50	$5,839,046	State Water Resources Control Board
Total	175		$63,969,099	

*Total number of projects and funding are based on Department of Conservation data.

Capacity Building

One of the primary hallmarks of the CalFed Watershed Program is the investment in community and organizational capacity building. These investments laid the groundwork for advancing localized watershed improvement activities while working to address overarching CalFed objectives. Community capacity and the ability of communities to address and respond to issues is measured through a framework of five capitals: cultural, financial, human, physical, and social (Kusel, 1996; Kusel et al., 2015). The watershed program's novel investment in human and social capital to address watershed health-related issues were considered by stakeholders to be a pivotal approach to natural resource management. This investment stimulated innovative and collaborative approaches that produced important social and ecological outcomes.

Capacity building efforts were supported in the CalFed Watershed Program primarily through watershed coordinator grants; however, a subset of project grants awarded to individual organizations supported similar activities such as conducting outreach and education, building information and resources sharing networks, forging partnerships, and increasing fundraising abilities. As such, investments in social and human capital of individual organizations translated into a greater collective knowledge among community members and stakeholders to address local concerns through a collective approach rather than individually-driven initiatives. Two notable examples of projects focused on organizational capacity building include: Council for

Watershed Health's (CFWH) "Organizational Development" project grant and the Sacramento River Watershed Program's (SRWP) "Program Support" project grant.

Stakeholders in the CFWH case lauded CalFed's capacity-building support as vital to the organization's growth. This support yielded results beyond the internal growth of the organization, contributing to the coordinated management of watershed resources and information across the Los Angeles and San Gabriel watersheds. The first phase of the organizational development grant supported CFWH's transition from volunteer staff to a full-time, paid professional staff. Also enhanced was the organization's ability to conduct outreach and its technical and administrative capabilities. This placed the organization at the center of sharing and coordinating watershed resources, instituting a hub for exchanging information among water entities and the general public in the Los Angeles area. With an established full-time staff and increased administrative capabilities, CFWH fostered a collaborative network of partnerships in the watershed and secured long-term fiscal support to advance projects managed by CFWH and its partners.

The CalFed grant awarded to SRWP in 2003 supported development of water quality monitoring programs in smaller organizations throughout the Sacramento River region. Grant activities supporting general capacity building of SRWP (e.g., administrative and technical capabilities) heightened the organization's influence across the Sacramento River watershed that contributed to the development of a robust information sharing network among sub-watersheds. As the largest grant ever received by SRWP, organizational development was supported for nearly three-and-a-half years, with the formation of committees that worked to advance projects in four realms of watershed improvement: agriculture, mercury, public outreach, and water quality monitoring. Of the four areas of project development, water quality monitoring drew the most attention from stakeholders, becoming the primary focus of the grant. Though SRWP's capacity was not commensurate with implementing a large-scale water quality monitoring system across the entire Sacramento River watershed, the organization nonetheless enhanced collaboration and information-sharing by introducing novel technologies, such as interactive online databases. The creation of an online platform for data exchange transformed how stakeholders accessed monitoring data, studies, and reports, resulting in greater connectivity among water interests across the entire Sacramento River region.

The capacity-building initiatives in the Sacramento River Watershed and the Los Angeles River watershed established central hubs for information-sharing, not solely for the benefit of the grant recipient organization but also for entities working across their watersheds. Despite the challenge of coordinating in densely populated or geographically large watersheds, the network each organization built represented a "bank" of institutional knowledge that favored the success of other organizations' projects. Such outcomes represent a "virtuous cycle," whereas an increase in

implementation projects engages a broader range of stakeholders, who in turn stimulate the interest and support of funders.

Large-Scale Monitoring & Assessment

A majority of project grants funded activities at the HUC-8 or HUC-10 scale.[6] However, the scope of work in some projects encompassed entire hydrologic regions. Two projects included in this assessment aimed to develop standardized procedures for regional monitoring and assessment activities. The project grant received by SRWP is once again highlighted in this discussion of large-scale assessments, as the grant supported efforts to establish a standardized regional water quality monitoring program across the Sacramento River hydrologic region. Similarly, CFWH received a grant in 2007 to develop a standardized watershed assessment "report card" (i.e., indicators to define and measure watershed health) to evaluate the condition of southern California watersheds. In both cases, the attempt to expand the scope and create centralized standards for watershed assessments created multiple challenges and problems associated with a mismatch of local resources and regional management.

In the Sacramento River case, monitoring activities established long-term baseline data for water quality in the Sacramento River watershed and contributed to a greater understanding of discharges that impact the Bay-Delta. Despite intensive efforts to develop regional monitoring, comparable data across local watersheds' impacts on the Bay-Delta remained incomplete as the grant recipient organization was unable to coordinate and centralize a program across a region as expansive and diverse as the Sacramento River. With SRWP's limited organizational capacity during the execution of the project grant, stakeholders noted that it was challenged to advance the program sustainably and, as a result, efforts to advance on-the-ground monitoring diminished as soon as the CalFed grant ended. Nonetheless, there was some success within the monitoring program in the form of an online data portal, which continues to engage stakeholders through an interactive platform and positions SRWP as a leading information clearinghouse in the region.

CFWH's efforts to develop a centralized system for assessing the ecosystem values of Southern California watersheds spawned the development of the "Southern California Watershed Assessment Framework." The framework was tested in the Arroyo Seco watershed, where CFWH attempted to assess the watershed's ecological, economic, and social health using a watershed "report card." Efforts in the pilot study revealed that not all watershed health indicators can be measured, especially those influenced by complex social structures and relationships. Despite the challenges with standardizing a process in a socially and ecologically

[6] HUC refers to the hydrologic unit codes used by the U.S. Geological Survey and other entities to classify watersheds or catchment basins. HUC-8 (sub-basin level) and HUC-10 (watershed level) are nested within the broader boundaries of hydrologic regions.

variable landscape, stakeholders learned that limited ability to measure watershed effects does not necessarily mean efforts are ineffective.

Watershed Assessments and Watershed Management Plans

Approximately 40% of all CalFed project grants funded the development of watershed assessments or management plans, or both. As observed in case study research, watershed assessments and management plans are part of a process for moving from understanding historical and current watershed conditions to implementing on-the-ground projects, typically supported by a network of diverse stakeholders. In seven cases, some including multiple grants, watershed assessments were developed by a diverse set of stakeholders and laid the groundwork for development of management plans. These provided necessary information perspectives to effectively break ground on new projects. Watershed assessments include an evaluation and synthesis of historical and current data to help formulate desired conditions and to identify objectives to promote healthier watersheds. Watershed management plans are an extension of an assessment component and identify specific projects and actions that move current natural resource conditions closer to desired states. Typically, project goals are paired with specific performance measures to help determine the success and benefits of implemented actions, including addressing land-use management challenges, ecological restoration and conservation, monitoring, natural resource allocation and use, parcel management techniques, and educational programs.

Watershed assessments

Protocols for developing watershed assessments typically included diverse stakeholders in a collaborative process, sometimes with subcommittees that focus on specific issues or campaigns often supported by expert consultants or agency staff. By identifying existing conditions and defining future desired conditions, stakeholder groups began to operationalize long-term protection, management, and sustainability of the watershed. Conditions reported in assessments were typically organized into land, water, wildlife habitat, and socioeconomic categories. For example, the assessment component of the Tujunga/Pacoima Watershed Plan explored four categories: *People* (historical events, cultural sensibilities, socioeconomic changes, land use history, common modes of transportation, major business types, etc.); *Wildlife Habitat* (aquatic, riparian, terrestrial, biodiversity, endangered species, ecosystem and plant communities, native species, exotic non-native species, habitat displacement, and open space benefits, etc.), *Land* (geology, sub watersheds and tributaries, land cover, land use, etc.), and *Water* (climate, water supply, water quality, groundwater, water rights, water imports, etc.). Beyond identifying historical and current conditions, watershed assessments also contained general objectives and goals related to improving local water supplies, improving surface and groundwater quality, restoring hydrologic function and flood management, ecosystem balance and enhancing wildlife

connectivity, public access and recreation, watershed awareness and stewardship, coordinated and collaborative planning, and resource management.

The most cited outcome of assessment work is that it laid critical groundwork for subsequent plan development, including wide-scale watershed management action plans and targeted plans, such as the Community Wildfire Protection Plan developed by the Tehama County RCD. Assessment activities in the Tujunga/Pacoima Wash led to an action plan of 37 prioritized projects. In the Cal-Neva RC&D case, landowners utilized a watershed assessment to develop state-regulated water quality reports and specialized nitrogen management plans. With the development of assessments, organizations reportedly had greater appeal to granting agencies when submitting applications for funding. According to stakeholders, applications backed by current science and with support of multiple perspectives had higher success rates in securing funding awards. Concurrent with assessment development, several organizations conducted public outreach and developed educational materials. In some cases, such as The River Project and North Cal Neva RC&D, grant recipient organizations developed comprehensive K-12 curriculums focused on watershed education to implement in local schools and advance stewardship.

The most rudimentary perspective of "success" of a watershed assessment is one that appropriately defines objectives and lead to action planning and implementation. Factors observed that either delayed or inhibited action planning and implementation include challenges with the collaborative process itself, complications with group dynamics and individual personalities, limited or poor communication among stakeholders, turnover of those involved with the assessment, inadequate dissemination of information to the public or possible implementing agencies, and funding instability. The 2008-2009 state bond freeze was cited by all grant recipients during that period as a major obstacle not only to funding continuity but to group and organizational success and operations and, therefore, continuation of the work itself.

Watershed management plans

Watershed management plans expanded upon the broad analyses provided by watershed assessments and outlined specific project concepts that could be included in grant or funding applications. Similar to collaborative processes to develop assessments, projects developed as a part of management plans typically reflected diverse stakeholder perspectives and interests. Incorporation of multiple stakeholder perspectives reduced project redundancies in watersheds and increased the likelihood of project funding.

In some cases, collaborative assessment and management plan development resulted in increased implementation efficiency by way of new partnerships and networks for sharing resources. The River Project's watershed management plan for the Tujunga/Pacoima watershed was developed

by a project team of 11 specialists and guided by a stakeholder steering committee composed of 45 representatives from local, state, and federal agencies, nonprofit organizations, and community residents. A Technical Advisory Committee (TAC) of 33 members was also established to inform and support the development of a plan and ensure that decisions aligned with the overarching goals and objectives of watershed assessment efforts. Numerous projects recommended in the Tujunga-Pacoima Watershed Plan have secured funding for implementation or have been completed, including the CalFed-funded Woodman Avenue Multi-Beneficial Stormwater Project. The Woodman Avenue project was implemented by a trifecta of partners, including two local agencies and The River Project, enabling a more efficient use of local resources for project implementation. Each partner maintained different networks in the city and contributed unique expertise that resulted in a streamlined process (e.g., a required permit was waived because of one agency's public right of way status). Stakeholders cited challenges with interagency communication strained from previous agency rivalries, but pointed out that identification of resources and partnering opportunities and an inclusive planning process resulted in successful and efficient project implementation that would otherwise not have taken place.

Challenges with partner communication and group dynamics seemed inevitable in some cases, particularly where the collaborative spirit was strained by pre-existing contentious relationships and poor group facilitation. For these reasons, trust building proved a delicate process and not always successful. This was the situation during Tuolumne River Trust's effort to lead collaborative development of an integrated watershed plan that synthesized existing plans into a single cohesive document. A document was produced by the end of the grant, but there remained lingering disagreement among stakeholders about its usefulness. Some informants suggested that staff turnover within participating stakeholder organizations and agencies contributed to the dissolution of collaboration and failure to advance the plan. A number of variables likely contributed to the breakdown, including frayed relationships that led to general "exhaustion" to continue meeting. Similarly, in the development of the Mt. Diablo Resource Management Planning Program in Contra Costa County, consensus-based approaches failed to build trust with private landowners, resulting in their rejection of some of the proposed activities because they feared that voluntary action could turn into mandatory requirements.

While challenges in the collaborative process were an impediment in the development of some management plans, most stakeholders across a wide variety of cases agreed that the process was more than worth the effort, yielding lasting beneficial outcomes in a watershed from improved relationships to enhanced project outcomes, including restored ecosystems. In these cases, a management plan served as a guide that helped stakeholders achieve collective goals through diverse projects. It has proven repeatedly to be an essential element of local watershed management.

Project Research and Planning

Distinct from large-scale watershed planning projects and watershed management plan development, some CalFed project grants supported planning and research efforts tied to specific on-the-ground projects. These research and planning efforts targeted an array of issues ranging from augmenting stormwater capture and urban runoff to restoring degraded fisheries and addressing contaminated mine drainage or streambank erosion. Successful watershed planning embraces stakeholder engagement. Included in cases studied are two project grants that focused primarily on planning efforts for specific projects: "Augmenting Groundwater Supplies through Groundwater Capture of Urban Runoff" received by the Council for Watershed Health (CFWH) in 2000 and the "Lower American River Environmental Enhancement," received by the Sacramento Area Flood Control Agency (SAFCA) in 2003.

The CFWH used a 2000 CalFed grant, combined with funds from the Metropolitan Water District and the Los Angeles Department of Water and Power, to study the effects of stormwater infiltration on groundwater in the Los Angeles and San Gabriel watersheds. The idea behind the augmentation study is that with proper planning and research, urban runoff for groundwater recharge can serve as a good alternative to reliance on imported water. The research was completed as the first phase of a decade-long project of groundwater augmentation using stormwater infiltration. One component of the research involved monitoring, which increased understanding of pollution trends and the relationship between urban water infiltration and soil and water quality. A series of stormwater demonstration projects across the watershed were launched, including a groundwater recharge project funded by the CalFed watershed program, the Sun Valley Neighborhood Retrofit (2007).

The "Lower American Environmental Enhancement" project included a broad-based public process to map land use of the lower five miles of the American River Parkway. The planning process received a planning award from the American Planning Association for its inclusive process that involved ten workshops, multiple site visits, and robust participation from diverse stakeholders. Despite this award-winning planning, however, the process failed to successfully engage a key private landowner who owned property needed to be acquired to complete the project. As a result, the visionary planning was not implemented and CalFed monies for the property purchase were subsequently returned.

While stakeholder interviews did not reveal specific challenges with the research component of the CFWH's water augmentation project, later challenges regarding disadvantaged community capacity and needs in the demonstration sites revealed a significant gap in early planning and research. The first phase of the water augmentation study focused on technical aspects of the research but did not adequately consider social and longer-term economic implications of the project. Planning efforts primarily engaged agency and nonprofit partners but ignored neighborhood and community residents whose properties served as implementation sites.

Community residents were receptive to green infrastructure but, critically, lacked capacity to maintain it, a scenario that is discussed below with some implementation grants. Similarly, in the "Lower American Environmental Enhancement" project a lack of stakeholder representation led to the project's demise. In both projects, adequate engagement and "buy-in" of stakeholders whose involvement vitally affects project outcomes, as well as engagement of disadvantaged and underserved communities, were components overlooked during the planning process, resulting in deleterious outcomes.

Education

Most CalFed project grants types (e.g., implementation, watershed management plan development) contained elements of education to increase public awareness associated with watershed health and restoration projects or to incorporate youth curriculum programs in local schools. Some CalFed project grants focused primarily on youth stewardship programming and promoted youth engagement in environmental education and service-learning projects. Two education-focused projects are highlighted here.

The Watershed Education Summit (WES) in the South Fork American River watershed annually engages 60-80 high school students in watershed education and monitoring activities during a four-day event. Data collected by students participating in WES continually add to a long-term monitoring dataset that informs watershed management decisions by the US Forest Service and the Sacramento Municipal Utility District. In the program, students learn water quality survey techniques consistent with the Pacific Southwest Region Stream Condition Inventory and how agencies incorporate results into management decisions.

The Tuolumne River Trust implemented a robust outdoor classroom curriculum involving teacher trainings, classroom lessons, river field trips and tours, service-learning projects, museum exhibits, and presentations focused on watershed issues. The program engaged over 96 classes and thousands of students from the Lower Tuolumne River to San Francisco Bay, and advancing understanding of their water resources.

In both the Watershed Education Summit and Tuolumne River Outdoor Classroom projects, stakeholders praised the programs for creating a sustainable learning experience for students, building awareness of watershed issues, and influencing student career paths. Both programs created models for student-oriented environmental education that are transferable and expandable, and that have been adopted in other watersheds. Establishing models that are replicable and adaptive contributes to sustainability and longevity of such programs. Once started, stakeholders reported that the programs are subsequently maintained by committed individuals and organizations.

A challenge with many youth education programs, however, is securing initial buy-in and financial support from state and county school boards. While project grants support specific outdoor education activities and implementation of outdoor curricula, other costs such as transportation and substitute teachers for field trips are contingent on county and local education officials support. Not surprisingly, stakeholders reported that watershed-related activities are more likely to gain traction if they comply with or contribute to improving student and school performance. Another commonly cited challenge concerned a lack of inclusion of disadvantaged schools and lower-performing students in outdoor education activities. Many schools have considered outdoor education programs to be enrichment programs and offer these programs only to high-achieving students. The recent shift in California science standards and to project-based learning will likely increase interest in these programs generally, and ideally to all schools and students of all abilities.

Implementation

Implementation includes on-the-ground project work ranging from physical capital development to ecological restoration (e.g., dam removal, road decommissioning, removal of invasive species, street and median retrofits for stormwater capture). In some cases, organizations received CalFed project grant funds for developing watershed management plans or specific project planning efforts that laid the groundwork for subsequent implementation grants. Eleven grants included in case research for this study funded project implementation.

Implementation projects typically advanced objectives that directly addressed water quality improvement and riparian habitat enhancement for wildlife and fish. In this sample of projects, objectives were addressed via elements such as stormwater capture, stream daylighting, green street infrastructure, and sedimentation reduction. Project activities commonly yielded a range of ecological outcomes with measurable benefits to fish and wildlife, including acres of riparian zones restored, sediment reduction in streams, and increased groundwater recharge. In addition to activities focused on ecological restoration, many implementation projects also advanced corresponding sub-projects related to monitoring, education, outreach, and capacity building.

Localized implementation projects were usually derived from stakeholder-informed watershed management plans or were in response to community-derived concerns and motivations. For example, the Woodman Avenue Multi-Beneficial Stormwater Capture Project was one of 37 priority projects identified in the River Project's Tujunga/Pacoima Wash Management Plan, a document developed through a multi-stakeholder informed process that was funded by a CalFed watershed project grant. In the City of El Cerrito, the Baxter Creek Gateway Restoration project grew out of local community residents' concern over the safety and value of a decommissioned railway yard that ran adjacent to the once meandering and biodiverse Baxter Creek. Similarly, in more rural areas, efforts such as the Murphy Creek Restoration Project, which targeted livestock dam removal, was initiated by the property owners. Project origins are not necessarily predictors

of the success of implementation, but appropriate and thoughtful involvement of stakeholders through the planning and implementation processes can mitigate challenges, such as longer-term maintenance.

Two prevailing challenges observed in implementation projects, especially those located in urban areas, include the involvement of disadvantaged communities and the long-term success of projects. The CFWH's Sun Valley Neighborhood Retrofit project engaged a disadvantaged community that was both willing and enthusiastic to participate in the project. This involved community members allowing their properties to be included in the demonstration project. There was, unfortunately, a lack of foresight concerning maintenance: lacking capacity, the community was challenged to maintain the stormwater capture infrastructure beyond basic native plant care. A similar challenge was observed in the Baxter Creek Gateway Project, which consisted of stream daylighting work and increased public park access. Notwithstanding the perspective of several stakeholders who considered the project successful, the project lacked involvement of disadvantaged community members, leading to design flaws and maintenance challenges and, ultimately, long-term project failures. Failure to identify who will maintain projects and sources of support for the work will likely constrain project outcomes and may ultimately lead to project failure.

Landowner participation and buy-in to projects also presents a challenge for rural watersheds. In the Murphy Creek Restoration Project in the Lower Mokelumne watershed, the primary goal included removal of a small dam. Stakeholders, however, reported challenges in obtaining buy-in and participation of adjacent landowners, resulting in more isolated impacts rather than watershed-wide outcomes as desired by project implementers. Stakeholders noted that perhaps more outreach and coordination could have responded to uncertainties and concerns from landowners regarding their participation. On a larger scale, the Battle Creek Watershed Stewardship project addressed a contentious history between private and public natural resource land managers by bringing on a watershed coordinator early in the process to lead what turned out to be a deliberative and inclusive planning process that presented tradeoffs and risks to landowners. Relationship building processes with considerable encouragement of community participation from the watershed coordinator ultimately resulted in watershed-wide outcomes contributed to by many of the major landowners collaborating with state and federal agencies in the watershed.

IV. Watershed Coordinator Grants

Coordinators exists across occupations and share common skills including, but not limited to: organizing people, assessing issues, developing organizational structures and management and project plans, and delivering public education programming. Research on building community coalitions has shown a coordinator is an important contributor to achieving successful outcomes. Attributes of a "good" coordinator include a person who motivates and inspires, possesses knowledge and enthusiasm, demonstrates initiative and drive, is a good communicator, and is a good organizer (Rabinowitz, P. (n.d).

Koontz and Newig (2014) found that watershed collaboration resulted in on-the-ground project implementation with sufficient resources, dedicated leaders, willing landowners, and networks. The notion that strong networks contribute to success in collaborative initiatives is supported by additional research (Rosenberg & Margeum, 2011; Lejano and Ingram, 2009). As part of the role of a watershed coordinator, the 2011-2014 Department of Conservation Request for Proposals tasked watershed coordinators with information sharing, advancing collaboration among interest groups, providing technical expertise, measuring performance, and acting as a liaison between communities and statewide programs. In executing the tasks to meet the 2011-2014 watershed coordinator position, watershed coordinators exhibited many of those factors elucidated by Koontz and Newig (2014), including filling leadership roles, cultivating trust and relationships to encourage landowners, and developing networks among diverse stakeholders.

The Environmental Protection Agency (EPA) published a "Lessons Learned" report in 1997 that presented recommendations on factors that lead to more successful watershed initiatives. These include the role of a watershed coordinator as a facilitator among stakeholders who provides a framework to develop plans with a clear vision, goals, and actions items; commitment to empowering others; balancing power among partners; ensuring accountability for progress through measures and communication; educating and involving stakeholders in driving actions; and building on small successes (Benthrup, 2001; EPA, 1997; Leach & Pelkey, 2001). The EPA report underscored the desirability of having a watershed coordinator to ensure more successful outcomes in watershed projects. These factors were adopted by the Department of Conservation watershed coordination program.

Watershed coordinators are not tasked with homogenous responsibilities. Sustaining the life of an organization may require performing administrative tasks that can consume a watershed coordinator. When an organization lacks capacity to accomplish basic survival tasks, the focus of the coordinator may by drawn away from developing partnerships and an active stakeholder network towards keeping the organization afloat (Bonnell and Koontz, 2007).

Introduction to Watershed Coordinator Grant Program

The Watershed Coordinator Grant Program (WCGP) typically funded full-time watershed coordinators; though, some organizations shared one coordinator between two watersheds or hired two half-time coordinators to foster collaboration and partnerships at the watershed scale. Duties supported by the grant program evolved through three grant cycles to include the following components: share information; advance collaboration among agencies, groups and individuals; provide technical assistance; develop local capacity for improved watershed management; identify best management practices; offer assistance and training for monitoring programs; and develop and support educational programs. An estimated $28.4 million was dedicated to watershed coordinator grants shown in Table 4.1.

Table 4.1. Watershed Coordinator Grants administered by the Department of Conservation (2000-2014)

Year	Number of Projects	Total Amount of Funding
2000-2002 (pilot)	30	$2,000,000
2002-2003* (pilot extension)	18	$1,100,001
2004-2007	48	$8,805,817
2008-2011	43	$8,585,629
2011-2014	41	$9,140,741
2014 (6- month extension)	37	$800,019
Total	150**	$28,432,208**

*Pilot grants and pilot extensions are not included in our study due to programmatic differences.
**Estimates provided by the Department of Conservation

Watershed Coordinator Pilot Program

The Department of Conservation initiated watershed coordinator grants in 2000 with a pilot program that awarded $2 million to 30 watershed coordinators. Initially, grants were exclusively offered to Resource Conservation Districts (RCD). Following the two-year pilot program, from 2002 through 2003, the Department of Conservation partnered with the California Bay Delta-Authority (CBDA) to extend the program to 18 of the original pilot grantees whose project areas fell within the CalFed Solution Area.

Watershed Coordinator Grants: 2004-2007 & 2008-2011

The WCGP expanded eligibility requirements during the 2004 to 2007 grant cycle from exclusively RCDs to special districts, nonprofit groups, and local governments, and provided approximately $9 million dollars over a three-year period. With funds from the Water Quality, Supply and Safe Drinking Water Projects Act of 2002 (Proposition 50), CalFed supported 48 watershed coordinators during the 2004 to 2007 grant cycle. The purpose, as stated in the 2004 RFP, was to facilitate watershed improvement efforts within the CalFed Solution Area, demonstrate a direct benefit to the Bay-Delta system, and support goals and objectives of the CalFed Watershed Program and at least one other authorized CalFed program criteria as listed in Table 4.2. A maximum of two watershed coordinators could be hired for each HUC-8 level watershed.

Table 4.2 WCGP Eligibility Criteria

1) A location within the CalFed Solution Area that drains to the Sacramento-San Joaquin Delta or San Francisco Bay, has clear benefits to the Bay-Delta system, and supports the CalFed Watershed Program and at least one other CalFed Program.	2) A location within the CalFed Solution Area that does not drain to the Sacramento-San Joaquin Delta or San Francisco Bay, has clear benefits to the Bay-Delta system, and supports the CalFed Watershed Program and the Water Use Efficiency Program.	3) A location outside of the CalFed Solution Area that demonstrates a direct benefit to the Bay-Delta system, supports the CalFed Watershed Program and a least one other program.

As grant administrator, the Department of Conservation awarded 43 watershed coordinator grants from 2008 to 2012 with work focused in the CalFed Solution Area. Proposition 50 funded the 2008 to 2012 watershed coordinator grant cycle as part of the CalFed Watershed Program. The 2007 request for proposal (RFP) included the same criteria for eligibility as the previous grant cycle.

Watershed Coordinator Grants: 2011- 2014

In 2010, the Department of Conservation awarded 41 watershed coordinator grants for 2011 to 2014. These grants were made available for watershed improvements throughout the state and were funded through the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act of 2006 (Proposition 84). Six-month extensions were made available to 37 grant recipients in response to Governor Brown's Drought Emergency Declaration in 2014.

The 2010 RFP signaled several changes for the WCGP. The 2011 to 2014 grant cycle was the first to indicate a preference for organizations that would maintain the watershed coordinator position as an employee in the organization rather than as a subcontractor working externally. This was based on the assumption that an "in house" position would more likely be supported and sustained beyond the term of a grant.

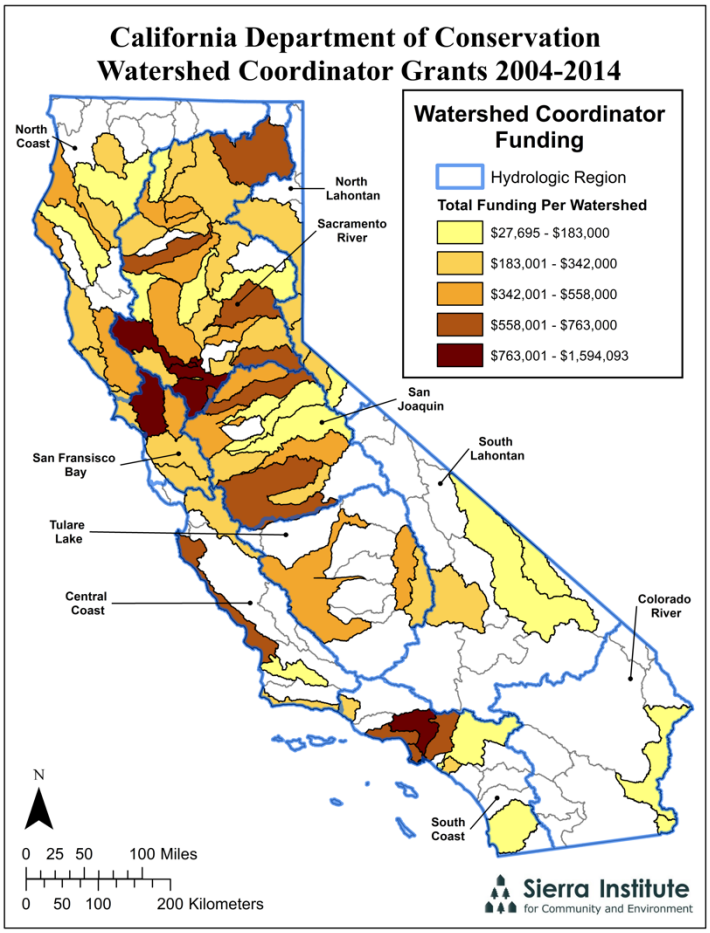
The Department of Conservation also altered eligibility requirements in the 2011 to 2014 grant cycle with a preference for seven specific conditions: 1) watershed coordination in as much of the land area of California as possible; 2) coordination where it has not previously been supported and meeting the interests of local communities; 3) coordination based on a whole watershed approach; 4) coordinators that work with all groups and interests within a selected watershed; 5) organizations that provide a higher match; 6) local and community-based watershed coordination supported by an established local organization already involved in natural resource management in the watershed; and 7) organizations that can utilize the grant money as an initial investment to develop or enhance sustainable local watershed partnerships and provide long-term support for watershed coordination.

The duties of the 2011-2014 watershed coordinator included, but were not limited to: 1) ensuring open and accurate sharing of information; 2) convening and advancing collaboration among and between various agencies, entities, groups, and individuals with interest in management of natural resources; 3) providing or assisting with the acquisition of necessary technical expertise; 4) reporting and measuring performance milestones; and 5) acting as a liaison between local communities and regional or statewide activities and programs.

Priorities shifted to support watershed coordination across all 10 hydrologic regions of California, including areas where it had not been previously supported, and to meet the interests of local communities. While the selection process was competitive, preference for funding relied on three categories, which considered location and previous eligibility listed in Table 3.2. The program emphasized supporting well-developed proposals in Category 1 regions, defined—significantly—as watersheds outside of the CalFed Bay-Delta Solution Area that had previously been ineligible. The program also emphasized Category 2 regions and watersheds that are located within the Bay-Delta Program Solution Area that had not previously been successful in obtaining a watershed coordinator because of the CalFed Program's limited scope. Category 1

and Category 2 projects were evaluated independently from the third category and qualified for 80% of the funds available for support. Eligible watersheds included: North Coast, North Lahontan, South Lahontan, Colorado River, Ocean-facing San Francisco Bay, Tulare Lake, Central Coast, and South Coast. Twenty percent of funds were made available to qualifying proposals from Category 3 watersheds in the Bay-Delta Program Solution Area where there had been opportunities to participate in the two preceding watershed coordinator solicitations. The distribution of all watershed coordinator grant funding across the state is shown in Figure 4.1.

Figure 4.1. Watershed Coordinator Grants Program Funding Distribution



What Does a Watershed Coordinator Do?

To fulfill the duties of a watershed coordinator outlined in the RFPs (2003, 2007, 2010) and meet the objectives presented by the WCGP, watershed coordinators were to respond to the context and needs of the local communities, watershed conditions, along with the organizational mission of the grant recipient. As observed in case studies, prominent roles fulfilled by watershed coordinators during the WCGP are listed in Table 4.3 below.

Table 4.3. Duties of a Watershed Coordinator

Roles of WC	General Description/Sub-roles	Specific Tools/Processes Utilized to Achieve Outcomes	Outcomes Reported & Observed
Administrator (Organizational and/or Technical)	● Developing organizational capacity ● Fundraising ● Managing	● Writes grants ● Manages additional staff, grants and/or programs ● Manages information sharing tools (e.g., websites, data portals, newsletter)	● Leveraged organizational funds ● Improved organizational technical capacity ● Increased public-organizational awareness
Champion (ecologically and/or socially)	● Advocating ● Voicing community concerns ● Building community capacity	● Champions for a specific cause ● Represents community in local/regional/statewide forums	● Increased awareness of ecological and/or community issues locally and beyond
Driver	● Cultivating interest ● Pushing/ accelerating/ advancing projects ● Driving efforts forward	● Maintains/provides a resource bank (information, resources, tools) ● Cheerleader/motivator ● Holds stakeholders accountable ● Organizes volunteer program ● Revitalizes old projects	● Community actively involved ● Public access to information resources ● Increased transparency ● Processes stay on track
Connector	● Bringing diverse interests to the table ● Educating ● Sharing information ● Cultivating trust ● Liaison between communities and regional or statewide activities and programs	● Bridges stakeholder groups and developing relationships ● Provides transparency through information sharing, in turn building trust ● Promotes collaborative agenda	● Reduced redundancies in efforts ● Expanded efforts and forged new efforts ● Development of trust and increased transparency ● Increased social capital
Facilitator	● Providing third-party facilitation ● Leading consensus-based approaches	● Exercises adaptive management ● Brings experts to meetings to help inform next steps ● Help to identify gaps in approaches ● Tracks and celebrates progress	● Works through conflict ● Produces well-informed plan & projects

While not mandatory, many watershed coordinators participated in facilitation and consensus building training for the pilot watershed coordinator program and during CalFed participation in the WCGP in 2001, 2003 and 2006. While facilitation was cited as a pivotal part of watershed coordination for several watersheds (e.g., RCD Santa Monica Mountains, San Joaquin RCD, Battle Creek Watershed Conservancy, Ojai Valley Land Conservancy), some watershed coordinators acted in an administrative capacity focusing on internal organizational needs and functions. Most coordinators fulfilled several of the roles listed in Table 4.3. Watershed coordinator duties are further discussed in the subsequent section with examples from case studies to illustrate strengths and challenges of the approaches taken by coordinators and to explicate factors that contributed to or impeded effective watershed coordination.

Administrator

Some watershed coordinators focused on administrative tasks, including, but not limited to, developing organizational capacity, fundraising, and managing daily organizational needs. Fundraising for organizational programs and on-the-ground watershed projects was typically pursued through grant writing, as well as developing partnerships that allowed for sharing and leveraging resources.

Watershed coordinator as administrator also included tasks like overseeing organizational programs, grants, and personnel. Many watershed coordinators were involved with data management and developing information sharing tools such as websites, data portals, and newsletters. Some of the more common outcomes associated with these tasks included: leveraged organizational and watershed project funding, improved technical assistance, and increased public awareness of the organization and its efforts.

In the case of the Pajaro River watershed, the Santa Cruz Resource Conservation District received a watershed coordinator grant split between the upper and lower Pajaro River watersheds, and shared watershed coordination money among three RCDs: Santa Cruz, San Benito, and Loma Prieta. The watershed coordinator associated with the lower capacity San Benito and Loma Prieta RCDs conducted a variety of administrative tasks for them, including fulfilling basic staffing needs by attending board meetings, managing communications, updating websites, and other reporting obligations that allowed the district to be in compliance with RCD regulations.

The relationship between organizational capacity and the duties of a watershed coordinator is further developed in more detail under themes that follow.

Champion

Watershed coordinators were often referred to as "champions" by informants. Watershed coordinator champions were individuals who advocated for the community and/or for watershed health, voiced community concerns to local, state, and federal agencies, and/or worked to build the capacity of communities to manage their watersheds locally. Champions also helped to elevate awareness of ecological and community issues throughout the watershed. In several cases, however, watershed coordinators were not the only "champions," as numerous long-time watershed advocates and devotees earned the "champion" title by local stakeholders.

The watershed coordinator hired by the Battle Creek Watershed Conservancy (BCWC), with the support of three consecutive DOC watershed coordinator grants (2004-2007; 2008-2012; 2011-2014), was such champion. Through this individual's efforts, landowners and other stakeholders were given access to information and a voice to engage with federal and state agencies involved

in the Battle Creek watershed. In addition, ecological restoration contracting remained local, resulting in local economic benefits. Through the watershed coordinator's efforts with the BCWC, agencies learned how to more productively work with other state and federal agencies and local stakeholders to accomplish on-the-ground work supported by the community. The presence of a watershed coordinator as a "champion" not only raised the profile of the work in Battle Creek but also brought community concerns to the forefront of the work in the watershed.

Driver

Drivers refer to watershed coordinators who cultivate interest among stakeholders and other participants to advance efforts and move projects forward. In order to advance watershed efforts, many coordinators had to motivate and organize stakeholders, hold stakeholders accountable, and revitalize projects. Outcomes included watershed coordinators guiding watershed projects from conception through implementation, providing communities with greater access to watershed information and resources that resulted in increased transparency among stakeholders and ongoing active community engagement in watersheds.

As a driver in the Lower Mokelumne River watershed, the watershed coordinator for the San Joaquin County Resource Conservation District gathered and distributed information to stakeholders, found the resources to support planning and implementing projects, enlisted expert help from state and federal agencies and partners, contributed to the narrative for grant proposals, and advanced goals outlined in the watershed management plan. The coordinator guided the group through visioning processes, and worked through project planning, development, and implementation, charting success, outcomes, and challenges to move projects forward.

Connector

One of the most notable accomplishments of watershed coordinators was bringing together diverse interests. For many, stakeholder meetings became a forum for information dissemination, educational opportunities, and action and plan transparency. Many watershed coordinators brought in experts to inform conversations. Through the process of bringing stakeholders together, relationships were developed and the watershed coordinator often worked to cultivate trust among participants. With stakeholders working on the "same team," groups could move a collaborative agenda forward, expand efforts, increase trust, and reduce redundancies in efforts.

The experiences of the Ojai Valley Land Conservancy watershed coordinator highlight some key outcomes of a connector. The watershed coordinator acted as a liaison between diverse groups to improve communication, coordinate efforts, provide access to information, and develop trust and respect among stakeholders. The coordinator also aided in the development of a network of stakeholders, which has enhanced the ability of the group to coordinate important initiatives

beyond the initial scope of the stakeholder group, including recovery efforts from the 2017 Thomas Fire.

Facilitator

Many watershed coordinators were trained in facilitation and consensus-based approaches to provide third-party facilitation for stakeholder groups. Some watershed coordinators used a structured, iterative process to guide group decision-making. Part of the iterative process involved providing the group with information from neutral, outside experts to dispel conflict and inform projects. This approach served as a mechanism to integrate science into group deliberations and decision-making, which advanced development of well-informed plans and projects. Informants acknowledged the benefits of having a facilitator present at stakeholder meetings to track and celebrate progress, as well as adapt and modify plans as conditions and circumstances changed.

One of the primary functions of the watershed coordinator at the Resource Conservation District of the Santa Monica Mountains was facilitation. As a neutral, third-party facilitator, the coordinator helped bridge and pacify relations among at-times contentious stakeholders and bring participants together, as one respondent noted, “on the same team.”

Watershed coordinator roles summary

The aforementioned roles were developed from interviews with informants describing the processes undertaken by watershed coordinators and outcomes from those processes. An online survey, the design informed by interviews with informants, was disseminated to obtain a clearer understanding of the roles of watershed coordinators, perceived outcomes from coordinator efforts, and characteristics of an effective coordinator. These results are discussed in the following section.

Survey Results: Stakeholder Perception of Outcomes from Watershed Coordination Under the Watershed Coordinator Grant Program

The watershed coordinator survey (survey I) consisted of sixteen questions to examine issues that emerged from stakeholder interviews and case studies. It included multiple choice, fill-in-the-blank, rankings, and Likert scale questions. Topics included background information on the watershed, status of watershed coordination, demographic information of the respondent, identification of beneficial components of watershed coordination including a ranking of the top three components, identification of processes that led to positive outcomes in the watershed, and effective characteristics of watershed coordinators with a ranking of the top three. A total of 96 interview participants who were involved in a DOC watershed coordinator grant program (WCGP) were sent a survey. Fifty-two individuals completed the survey, resulting in a 54% response rate. Responses were received from all 17 grant recipient organizations included in our

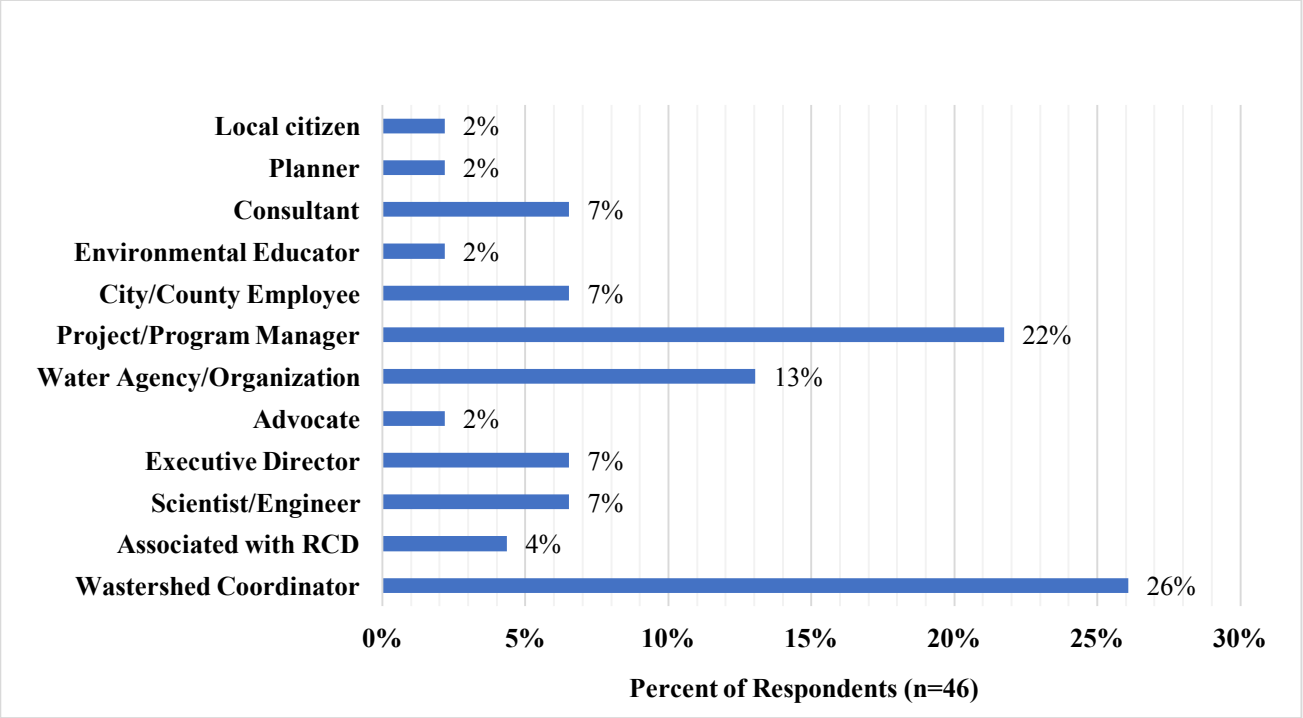
case study research and presented in Table 4.4. Grant recipient organizations received, on average, three responses. Survey II is a follow-up survey conducted to resolve uncertainties regarding watershed coordinator longevity and retention, and survey II expanded the respondent pool to include all watershed coordinator grants from 2004 to 2014. Forty-nine percent of the grant recipient organizations, 43 of 88, responded to survey II.

Table 4.4. Number of Participants from each WCGP Recipient Case (Survey I)

Watershed Coordinator Grant Recipient	Number of Survey Participants	Percent
Arroyo Seco Foundation	5	9.6
Battle Creek Watershed Conservancy	3	5.8
Contra Costa RCD	3	5.8
Council for Watershed Health	3	5.8
Earth Resources Foundation	4	7.7
Gualala River Watershed Council	2	3.8
North Cal-Neva RCD	2	3.8
Ojai Valley Land Conservancy	6	11.5
RCD of the Santa Monica Mountains	3	5.8
Sacramento Flood Control Agency	1	1.9
San Joaquin County RCD	4	7.7
Santa Cruz RCD	3	5.8
Shasta Valley RCD	3	5.8
Sonoma County RCD	3	5.8
Tehama County RCD	2	3.8
Trinity County RCD	4	7.7
Truckee River Watershed Council	1	1.9
Total	**52**	**100**

To strengthen our understanding of outcomes of watershed coordination from the perspective of stakeholders who were involved with the WCGP, we asked informants to provide names of individuals who not only have been involved with the grant program but also individuals who may have been affected by the program (see also snowball sampling described in the methods section). Expanding the pool of informants beyond those involved directly with grant administration and documentation is important to develop a more comprehensive understanding of the grant program. Previous studies have typically limited interviews to a single watershed coordinator or program manager (Bidwell & Ryan, 2006). This narrows interviews to those directly tied to grant and program implementation and can be duplicative of perspectives already represented in grant documentation. Figure 4.2 below presents the occupational identifiers for survey participants. Seventy-four percent of survey participants were not watershed coordinators.

Figure 4.2. Occupational Identifier for Watershed Coordinator Grant Survey Participants



Responses are distributed across all grant cycles. The pilot program (2000-2002) is included as a permitted response despite pilot cases being excluded in our case study selection because several stakeholders were involved in the pilot program and indicated the pilot grants were relevant in the context of the other watershed coordinator grants received. Figure 4.3 displays the percentage of survey respondents by grant cycle with 53 respondents and multiple responses for most participants equating to 96 total responses. The most recent grant cycle (2011-2014) has the highest representation in the survey with 28% of all respondents from case study research.

Figure 4.3. Watershed Coordinator Grants Represented in the Survey (n=96)

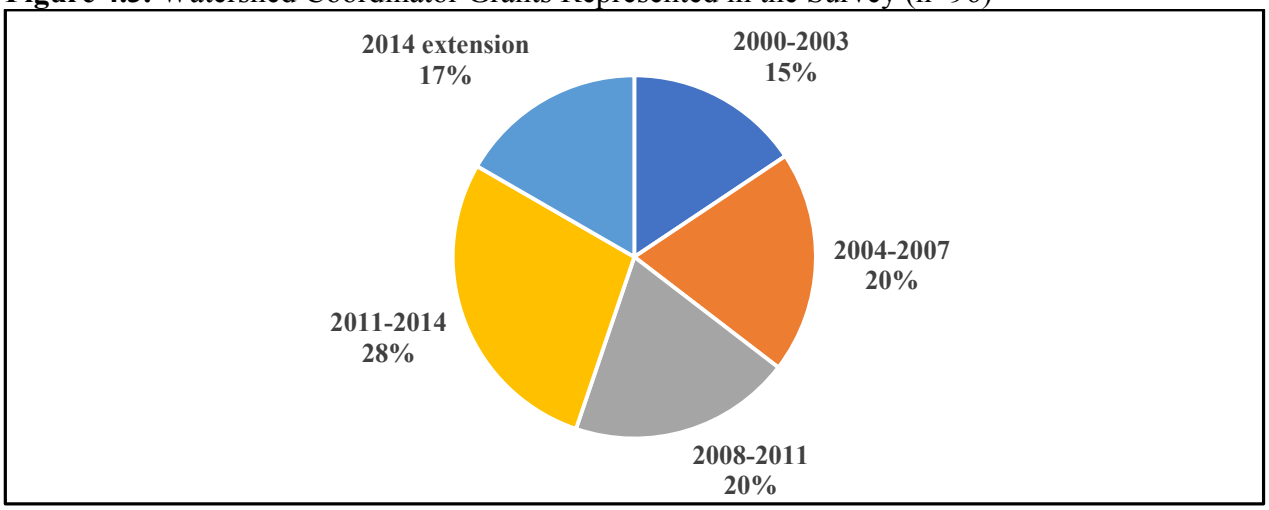
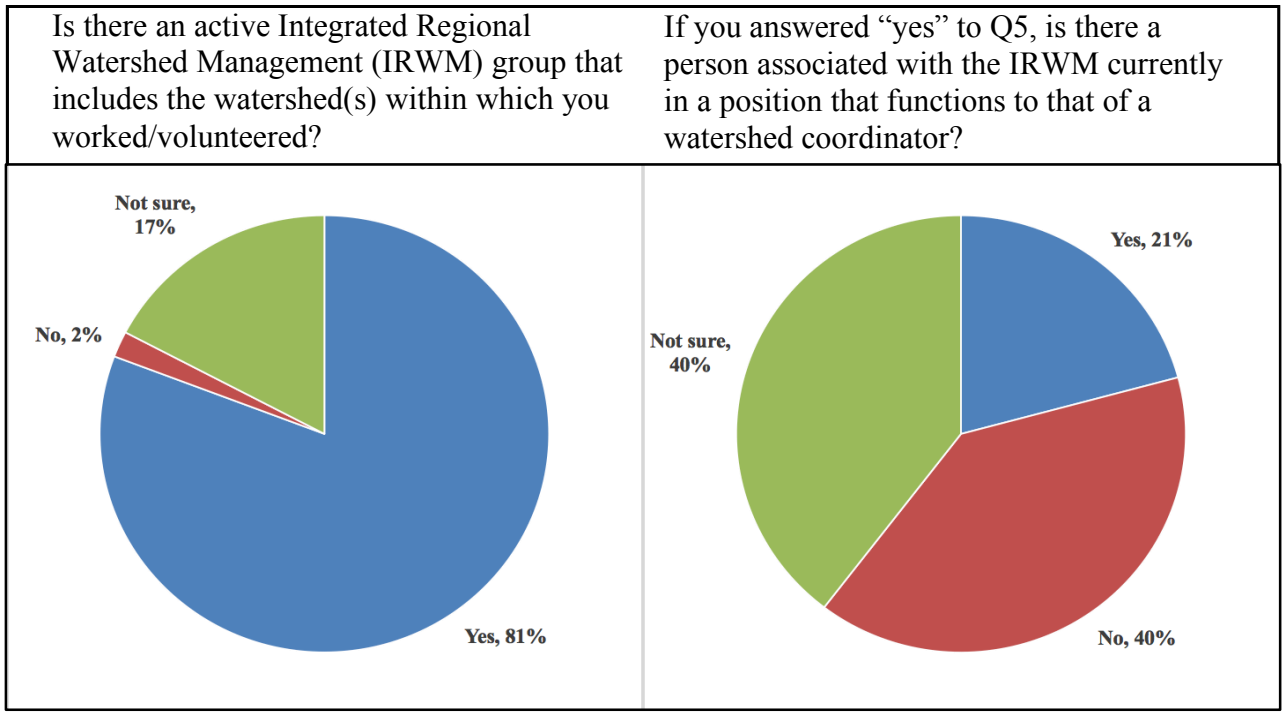


Figure 4.4 shows the response to the question about whether there is currently an active Integrated Regional Watershed Management Group. A total of 81% of the respondents indicated they were aware of an active IRWM in their area. In contrast, of those who indicated there was an active IRWM, only 21% indicated there is a person associated with the IRWM who functions like a watershed coordinator.

Figure 4.4. Watershed Coordinators and Integrated Regional Water Management



Three survey questions posed statements and requested respondents' level of agreement/disagreement on a variety of watershed coordination topics associated with grants

with which they were involved. (Participants were instructed to mark N/A, not applicable, if the component did not apply to the grant-related watershed work with which they were involved.) The first inquired about the significance of each component contributing toward positive outcomes in the watershed. Twenty-one items were included and responses are divided into three figures as seen in Figures 4.5a- c. Owing to high levels of consensus, survey responses are divided into three figures and defined as follows: 1) high level of consensus defined as 85-100% "strongly agree" or "agree"; 2) medium to high level of consensus defined as 60%-84% "strongly agree" or "agree"; and 3) mixed levels of consensus define as <60% "strongly agree" or "agree".

Building relationships among stakeholders is the one item that all respondents agreed (including strongly agreed) contributed to positive outcomes in the watershed. *Sharing information among stakeholders*, *developing trust among stakeholders,* and *establishing a forum to address watershed issues* also had extremely high levels of agreement. Four of the twenty-one components did not meet a threshold of 60% with agreed and strongly agreed responses; these included: *1) developing and maintaining a project-focused website, 2) involving the public in monitoring programs, 3) providing third party facilitation to address contentious issues, and 4) involving the public in project design plans.* These mixed responses present an interesting contrast to interview results. For example, third party facilitation was identified as a crucial and necessary component of watershed coordination, but survey responses are more ambiguous. Two of the four with lower level of agreement involve watershed coordinator contribution to public participation. While many coordinators brought together interested stakeholders, not all stakeholders felt the need to include the public at large in all watershed initiative phases (e.g., scoping, planning, implementation). This could be attributed to skepticism about the public's desire to participate, assumption of the public's lack of the knowledge or capabilities, or for some other reasons entirely, such as a survey respondent may have felt a watershed coordinator did not involve the public in monitoring or project design because it was simply not part of a particular project, which is not the same as whether they thought an item contributed to positive watershed outcomes (National Research Council, 2008).

Case Highlight: Network of Watershed Coordinators

North Coast Watershed Coordinator Team

In the North Coast hydrologic region, a novel enterprise among watershed groups emerged in an effort to coordinate conservation activities, amalgamate resources, and most effectively and efficiently secure watershed coordination funding through the 2011-2014 Department of Conservation Watershed Coordinator Grant Program. The Department's 2010 Request for Proposals indicated, "Proposals, regardless of scale, that compete with, contradict or duplicate the efforts of existing coordination efforts or other applicants responding to this solicitation, will not compete well for grant funding. Conversely, proposals that demonstrate strong cooperation and planning within a watershed will be more competitive." In response to the Department's guidelines the local Mattole Restoration Council organized a gathering of watershed groups from throughout the region to identify commonalities, challenges, and mutual interests. The group became known as the North Coast Watershed Coordinator Team (NCWCT) that team members characterized as "an effective approach for sharing knowledge, talent and ideas, and for getting more accomplished by working collaboratively on projects."

The North Coast Hydrologic Region

The North Coast Hydrologic Region is rural with its rugged topography connected by winding roads linking mostly small communities to each other, the ocean, and Highway 101. Consisting of five counties, the total population of the region is under a million. In the northernmost counties the majority of the population lives in unincorporated areas. Of the 7,056,565-acre land area, approximately 72% of the North Coast region is privately owned, 21% Federal, 3% Tribal, with the remaining is state and county owned (The Conservation Fund, 2005). Approximately half the total land acreage is forested and privately owned, evenly divided between industrial and nonindustrial timberland. The primary economic driver of the region is agriculture, including enterprises of forestry, dairy, wine grape growing, and fishing (The Conservation Fund, 2005). In the opinion of multiple stakeholders, the benefits of regional and joint learning were a prime rationale for the widespread participation in the coordinator team, but it was also the region's defining rural character and resource-based economic dependence that attracted their participation in a regional network.

The North Coast Watershed Coordinator Team

Through the Mattole Restoration Council's targeted outreach to watershed groups in the region, five organizations, Mattole Restoration Council; Pacific Coast, Fish, Wildlife and Wetlands Restoration Association (PCFWWRA); City of Trinidad; Salmon River Restoration; and Trinity County RCD)], came together to coordinate work plans for the submission of watershed coordinator grant applications. Through the coordinated effort, each of the organizations' work plan applications to the Department of Conservation grant program included consistent language such as, "work with the North Coast Watershed Coordinator Team" or "collaborate with stakeholders and watershed coordinators in the local region" to "share ideas, exchange resources, provide support to other watershed coordinators," and "attend at least three meetings or site visits

per year." The synchronized work plans eliminated overlap and emphasized commonalities across watersheds, a likely factor behind their success in funding eleven watershed coordinators between 2011 and 2014 to work across the Mattole River, Redwood Creek, Trinidad, Mad River, Humboldt Bay, Salmon River, South Fork Trinity, Redwood Creek, Salt River, and Eel River watersheds.

Through a process of identifying common issues present in each individual watershed, team participants discovered five common areas of interest: drought response, water quality improvements, sediment and roads, education and outreach, and wetlands and fisheries recovery. Other interests and issues represented in many, but not all watersheds included: invasive species and native plants, community advocacy, fire and fuels, monitoring, and climate change. With commonalities established, the NCWCT held quarterly meetings, alternating locations and facilitation duties among coordinators. Meetings involved touring individual projects of the hosting organization, sharing lessons learned, identifying mutual issues to be collectively addressed, and forging a cohesive voice to strengthen influence at the state level.

In Spring 2014, participants of the NCWCT met with the Department of Conservation and communicated the general benefits of watershed coordinators, highlighted the unique benefit of the NCWCT, and answered the Department's questions about the role of watershed coordinators in addressing watershed challenges and community needs, such as drought issues, marijuana cultivation problems, community advocacy, and spring Chinook. The meeting initiated a relationship through which watershed coordinators collectively communicated concerns—including support of the 2014 drought response extension, desire for long-term continuation of the grant program, and advocacy for statewide education regarding the current state water delivery system. Among the team's recommendations were tours for state legislators regarding transfer liability of resource extraction, ways in which retained profits might be allocated to support additional restoration work, and establishing infrastructure for information sharing at local, regional, and statewide levels.

The regional watershed coordinator team evolved into a valuable water management resource for the North Coast region. The underlying function of the network—to establish partnerships and generate more inclusive and competitive grant applications—supported the advancement of watershed conservation work collaboratively, efficiently, and holistically. Benefits of the network included the ability to share and transfer technical expertise among watershed groups, information exchange, collective solutions for common challenges, strengthened advocacy role for watershed coordinators, and improved overall morale of participants.

Lessons from a Regional Network of Watershed Coordinators

In terms of sharing technical expertise, groups within the NCWCT with limited organizational capacity benefited from the efforts of "higher capacity" members such as the Mattole Restoration Council, which developed a website for centralizing watershed information. Accessible and centralized information maintained the team's awareness of other efforts in the region, and provided a regional context and rationale for individual roles and restoration efforts.

The network also served as a mentorship program for less experienced coordinators and those seeking input and advice for project development or grant proposals. Watershed coordinators were able to exchange information regarding funding opportunities and how to complete more technical requirements for projects, such as obtaining permits. By identifying common interests and issues, the network also outlined common challenges and obstacles and brainstormed means for addressing them. Working together, the watershed coordinators engineered effective ways engage landowners and other stakeholders, work with agencies and adhere to regulatory requirements, and more specifically, work with law enforcement on the safe cleanup of illegal cannabis operations.

Through regular communication, the network created opportunities to strengthen and unify diverse voices, improving their influence on decision-making regionally and statewide. Notwithstanding the rural nature of North Coast communities, the network has been very effective at creating connections among professionals working in similar fields and advancing a common vision. These relationships not only augmented project efficiency, but the sense of belonging boosted morale among individuals that otherwise would have been geographically and institutionally isolated from colleagues.

Today, absent funding, the NCWCT no longer meets. However, the relationships and partnerships developed during the network's active years (2011-2014) have endured as an important asset in watershed conservation in the region. Yet as one participant noted, "The willingness is there, but the vibrancy of what we were doing disappeared when funding disappeared."

It remains a challenge for entities to generate consistent outcomes with inconsistent programs and unreliable funding for long-term planning. One stakeholder indicated that by not having watershed coordinator funding and support, the cost of operation for watershed entities are increasing as resources are spent responding to environmentally damaging events rather than mitigation strategies, an activity that was previously a focus of watershed coordinators.

Figure 4.5a. Perceived Contributions of a Watershed Coordinator- High Level of Consensus (85%-100% "strongly agree" or "agree")

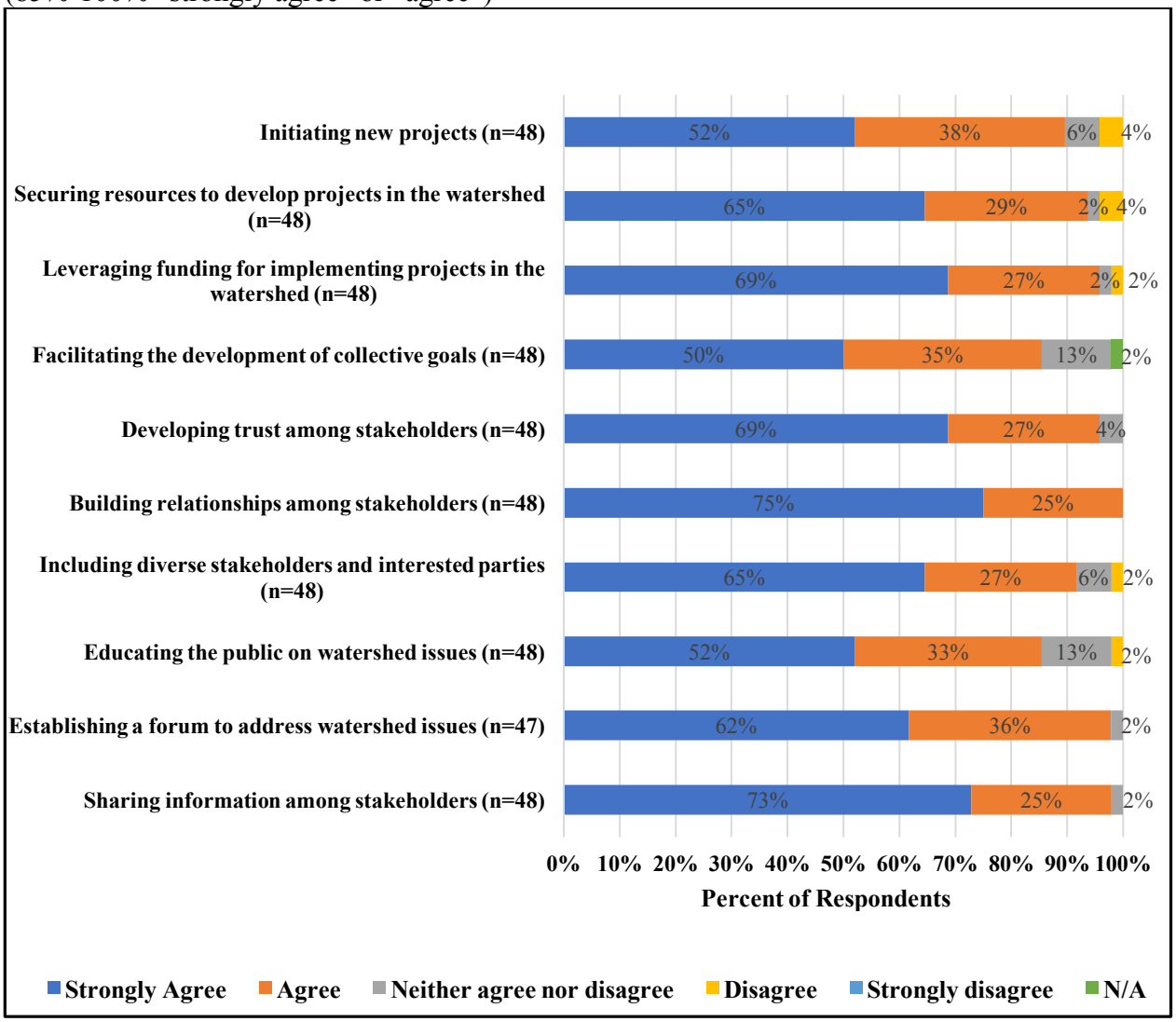


Figure 4.5b. Perceived Contributions of a Watershed Coordinator- Medium to High Level of Consensus (60%-84% "strongly agree" or "agree")

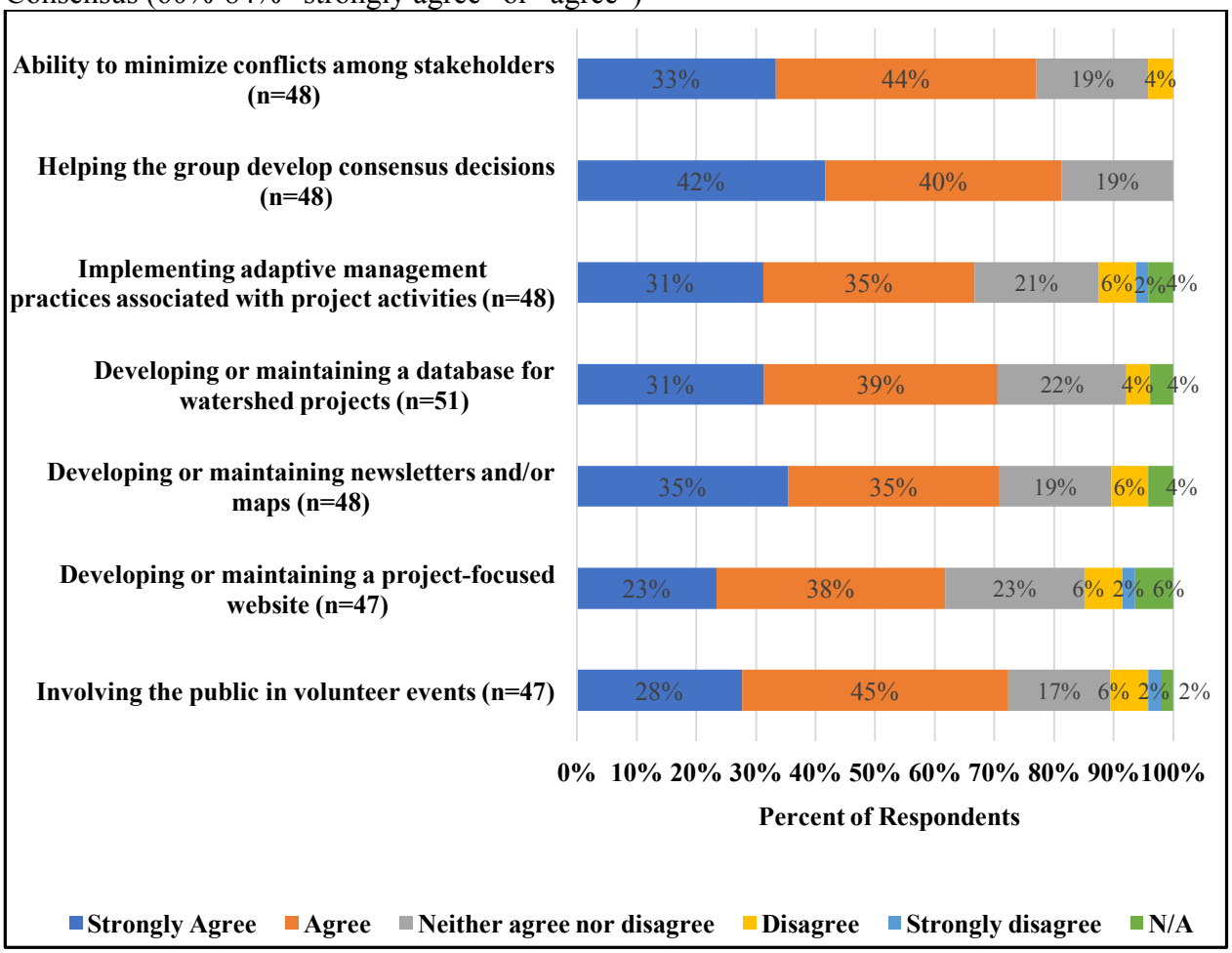
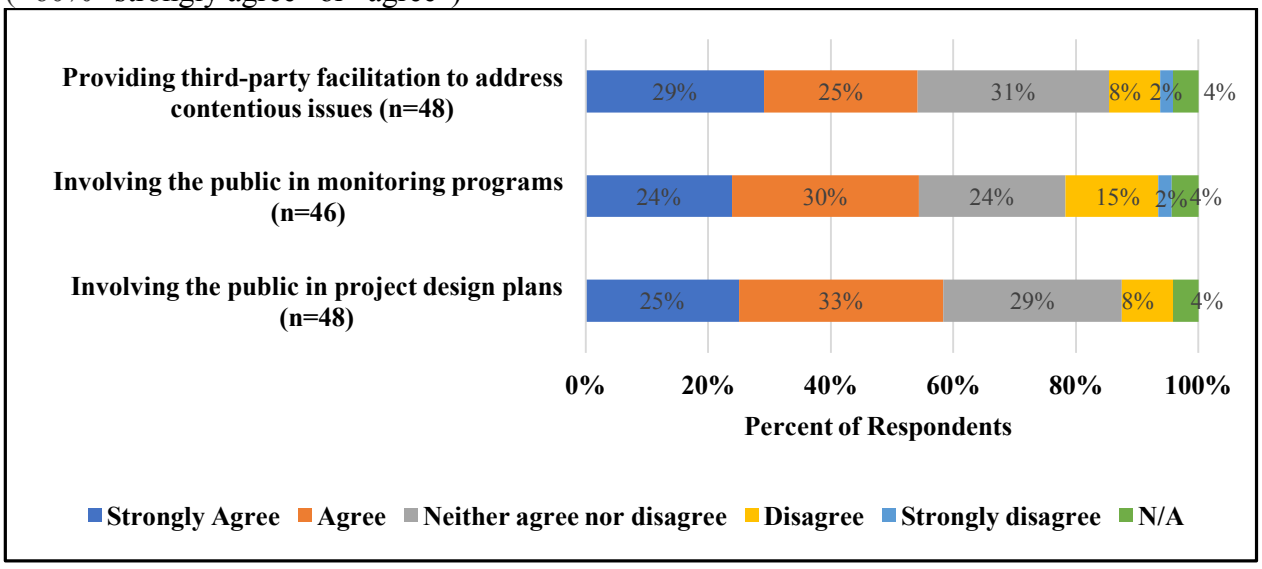


Figure 4.5c. Perceived Contributions of a Watershed Coordinator- Mixed Levels of Consensus (<60% "strongly agree" or "agree")



Following the questions regarding stakeholder agreement with specific coordinator duties that contribute to positive outcomes, survey participants were asked to list and rank the top three components of watershed coordination that resulted in positive outcomes in the watershed. A word cloud is presented below with the results shown in Figure 4.6. The larger the text, the more often individuals ranked the component phrase in the top three. Rankings 1, 2 and 3 were combined to demonstrate the most cited components—*building relationships* and *leveraging funding*—not unexpected considering the amount of funding watershed coordinators were able to leverage. With approximately $26,016,000 invested in the DOC Watershed Coordinator Grant Program between 2004-2014, watershed coordinators leveraged over seven times the investment amount, roughly $190,046,000.

Other highly-cited components included *securing resources to develop projects and educating the public on water issues.* While *involving the public in project design plans* and *involving the public in monitoring programs* received mixed levels of agreement in contributing to positive outcomes in the watershed, *educating the public on water issues* is ranked in the top three by many respondents. Involvement of the public in on-the-ground projects and programs is not always ranked highly, but ensuring the public is informed and understands the issues is of importance in the program and is perceived to lead to positive outcomes in the watershed.

Figure 4.6. Perceived Contributions of a Watershed Coordinator- Top Three

A second question assessed survey participants' level of agreement regarding a list of outcomes that the watershed coordinator grant enabled or helped to accomplish. These outcomes were

initially identified through stakeholder interviews. Twenty-three outcomes were presented to survey participants and were presented and defined in the same manner- consensus-based- as the previous question. No outcome received full agreement by respondents. This is perhaps related to the multidimensional nature of success for the watershed coordinator program and the difficulty of trying to tease out cause and effect with investment in human and social capital. Questions related to maintenance, biodiversity, local economy, as well as the continuation of a watershed coordinator revealed mixed results, with survey participants frequently indicating "neither agree nor disagree."

Figure 4.7a. Perceived Outcomes Enabled by the Watershed Coordinator- High Level of Consensus (85%-100% "strongly agree" or "agree")

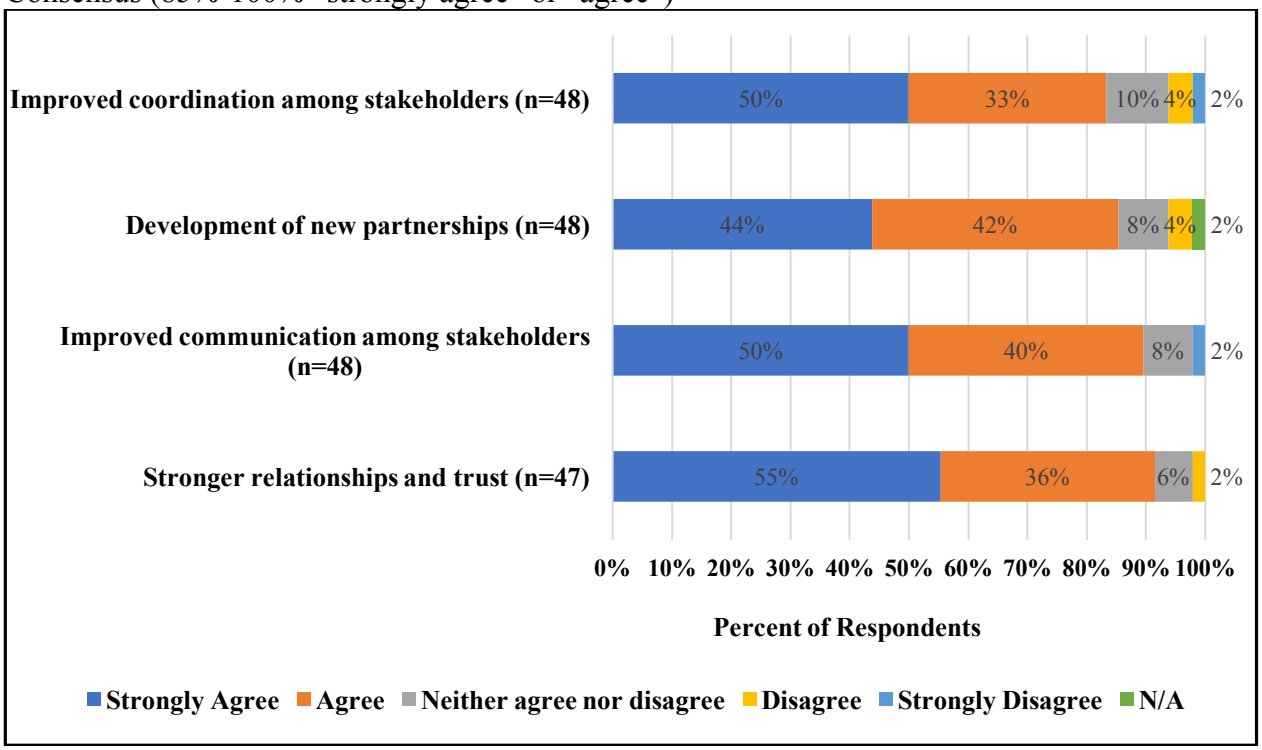


Figure 4.7b. Perceived Outcomes Enabled by the Watershed Coordinator- Medium to High Level of Consensus (60%-84% "strongly agree" or "agree")

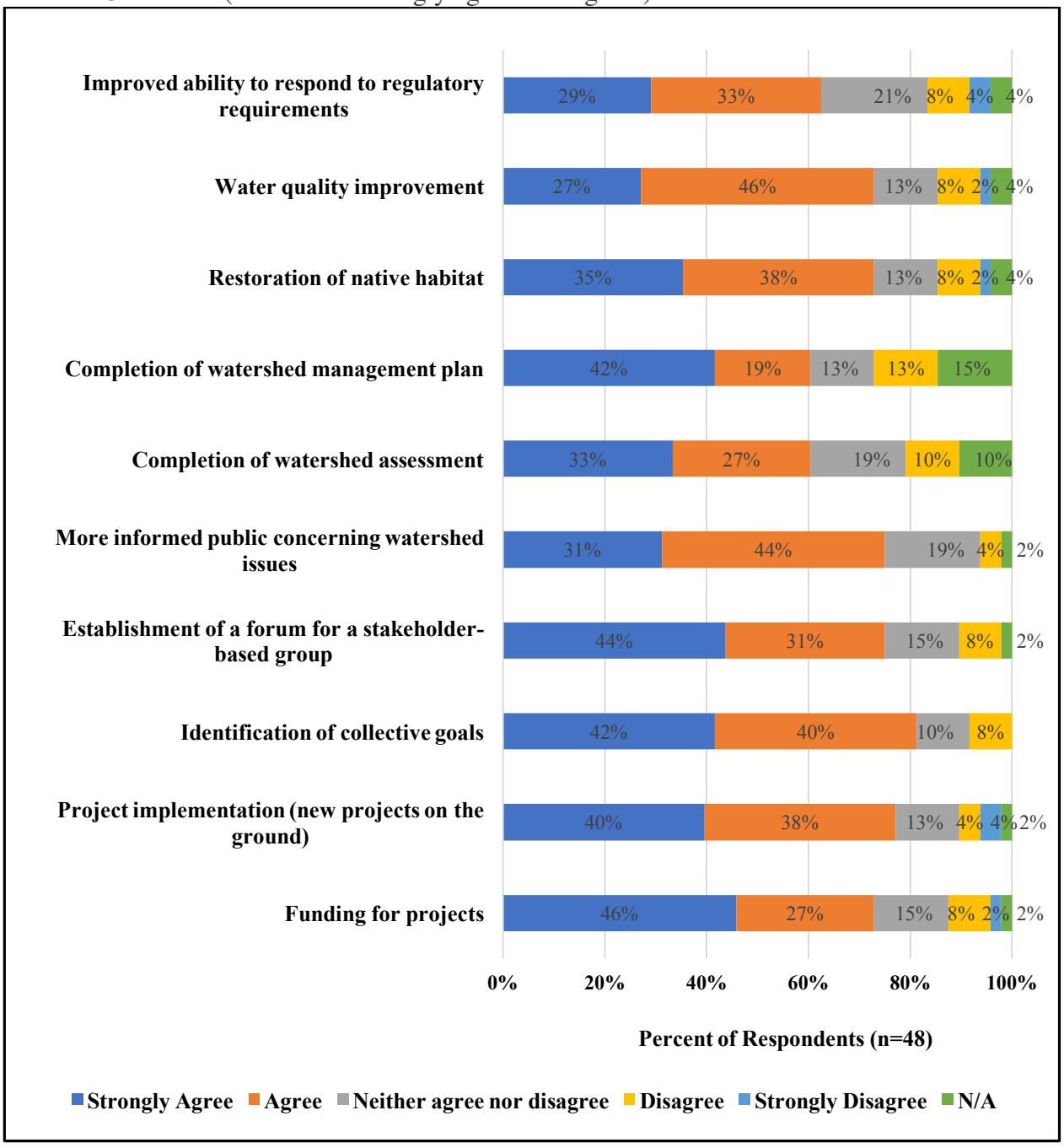
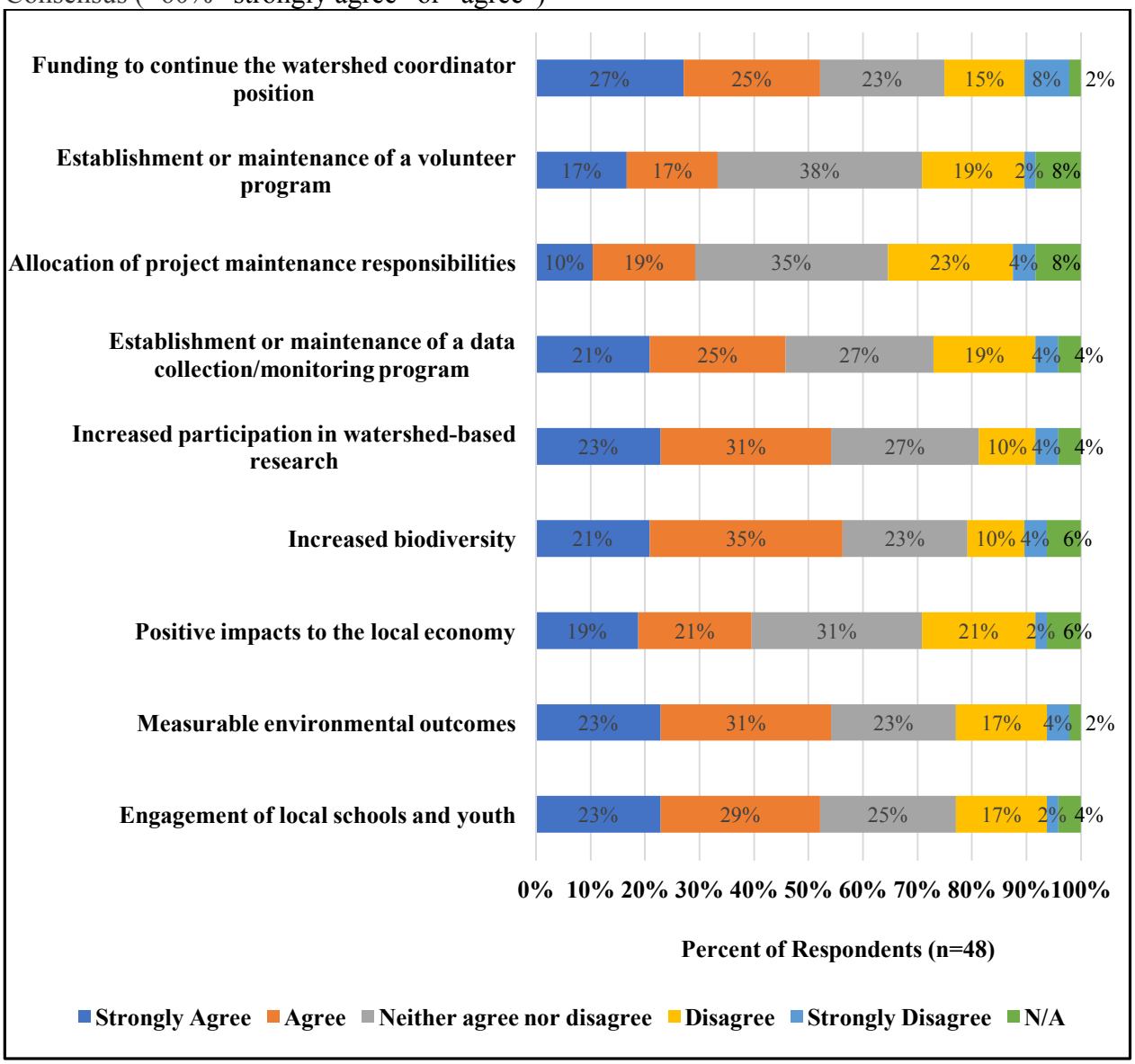


Figure 4.7c. Perceived Outcomes Enabled by the Watershed Coordinator- Mixed Level of Consensus (<60% "strongly agree" or "agree")



The final question examined survey participants' levels of agreement with a list of "important characteristics" of an effective watershed coordinator. The survey presented twenty-two characteristics that were drawn from interviews with stakeholders. With the highest levels of consensus among all questions, survey responses are divided in the two figures and defined as follows: 1) complete consensus at 100% "strongly agree or "agree" and 2) high level of consensus defined as 85-100% "strongly agree" or "agree". Figure 4.8a shows the five most effective characteristics of a watershed coordinator from stakeholder perceptions—*promotes watershed group/collaborative agenda, is dedicated, is trustworthy, is accountable,* and *communicates clearly*. Figure 4.8b presents those characteristics receiving high levels of agreement for characteristics that are effective for watershed coordination. Two characteristics

are not included in figures below: 1) *promotes own agenda* received high levels of disagreement with 70% of survey participants either strongly disagreeing or disagreeing with this statement; and 2) *promotes grant recipient's agenda* received 81% consensus ("strongly agree" or "agree") but did not meet the 85% threshold to be included in Figure 4.8b.

Figure 4.8a. "Important Characteristics" of an Effective Watershed Coordinator as Perceived by Stakeholders- Complete Consensus

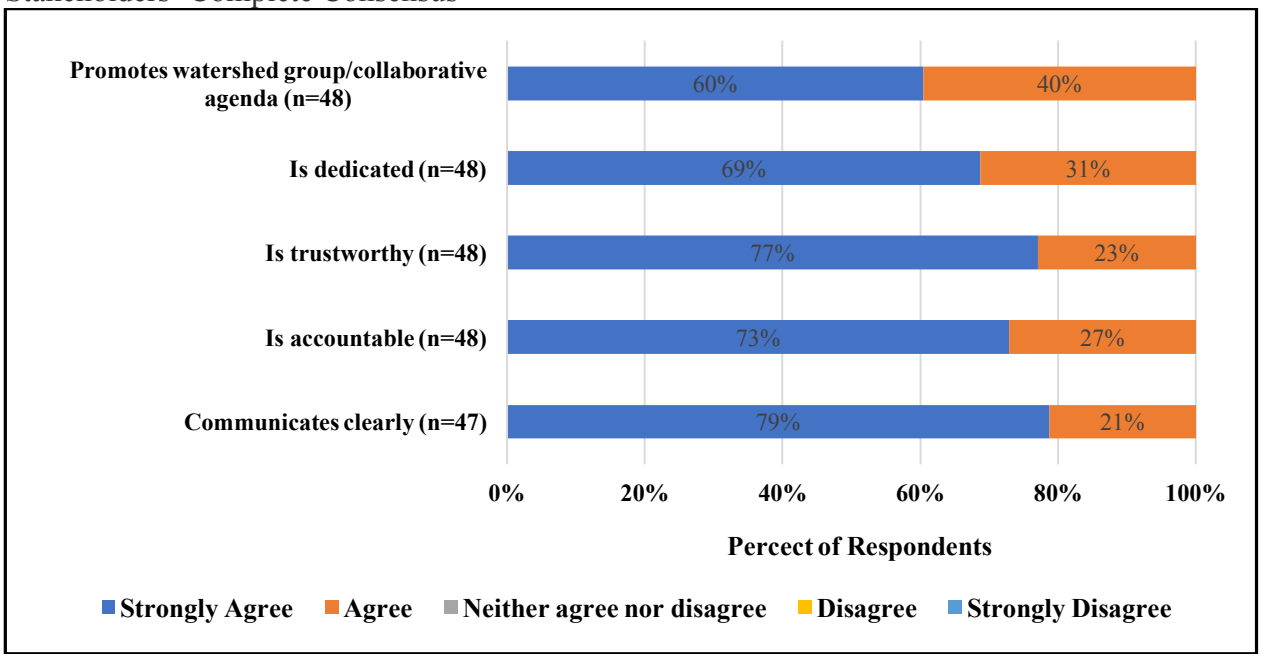
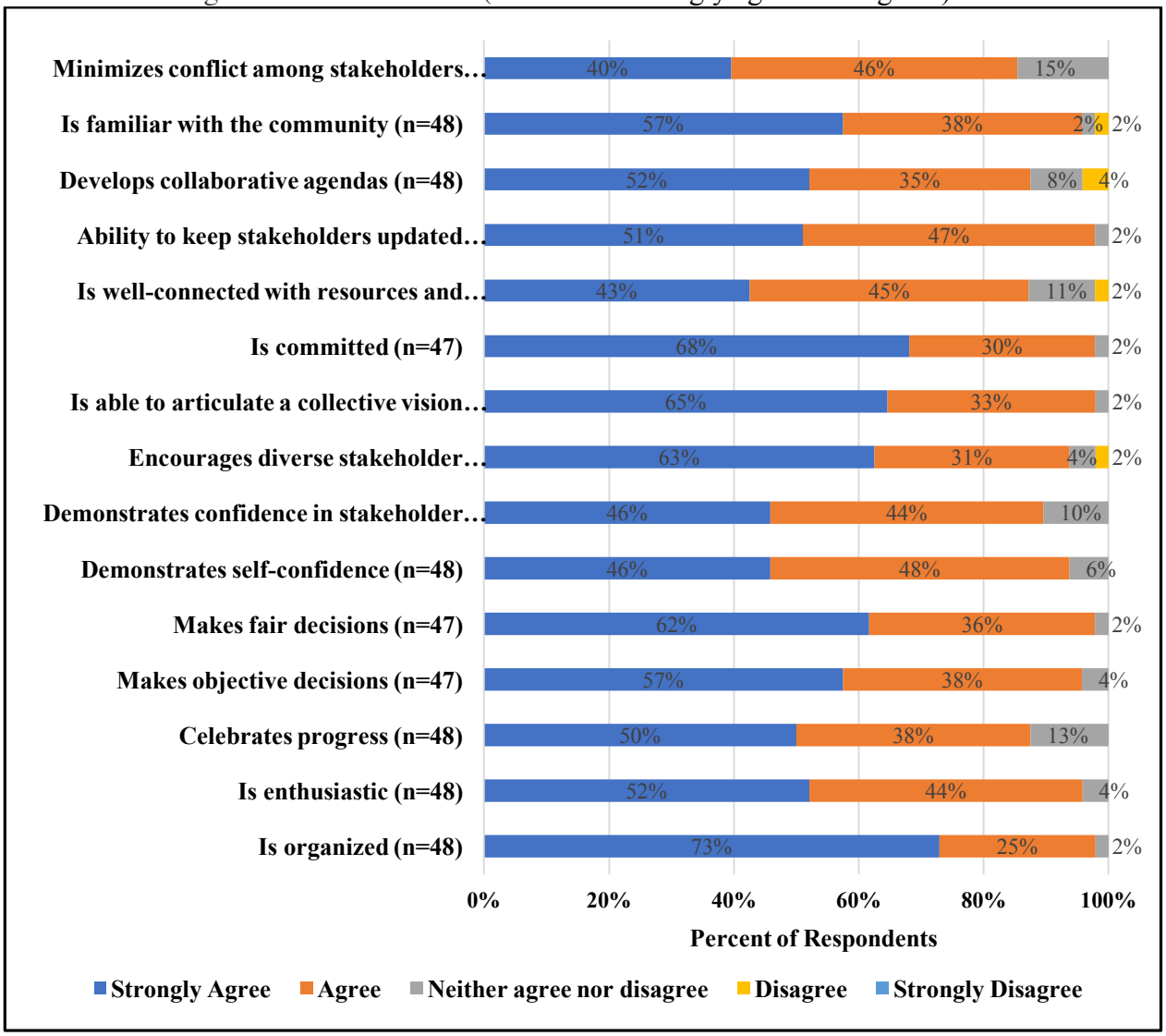


Figure 4.8b. "Important Characteristics" of an Effective Watershed Coordinator as Perceived by Stakeholders- High Level of Consensus (85%-99% "strongly agree" or "agree")



Survey participants were also asked to list the top three characteristics in terms of contributing to an effective watershed coordinator. Again, the choices offered respondents were drawn from interviews. Results are presented in Figure 4.9 with a word cloud representing the most frequently cited characteristics. There is no differentiation by rank in the word cloud below; the top three items selected by respondents received the same weight. While all survey respondents agreed that important characteristics of a watershed coordinator (see Figures 4.8a-b) *is dedicated and committed* and *is accountable*, few survey participants ranked either characteristic in their top three. The other three characteristics receiving 100% agreement were frequently ranked as top three- *promote watershed group/collaborative agenda, communicates clearly, is trustworthy* (though to a slightly lesser degree). *Encourages diverse stakeholder participation* and *is able to articulate a collective vision* are on the higher end of agreement and are frequently cited as top three important characteristics.

Figure 4.9. Perceived Important Characteristics of a Watershed Coordinator- Top

Longevity & retention (survey I)

To understand longevity of the watershed coordinator program beyond the grant funding, we presented a multiple-choice question with three options- "yes," "no," and "not sure." We envisioned that there may be more nuance than the options given, and accordingly, we provided space for additional open-ended explanations for answers affirming that a watershed coordinator did continue beyond the Watershed Program. Those responses are coded and presented in Table 4.5 below. Results show that only two out of 23 respondents indicated a full-time watershed coordinator was present beyond grant funding. Slightly more than half indicated a part-time watershed coordination continue after WCGP funding ceased. Respondents also indicated that in a number of cases watershed coordination work was absorbed by other positions or carried out by volunteers.

Table 4.5. Continuation of Watershed Coordination beyond the WCGP

Survey Participants	Part time	Full time	Volunteers	Absorbed by other positions	Not Sure
1	x				
2			x	x	
3	x				
4	x				
5	x				
6	x				
7					x
8	x				
9					x
10			x		
11	x				
12			x		
13				x	
14	x				
15		x			
16					
17				x	
18		x			
19	x				
20					x
21	x		x		
22	x				
23	x			x	
Totals	**12**	**2**	**4**	**4**	**3**

Longevity & retention (survey II)

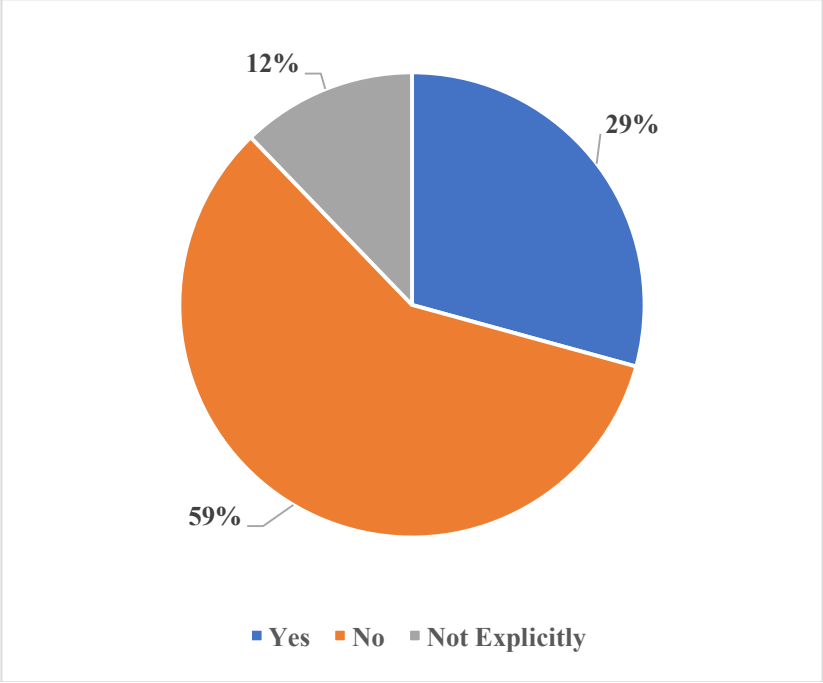
Owing to what appears to be a tenuous nature of watershed coordination beyond the WCGP, we wanted to and gain further insight into 1) how those that were able to continue, continued full-time; 2) better understand the challenges preventing a watershed coordinator from continuing; 3) mechanisms that funded part time and full time beyond the grant term; and 4) whether in-house coordination as opposed to contract watershed coordination was a factor in determining the longevity of watershed coordination beyond the WCGP. A second survey was sent to the most knowledgeable representative from each watershed coordinator grant in terms of continuation of the program. This was also an effort to expand the sample beyond selected case studies to include every watershed coordinator grant administered under the Watershed Program, 2004-2014. Requesting the most knowledgeable individual was a necessary step given the difference of opinion that involving multiple individuals from a single case to what on the surface seemed like a straightforward answer- did the watershed coordinator continue beyond the DOC grant?

All grant recipient organizations still in operation today received a phone and/or email request to participate in part II of the watershed coordinator survey. Of the 88 organizations that received

watershed coordinator grants during the 2004-2014 grant cycles, the research team was able to secure information for 43 of the organizations regarding their watershed coordinator grants.

As a starting point, representatives answered the question of whether there was a watershed coordinator present prior to receiving the Department of Conservation watershed coordinator grant. A total of 59% of survey respondents indicated there was no watershed coordinator prior to the grant. Several survey participants indicated that they did have a watershed coordinator, but from the pilot watershed coordinator grants (2000-2002) initially limited to resources conservation districts (RCD). These results are shown in Figure 4.10.

Figure 4.10. Presence of a Watershed Coordinator Prior to the DOC WCGP (n=41)



While this question may appear to have only a dichotomous answer-they either "did" or "did not have a watershed coordinator," 12% of participants either could not answer this question in a binary manner or, upon further examination, their comments led researchers to code their answer in a non-binary fashion- "not explicitly." The comments related to the third code that emerged are provided in Table 4.6 below.

Table 4.6. Watershed Coordinators "Not Explicitly" Involved Prior to the WCGP

Code	Presence of a Watershed Coordinator Prior to the DOC Watershed Coordination Grant Program (2004-2014)
Not explicitly	Not explicitly. Some functions of the watershed coordinator position were previously being performed by staff at the Mattole Restoration Council, Mattole Salmon Group, and Sanctuary Forest (all NGOs focused on conservation and restoration in the Mattole watershed), but the DOC WC grant enabled a substantial increase in community and regional outreach, greater focus on project planning and regional coordination, and increased fundraising capacity.
Not explicitly	The Mendocino Land Trust had a position in which many of the duties associated with a watershed coordinator were listed, but it was not well-funded. The title of the position was Program Manager
Not explicitly	No, but someone at the VCWC did perform some coordination activities
Not explicitly	We didn't call it a watershed coordinator. The executive director was one in effect a watershed coordinator, but the position was often unfunded.

One of the concepts brought forth in the 2010-2014 request for proposals (RFP) for the WCGP was that a watershed coordinator who is housed within the grant recipient organization will more likely continue beyond the grant term. The RFP explicitly encouraged those submitting proposals to house coordinators within their organization. In order to examine the assumption of continuation beyond the grant, we asked survey participants whether their watershed coordinator position was hosted in-house or subcontracted, and if the watershed coordinator continued beyond the grant period, see Figures 4.11 and 4.12.

Figure 4.11. Watershed Coordinators In-house vs. Subcontracted (n=43)

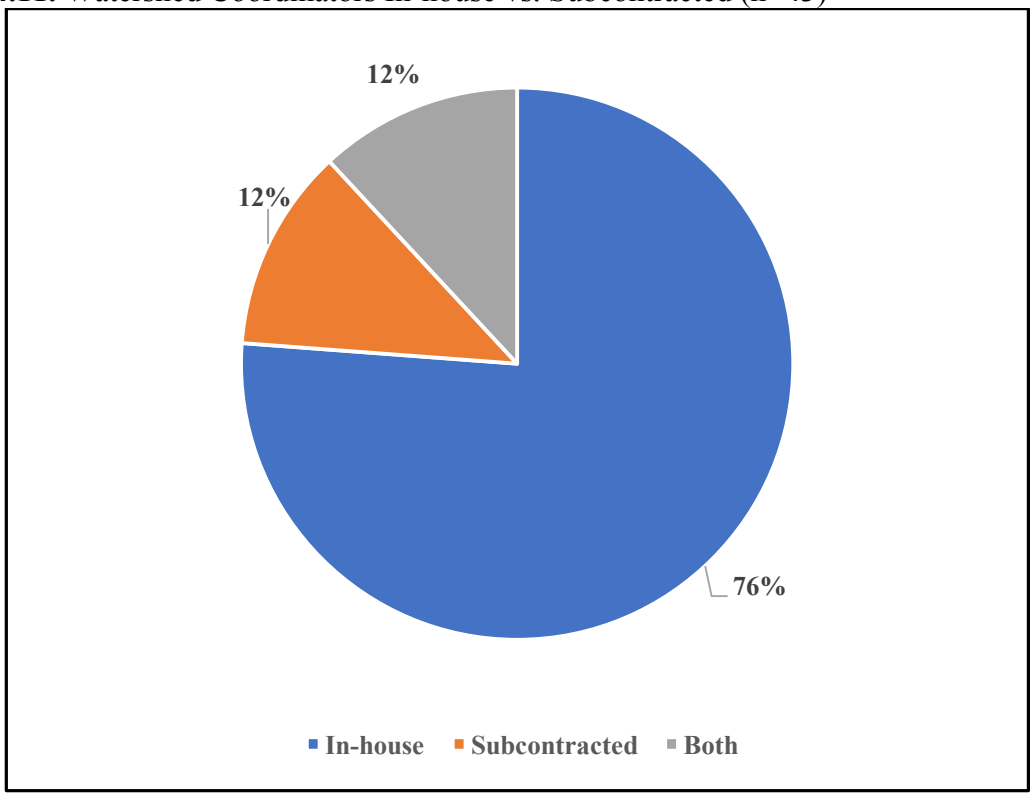


Figure 4.12. Longevity of Watershed Coordinators In-house vs. Subcontracted (n=43)

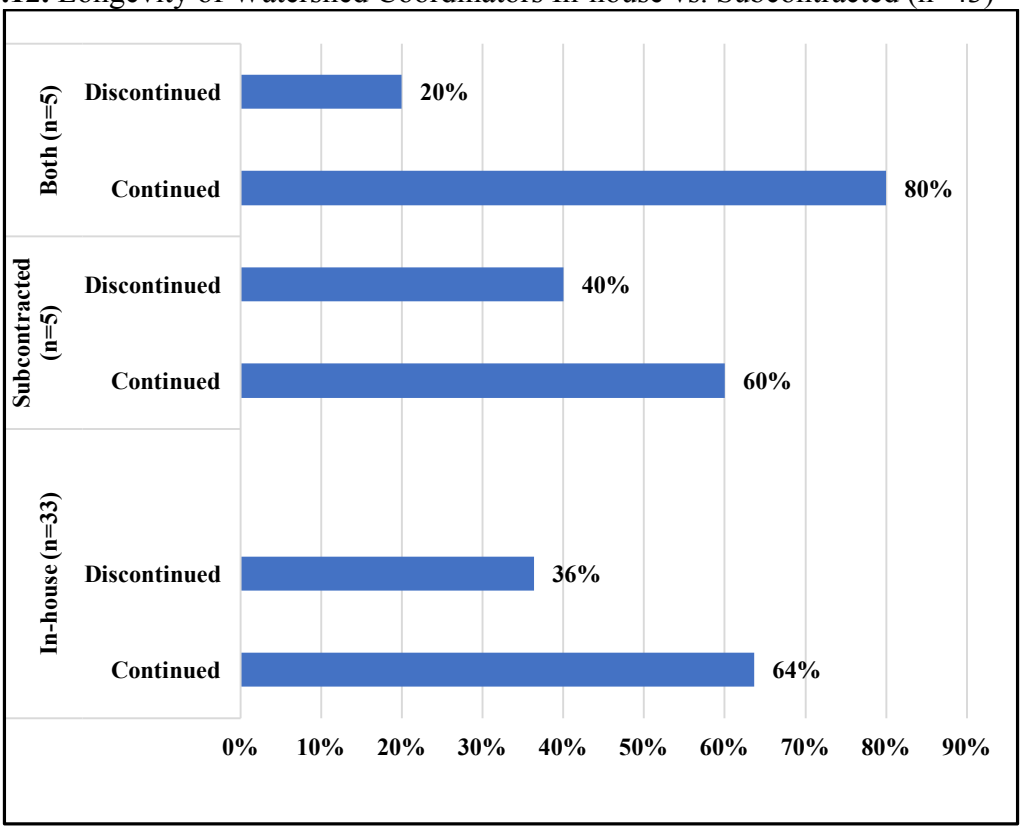
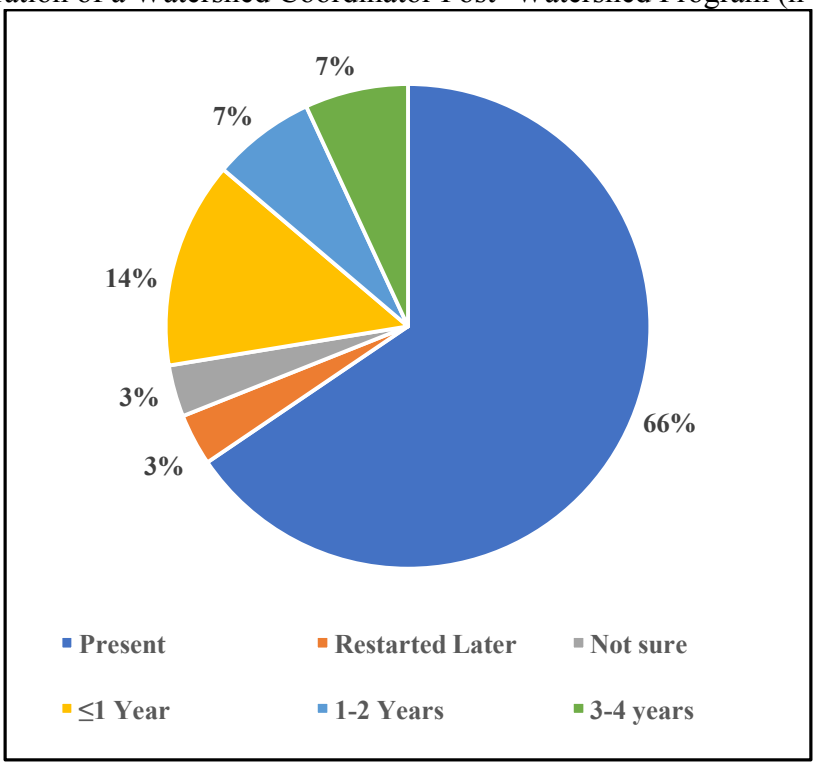


Figure 4.12 shows that 40% of the subcontracted watershed coordinators did not continue beyond the grant period, while 36% of the in-house did not continue. There appears to be a slightly greater retention for in-house coordinators, however, the small number of subcontracted watershed coordinators is insufficient to conclude that in-house coordinators are more likely to continue. More subcontracted watershed coordinators are needed for a valid comparison. The category of "both" is ambiguous and therefore is not included in either subcontracted or in-house categories for this analysis.

Two of most important observations from these data is that 1) once watershed coordination is established, efforts continue to maintain this coordination, with over half succeeding regardless of status of the coordinator, and 2) for those who were able to maintain a watershed coordinator following the end of the Watershed Program, 66% of those surveyed are still working in the watershed as a coordinator, labeled as "present" in Figure 4.13. Fourteen percent were present for up to a year of work following the grant and fourteen percent lasted between a year and four years.

Figure 4.13. Duration of a Watershed Coordinator Post- Watershed Program (n=29)



Watershed coordinator duties and scope post-Watershed Program funding

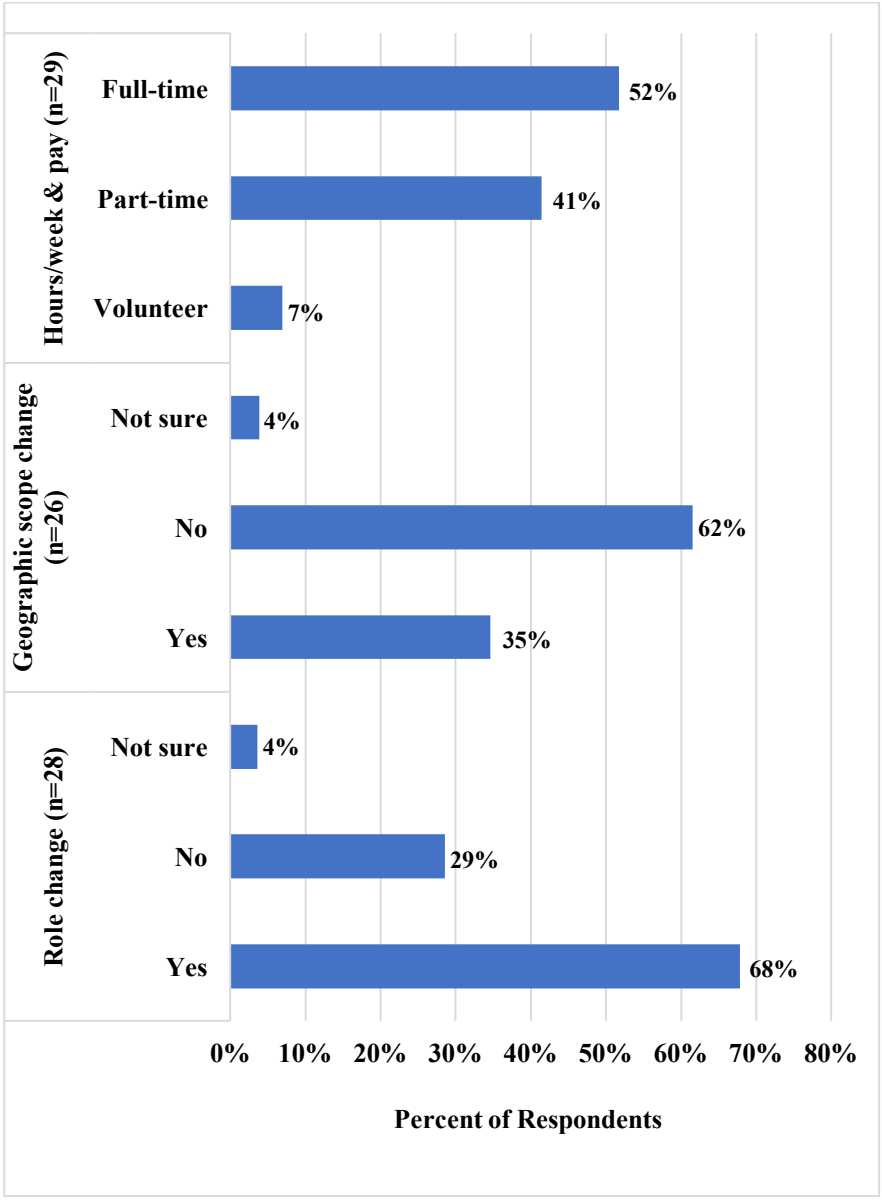
Those watershed coordinators that remained active following the end of the Watershed Program continued in different ways. Several respondents indicated that a watershed coordinator was present in reference to watershed coordinator *duties* that were carried out by other employees, though not under the title of watershed coordinator. Several watershed coordinators that continued with an organization had either a reduced role or a different scope of work. Some watershed coordinators continued by way of being hired by either the grant recipient organization or another organization in the same watershed for a similar job with a different job title.

Table 4.6. Descriptions of Water Coordinator Positions Following End of Watershed Program Funding

Status	Description
Present	Continued as an Administrative Assistant/RCD Coordinator
Present	WC is only one part the person's job responsibilities
Present	Sub-contracted position ended and the other in-house WC was on staff for a couple more years, and then hired by county as "Water Resource Coordinator"
1-2 years	The first WC lasted 2 years, the second Watershed Coordinator lasted 4 years; The first WC became a manager at the Watershed Department. The second WC transitioned to a full-time position with water conservation, water quality, climate registry and watershed management
≤1 Year	The employee became funded through other grants, thus unable to focus on watershed coordinator tasks.
Present	The position continues to this day, but with a reduced scope.
≤1 Year	Until the coordinated resource management partnership dissolved
Present	The WC position did continue after the grant ended in 2015 and continues to this day. The duties were encapsulated into another position and are now being delegated to a Conservation Project Manager.
Restarted later	It started again in 2016, and the new funding will run out at the end of 2018.
Present	Yes, the grant created a new position and that position still exists today. But not as a "watershed coordinator." It is "Program manager" through today
Present	The function has continued, but not the position; N/A
Present	Through today, minimal capacity
3-4 years	The position did continue, but the scope and breadth of the position diminished over time (part-time) due to the reduced funding. The original watershed coordinator left the program in 2015.

In addition to differences in the length that a watershed coordinator continued to operate in a watershed, there were also differences in their role in the watershed (job duties), geographic scope, and hours. These differences are shown in Figure 4.14 below. Fifty-two percent of the watershed coordinators that stayed on continued full-time, 41% part-time, and 7% continued as volunteers. Regarding the geographic scope of the watershed coordinator's work, of those that responded, 35% stated that their geographic scope had increased or decreased, whereas 62% claimed it had not changed. Finally, 68% of the respondents stated that their role had changed (e.g., from working with landowners to grant writing).

Figure 4.14. Watershed Coordinator Position Changes Post- Watershed Program



In order to better understand the changes in the role of a watershed coordinator, the geographic scope and the hours, we asked survey participants to elaborate on their responses. These are presented in Table 4.7 and listed with the type of change that occurred. The roles of several watershed coordinators who worked with landowners were changed. Many watershed coordinators faced reductions in their scope of work, shifting from a comprehensive watershed-wide scope of coordination activities (e.g., outreach, community partnership building, facilitation, education) to a focus on projects (10 respondents). However, some respondents answered that with the grant, the organization was able to increase their capacity (2 respondents) and expanded the scope of the coordinator's work because of all that was accomplished during the grant (4 respondents).

Table 4.7. Descriptions of Watershed Coordinator Position Changes Post-Watershed Program Funding

Reduced scope	WC hours were cut due to lack of funding; more WC's time spent looking for funding to support the WC
Reduced scope and capacity	All WC duties in the upper watershed. Watershed coordination in the lower remains, but the position title switched to program manager and coordination activities have been reduced.
Reduced capacity	The WC has continued to assist in grant searches and grant writing. The job duties changed…from [previously focused on] weed management and containment where the WC had oversight for a field crew and interfaced with agricultural landowners, the Forest Service and California Department of Food & Agriculture as well as local tribes that have not yet attained their federal recognition.
Reduced capacity	Activities decreased since the position became part-time. The WC focused on development of a management plan. Now activities center on keeping group momentum and outreach via newsletter
Reduced capacity	Similar role and job duties, but not as much capacity to complete tasks.
Reduced Capacity	Volunteered
Reduced capacity and scope; Landownership relationships	The role and job duties were reduced to stakeholder meeting management/note-taking. Grant writing/administration, project management, maintaining landowner relationships, etc. are types of duties that are no longer being included.
Landowner relationships; Reduced capacity	Partnerships had to be modified. Examples: I worked to more fully develop the operations of a volunteer non-profit watershed council. I performed much of their administrative duties and guided them into a more functioning organization. When the WC funding ended, I was no longer able to assist in the same capacity. Although I prepared the council for my reduced time, their stride has been hampered. Another example is not being able to find time to participate in partner projects for technical assistance; many government environmental projects do not integrate landowner needs.
Reduced capacity; Landowner relationships	The main change has been decreased capacity to conduct outreach to landowners and the community, and engagement with other watersheds/groups in the region, and with recovery planning and legislative issues at the state level. The groups currently focused more narrowly on proposing and raising funds for specific on-the-ground projects - both groups in some sense are functioning more like restoration contractors, with less capacity for outreach, engagement, and long-range planning...We are now limited in our ability to offer input, knowledge, and experience to larger planning/policy processes.
Landowner relationships; Project focused	The position went from planning to more specific activities. Currently the position provides support & coordination for forest health projects & resource conservation district engagement with local groundwater sustainability agencies. The position was more focused on outreach and education to landowners- water conservation and wise gardening in urban areas to more practical support for specific projects (i.e., fuel break & fire projects on landowners' properties).
Project focused	The WC became the Project Manager at the RCD prior to her leaving.
Project focused	The WC position was changed: the roles/duties are now focused on individual restoration work with partners. WC participates in a more recent formalized partnership, but is not the lead partner designated with "Coordinator" duties for the partnership.
Project focused; Reduced scope	The WC funding enabled us to hire a restoration director. The role of oversaw our restoration program work and the bigger picture outreach, education and collaboration. With the end of the WC funding, we had to figure out how to pay the salary out of project funding, greatly reducing the amount of time that she is able to spend on big picture tasks.
Increased Capacity	As the group built its foundation and gained more diverse funding sources, the organization was able to bring on additional staff. The WC was promoted to Senior WC and another WC was hired. The WC position has evolved into more of a program manager role with staff responsible for coordination.
Increased capacity	An organization formed in 2014 and is now evolving to become an IRS-approved non-profit based on the partnership
Increased scope	The role has expanded to include more than watershed restoration work. It's an all-around position that includes trail maintenance and trail building, grant writing, GIS, watershed restoration and conservation work.
Increased scope	This new one includes a restoration project trend analysis, creating bylaws, and building membership in the council. Instead of focusing on one river, the WC position covers the whole watershed.
Increase scope	Watershed-wide issues focus, including forest-related projects
Increased scope	Watershed coordination for the RCD jurisdiction was picked up by WC for [a different] RCD, the focus transitioned from noxious weeds to watershed wide issues

As Table 4.7 shows, the end of the Watershed Program support for watershed coordinators affected the relationships that watershed coordinators were building with landowners and on-the-ground work on private lands. For example, Sonoma RCD received a watershed coordinator grant in partnership with Sonoma Ecology Center, which had received two previous watershed coordinator grants. The Sonoma RCD was able to build upon the previous work with the new grants. The box below illustrates a key role that watershed coordinators played in building relationships with landowners.

Box 1 Case Example: Sonoma County RCD Watershed Coordinator Grant

A critical component of restoration and habitat enhancement work involved developing relations with landowners in the watershed because a majority of the region is privately owned and highly parceled. The previous WCs (2004-2007 and 2008-2011) were housed in the Sonoma Ecology Center and focused their work in the Sonoma Creek watershed. The WC linked landowners with technical assistance and resources to encourage landowner participation in watershed improvement projects on their property. The Southern Sonoma RCD also focused some of its 2011 to 2014 watershed coordination efforts in the Sonoma Creek watershed. At minimum, a part-time WC was present throughout the three WC grant periods, as well as the extension (2004-2007; 2008-2011; 2011-2014 and the 2014). Community outreach efforts continued through this grant, including monthly audio clips on a local radio show and newspaper announcements, Facebook posts, SEC website advertisements, and community engagement during clean-up workday activities.

The history of watershed coordination in the Sonoma Creek watershed contributed to the development and maintenance of relationships between the WCs, as representatives from the Sonoma Ecology Center and Sonoma County RCD, and the landowners. Owing to these relationships, one of the major successes of the 2011-2014 WC grant was the assessment and enhancement work for salmonid habitat on 40 privately owned streamside parcels involving over 300,000 vegetation plantings. Highly fragmented privately-owned lands necessitated coordinated efforts among private landowners to achieve successful restoration. This was accomplished through the leadership of the WC.

Similar to Sonoma Creek, a large portion of the Petaluma watershed is privately owned, which necessitated that the WC work closely with private landowners. To connect with the community, the WC assisted the RCD in developing and updating a landowner outreach database, coordinating planting days with a local high school and elementary school, coordinating trash clean up days at local parks, and assisting with a water forum that involved both agency and landowners from the watershed. While much work focused on public land, the WC helped to develop bank stabilization, fencing, fish barrier removal, riparian enhancement, and rainwater catchment projects on 11 private properties.

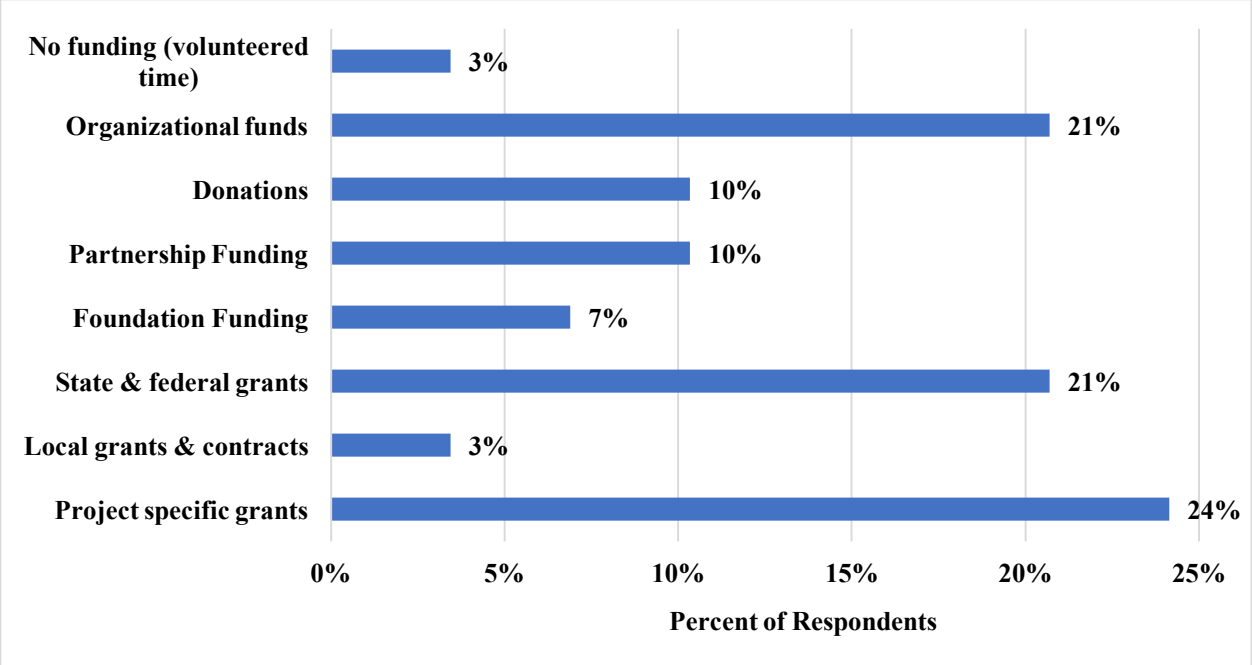
Challenges

WC turnover resulted in two separate coordinators participating in the Southern Sonoma County RCD WC grant. When the first watershed coordinator departed, the RCD hired a second coordinator to complete the grant. A primary role of the WC was to develop relations with local landowners, which requires time and consistent contact. Multiple informants underscored the importance of consistent contact with a WC and the watershed coordinator's role in developing and mediating a relationship between the RCD and the landowners, as well as other agencies and landowners. Turnover interrupted the processes as the subsequent WC was brought on near the end of the grant with little time to cultivate trust with landowners, a necessary step to implement watershed projects (e.g., fish restoration, riparian enhancement, sediment reduction) in the mostly privately-owned watershed.

Funding sources

Funding sources to support watershed coordination efforts beyond the Watershed Program varied. Twenty-six grant recipient organizations provided explanations about how they were able to support watershed coordination. Many organizations secured other sources of funding including, for example, private donations and partnership funding, and one individual stated that they advanced work through volunteering their time. Funding sources are listed in Figure 5.15.

Figure 5.15. Watershed Coordinator Funding Post- Watershed Program (n=29)



Many respondents who indicated that project specific grants were used to fund a watershed coordinator acknowledged that this limited the scope of duties a watershed coordinator was able to take on. Watershed coordinators who were previously able to do outreach, education, and cultivate relationships among the community and build partnerships had to turn their focus toward administration and project management.

What happened when a watershed coordinator did *not* continue?

For the 17 survey respondents who indicated that a watershed coordinator did not continue beyond the Watershed Program, we posed two questions: 1) *Were any of the watershed coordinator duties picked up by others?* and 2) *Following the departure of the watershed coordinator, have efforts been affected or slowed?*

For the first question, 9 of 17 participants indicated that watershed coordinator duties were picked up by either their organization's staff, watershed coalitions, and/or volunteers. Five, or

just under 30% of the respondents indicated that the duties were simply dropped as there were no resources to support those tasks. As for whether efforts in the watershed were affected or slowed, the majority of respondents discussed how the efforts had been affected, including: projects discontinued, organizations closing, and reduced ability to coordinate shown in Table 4.8.

Table 4.8. When a Watershed Coordinator Does not continue: Effects on Post-Watershed Program Work

Following the departure of the watershed coordinator, have efforts been affected or slowed?
Several projects continued, and some ceased because of funding challenges
The organization shut its doors
Slowed for projects identified beyond the needs of the water coalitions. The water coalitions are addressing some of the more immediate needs but not the long-range watershed planning and/or restoration.
The departure of the WC efforts has affected related activities. There is now a Groundwater Sustainability Agency in place and efforts are underway to develop a Groundwater Sustainability Plan. A WC position would be a great benefit to the area.
Much less ability to coordinate efforts in some watersheds.
Yes, the WC position allowed us to focus efforts on conservation projects that fit our region versus chasing whatever grant funding was available that may or may not have been tailored to our needs.
There are a host of entities promoting and conducting conservation work in the watershed as there were before our WC grant. Education efforts have slowed, but partner organizations and the RCD have continued to secure project funding for implementing on-the-ground projects.
Yes
Yes, slowed
There was less proactive involvement versus reactive to issues in the watershed. The county has three districts and only one that really does watershed work, and there is also a large part of the county that is not covered by a district, so we serve those areas as well with grant funds.
Yes. Very hard to fund coordination.
Yes, grant writing has been maintained as much as possible since it is how we survive. Coordinating and collaborating with others has slowed, however.
No

Survey summary

Responses to the surveys show considerable stakeholder support for watershed coordinators, but more importantly they identified specific characteristics of coordinators that were critical to their success. Through the process of establishing a forum to address watershed issues and sharing information, watershed coordinators built relationships and trust among stakeholders. They did so by personally being enthusiastic, committed, able to articulate a collective vision, organized, and through actions that both encouraged diverse stakeholder participation and kept stakeholders updated.

In a number of areas, watershed coordinators helped build collaboration where there was none, and strengthened collaborative practices elsewhere. More specifically, watershed coordinators contributed to the development of *soft infrastructure*, the human, social, and cultural capital that helps build and maintain to collaborative watershed work. This consisted of building community

among stakeholders, encouraging collaborative efforts, and educating the public on watershed issues. Watershed coordinators also helped developed a culture of collaboration. Cultural capital, a program dimension that is generally less well understood but, as this survey reveals, was one of the most powerful, unique, and important dimensions of the watershed coordinator program. Not surprisingly, watershed coordinator outcomes that had the highest level of respondent agreement included improved coordination among stakeholders, improved communication, stronger relationships, and development of new partnerships. Respondents also identified "building relationships" as a top-ranked contribution of a coordinator that led to "leveraged funding," another top-ranked watershed coordinator contribution.

As discussed in the previous section of this report, *Advancing a Clear Vision of Success,* many of these organizational successes and increases in soft infrastructure are often harder to measure, yet are linked to outcomes in watershed health and improvements in water quality.

A major challenge many grant recipients faced was continuing funding for full-time watershed coordinators beyond the WCGP. Sixty-five percent of survey respondents stated that a watershed coordinator's tenure extended beyond the grant cycle. Upon closer examination, however, post-watershed funding is more nuanced than "yes/no" answers reveal. Of the watershed coordinators that remained, just over half remained in a full-time position. Thirty-five percent had a change in the geographic scope of their work and 68% stated that their roles had changed. Most of the changes reduced the ability of the watershed coordinator to complete the amount of work accomplished with Watershed Program funding.

Other survey respondents emphasized how with less funding, tasks related to partnership development and working with landowners and agencies were the first to be cut, as those tasks are typically not funded through other grants—such as project grants—that organizations working in the watershed can acquire. In order to maintain those tasks related to *soft infrastructure,* grant recipient organizations had to secure donations, apply for foundation grants, use overhead from other grants and/or apply general organizational funds to cover costs. Other watershed coordinators had to narrow their scope and focus primarily on specific projects in order to maintain their position, essentially transitioning from a coordinator to a project or program manager.

V. Themes and Lessons Learned from Case Studies

Numerous findings were identified along with a number of hypotheses generated during our interviews for project and coordinator grants. Hypotheses related to watershed coordinator grans were further tested using an online survey followed by a second survey for further clarification. The research team discussed, debunked, and further developed the hypotheses, grounding case observations in literature to create well-informed discussions of the themes that emerged. The following themes are relevant to the effectiveness of watershed coordination efforts: 1) advancing a clear vision of success; 2) watershed coordinators as third-party facilitators; 3) approaches to community-based strategies; 4) the clash of ecological and social objectives and perceived effectiveness in an urban setting; 5) social contexts: the "who?" component of ecological restoration and underrepresented community involvement; 6) maintenance of implementation projects and aging project sites; and 7) organizational capacity.

Advancing a Clear Vision of Success

Natural resource management is trending away from top-down approaches and toward more collaborative approaches that emphasize multi-stakeholder inclusion in an effort to address local needs and meet management and resource challenges both in the United States and abroad (Kenney, 2000; Lejano and Ingram, 2009; Ribot, 2003). Watersheds are part of a complex system that involves a diverse set of stakeholders who impact, and conversely, are affected by watershed health. According to Mullen and Allison (1999), local needs and concerns can lead to the mobilization of social capital, inspiring locally-led or community-based watershed management initiatives, resulting in stakeholders coming together to address watershed challenges.

Local watershed approaches were a foundational element of the CalFed Watershed Program (Watershed Program), which promoted improved coordination among agencies, organizations and local watershed groups through programmatic objectives. Housed within the Watershed Program, the Watershed Coordination Grant Program (WCGP) encouraged objectives aimed to "meet diverse needs and interests of local communities and stakeholders," "involve community-based, natural resource-oriented organizations that can provide match," and "seed an initial investment to enhance sustainable local watershed partnerships and secure local long-term support for watershed coordination" (DOC RFP, 2010).

In order to achieve effective watershed management and success with watershed initiatives, a number of studies acknowledge the importance of ensuring a *diverse and inclusive processes* (Bidwell and Ryan, 2006; Coughlin, 1999; Kenney, 2000; Leach, 2000). However, some factors challenge inclusion of diverse interests, including conflict arising from intrinsically discordant values held by stakeholders, the capabilities of coordinators to encourage involvement, and varying levels of capital enabling/impeding stakeholder participation. These factors can hinder

meaningful engagement of diverse stakeholders in open dialogue, an important step towards stakeholder agreement on watershed management (Mullen and Allison, 1999).

The Sierra Institute research team explored case studies to identify effective watershed management, and how collaborative groups achieve it. We asked the questions: What constitutes success? and Who defines it? Research that identifies factors that contribute to success in watershed initiatives is abundant, but due to the multi-dimensional nature of success, definitions of success are non-uniform and sometimes poorly explicated. From measurable environmental impacts to harder-to-measure, more ambiguous outcomes, such as increased collaborative learning and enhanced trust, there is no standardized or universal measure for what constitutes success across watershed studies (Anderson and Yaffe, 1998). On-the-ground watershed restoration and enhanced stakeholder awareness of watershed health both constitute forms of "success." Successful collaborative processes can augment relationships and social capital among community members in a watershed leading to robust implementation of watershed projects in the future. Determining successful outcomes is further complicated by the common misalignment of timing of initiatives and observable environmental impacts—results from watershed initiatives may not affect physical watershed change within a given grant cycle or show up in near-term, post-project monitoring (Kenney, 2001).

Project grants and coordinator grants have attained various forms of success with both on-the-ground measurable outcomes, as well as with the development of *soft infrastructure* such as increased social capital in the watershed.[7] From cases selected, several project grants were implementation-oriented, achieving on-the-ground water quality and supply or habitat improvements through diverse project activities such as, the construction of natural storm water capture systems or invasive species removal. The value of watershed coordination in achieving such measurable outcomes, however, is largely demonstrated in projects implemented by organizations or agencies that hired coordinators, despite not having a Department of Conservation watershed coordinator grant. In such cases, such as the Baxter Creek Gateway Restoration Project, grant implementers subcontracted a part-time watershed coordinator as part of an individual project's budget to organize specific watershed awareness and volunteer events, a critical process to achieving objectives concerning the engagement of stakeholders and the general public. Conversely, such activities are commonly conducted as a part of watershed coordinator grants and yielded powerful outcomes when paired with funding for specific

[7] Soft infrastructure refers to human, social, and cultural capitals that are components of capacity. Whereas we define capacity as the ability to respond to circumstances of all sorts and to meet the needs of all residents. This includes the ability of communities to respond to internal and external stresses, as well as take advantage of opportunities. Human capital is the knowledge and ability to address issues of local concern, and the experience and capabilities of individuals and their willingness to use these locally. Social capital refers to the ability and willingness of local residents to work together towards community ends and purposes and beyond self-interested ends. Cultural capital involves the existence and strength of shared beliefs and ways of living, and bonds that connect residents.

watershed projects. As observed in case studies, years of investment in soft infrastructure through watershed coordinator grants or other mechanisms helped attain measurable on-the-ground outcomes with an effectiveness and efficiency that would not have been possible without investment building relationships and collaborative processes.

Interpretations of success

The success of watershed management is at least in part determined by the manner in which results are interpreted: what criteria is an outcome being measured against, and in whose values are the criteria based? Below we list interpretations of success observed across case studies.

1. State of California and taxpayers—measured against the ability for state funds to yield tangible outcomes, i.e., is the investment an effective use of state funds?
2. CalFed—measured against overarching programmatic goals (Ecosystem Restoration, Water Reliability, Water Quality, Levee System Integrity) within the scope of the Bay-Delta watershed system
3. Granting agency (Department of Conservation)—measured against goals and objectives listed in the request for proposals
4. Individual stakeholders—measured against one or multiple interests (environmental, ecological, agricultural, economic, recreational, local or regional water regulatory statutes, etc.)
5. Stakeholder group—measured against a collective mission and vision, establishing an enduring process for collaboration and conflict resolution that yields ecological benefits
6. Grant recipient—measured by the ability to advance organizational mission, build organization capacity to foster watershed-wide work, secure a more permanent watershed coordinator position.

Other perspectives:

1. The extent at which a watershed is ecologically restored to its naturally functioning state
2. The improvement in process to increase the efficiency and effectiveness of ecological restoration, adaptive learning (do it better next time)
3. The increased social connectivity, networks that extend beyond forums of watershed management.

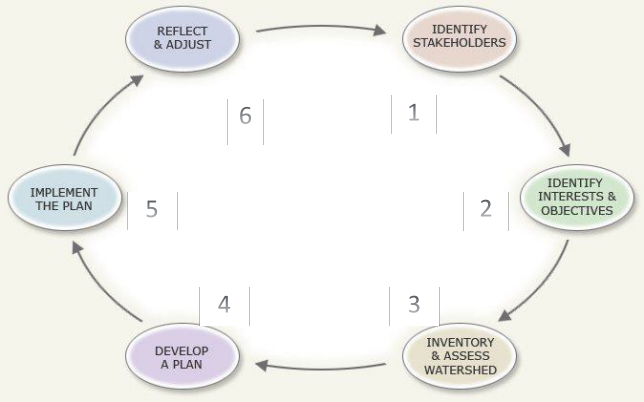
A commonality among aforementioned measures of success also involves the sustainability of outcomes and the ability for investments to leverage more resources to accomplish more work.

Phased approach to achieving success

A phased, adaptive management approach to watershed efforts was encouraged by the 2010 WCGP request for proposals, see Figure 5.1. Case studies revealed that multiple phases can be achieved over a single three-year watershed coordinator grant period, whereas single project grants typically supported a single phase. With both project and coordinator grants, support from

multiple consecutive grants increased the pace of progress possible within the phased approach. The Santa Ana River watershed coordinator supported by the Earth Resources Foundation is a prime example.

Figure 5.1. Phased Approach to Watershed Management (DOC RFP, 2010)



The watershed coordinator grant received by the Earth Resources Foundation directly contributed to the development of the Santa Ana River Watershed Alliance (SARWA), a forum involving stakeholders from nonprofits, community groups, agencies, and private businesses to identify and address watershed management goals in major local watersheds. On average, 25 stakeholders attended monthly meetings in which the watershed coordinator and consultants facilitated round-table updates and watershed management goal development (Phases 1 and 2). Partnerships and information-sharing networks established through early SARWA processes led to the group's development of a project inventory, including existing restoration projects, potential project sites, funding needs and possibilities, and opportunities for partnering and volunteering (Phase 3). Stakeholders reported the inventory to be a useful tool for increasing stakeholder participation and engagement, as well as encouraging project implementation. Several stakeholders recognized that the most significant process executed during SARWA's active years involved the development of the Santiago Creek Assessment and Visioning document, guided by SARWA stakeholders and experts and facilitated by the watershed coordinator (Phase 4). However, the momentum of the group ceased at Phase 4 with no outcomes reported beyond the production of the report.

As seen in the Earth Resources Foundation case, multiple watershed coordinator grantees initiated work with Phase 1 and worked through to Phase 4, developing a plan just short of implementation. Implementation and sustained group momentum are often contingent on and impacted by multiple external factors, including available funding and resources. Grant recipients who were able to secure multiple watershed coordinator grants and/or project grants tended to generate more on-the-ground outcomes, and had increased rates of implementing projects identified in management plans. Leach and Sabatier (2005) found that once there is an agreement among stakeholders involved in a watershed partnership, the implementation is

dependent on time and money. Koontz and Newig (2014) found that a combination of resources, including funding a full-time coordinator, willing landowners, and networks are key factors in promoting implementation of plans, with watershed coordinators utilizing their networks to achieve on-the-ground implementation. This scenario is demonstrated in the Lower Mokelumne River watershed where for 12 consecutive years the same watershed coordinator fostered stakeholder relationships within the structure of a watershed council and helped connect resources to project implementation across multiple land ownerships. The watershed council remains actively as of the writing of this report, and stakeholders attribute the sustainability of leveraged funds and outcomes to momentum of the "central wheel" of resources and relationships the watershed coordinator cultivated over time.

Project grants supported a phased watershed management process, however, most projects focused on a single phase (i.e., completion of a watershed assessment, development of a watershed plan or implementation of a project). Often, multiple consecutive project grants in a watershed enabled a phased approach, several of which were initiated through the groundwork laid by a watershed coordinator driving the process. Thirty-seven out of 173 grant recipients were host to at least one grant of each kind, a combination that proved effective.

The Clavey River Watershed Assessment and Clavey River Ecosystem Project are both projects that covered a single phase of the process described in the 2010 WCGP request for proposals. With the first grant, the Clavey Watershed Council developed an assessment of watershed conditions and created a framework for identifying and implementing high-priority, stakeholder supported projects. With the second, the Council used data from the watershed assessment and framework strategy to inform the implementation of projects and create an action plan. During this time, the 2009 bond freeze disrupted grant funding and slowed implementation. However, stakeholders noted that at least two meadow restoration projects identified through this process were later implemented with support from the Sierra Nevada Conservancy's Rim Fire recovery grant program.

Perceptions of success in a phased approach are nested, and the inability to achieve one or more desired outcomes is hardly interpreted a failure by those engaged. In one regard, as long as the phase in focus is completed and satisfies objectives, it is considered a success. Success might also be interpreted as simply learning from the process and the ability to apply what is learned from previous phases or other projects to current activities, despite the extent of completion. Beyond completion of a phase, success is also laying the groundwork that leads to the next phase, and creating a replicable process that sustains future watershed management activities.

Factors that impact perceptions of success

Perceptions of environmental success and organizational success are another factor in understanding what constitutes success and success for whom, and studies have shown that several variables impact those perceptions. Leach and Sabatier (2005) found that watershed partnerships older than thirty-six months show a positive and statistically significant relationships between trust and level of agreement of partnerships groups; furthermore, these researchers learned that trust induces stakeholder to evaluate their partnerships more positively. Referred to as the "halo effect," trust and social capital affect stakeholders' perceptions of their collective impact on the watershed making the partnership appear to be more "successful" than may have been actually achieved. Koontz and Newig (2014) caution that stakeholder perceptions of "eventual" environmental outcomes can be less dependable in an "absolute" sense and question the plausibility of stakeholders' tendencies to over-report environmental successes.

Based on case study research, it appears that when soft infrastructure is strong perceptions of positive environmental outcomes are stronger, which in turn encourage watershed groups in their collaborative approach; success breeds success. While not all outcomes are measurable within the short timeframe of watershed coordinator or project grant cycles, perceptions of success are relevant and are a measure regularly utilized in watershed collaborative research.

Variables contributing to "success"

While success takes many forms in watershed management research (e.g., environmental outcomes, community outcomes, organizational outcomes), Leach et al. (2001) assessed variables that contribute to achieving more successful watershed initiative based on a meta-analysis of 36 watershed studies. In addition to a diverse and inclusive set of stakeholders, the results revealed the most frequently cited factors, include: adequate funding; cooperative, enthusiastic, and committed participants; effective leadership; local or bottom-up initiatives; balanced local, state, and federal participation; trust among participants in the process; manageable levels of conflict; adequate time; proper geographic scope; appropriate decision-making rules and processes; consensus decision-making; enforcement mechanisms; community and information exchange; training in collaboration; agency support; and community resources and support.

Due to the complexities of measuring success, as well as the contextual, project, and hydrological diversity, the Sierra Institute in its case evaluation refrained from directly and comparatively rating each watershed initiative. Rather, our investigation was to develop a deeper understanding of the factors that lead to and those that prevent more effective outcomes of watershed initiatives, and to develop general findings along with recommendations for future watershed programs and projects.

Watershed Coordinators as Third-Party Facilitators

"Of the myriad factors that influence environmental conflict and its resolution, few are perceived to be more important than the role of professional facilitators" (Leach & Sabatier, 2003:148). Addressing watershed health and restoration involves stakeholders from different walks of life. With an array of interests that are both reliant on and impact the health of the watershed, including industry, nonprofit organizations, water agencies, communities, and user groups (e.g., recreational, agricultural, etc.), some level of conflict among groups is inevitable when bringing diverse stakeholders together to address watershed management. Facilitation is an effective way to mitigate conflict at the onset of collaboration and throughout the process (Margerum, 2008).

Not all coordinators take on the role of facilitator; nonetheless, facilitation was a primary function of several watershed coordinator grants in the Watershed Coordinator Grant Program (WCGP), including, but not limited to the watershed coordinators hired by the Resource Conservation District of the Santa Monica Mountains (RCDSMM), the San Joaquin Resource Conservation District, the Ojai Valley Land Conservancy, Contra Costa Resource Conservation District and the Battle Creek Watershed Conservancy.

Facilitation and coordination have been recognized as one of the most important investments for effective watershed partnerships in previous studies- 60% of studies analyzed by Leach, Neil and Pelkey (2001) in their meta-analysis recognized the importance of *managerial assets* for effective partnerships in watersheds, which included funding, effective leadership, facilitation, and/or coordination.

Governmental agencies sometimes offer agency staff to fulfill facilitation and coordination services for watershed groups; however, neutrality, time commitments, experience and specific training in consensus-based approaches can impact effectiveness according to nine case studies reviewed by Leach, Neil and Pelkey (2001). Neutrality, or what study informants referred to as "third-party facilitation," emerged as one of the lauded components of watershed coordination under the Watershed Program as a mechanism to create an open forum for stakeholders to share in discussions and develop relationships. In line with WCGP case observations, neutral facilitation was presented as one of three precursors to cultivate interpersonal trust in partnerships. The other two precursors were *clear process rules* and *unimpaired sharing of data and information* which can both be effectively implemented through good facilitation (Leach, Neil and Pelkey, 2001).

As part of the WCGP facilitation conducted by watershed coordinators was implemented as an effective way to mitigate conflict at the onset and throughout the collaborative process with watershed groups and collaboratives. The watershed coordinator survey conducted in this research indicated that according to informants, characteristics that contribute to effective watershed coordination include *clear communication*, *promotion of a watershed*

group/collaborative agenda, and *ability to articulate a collective vision*- all attributes and/or activities implemented with effective facilitation throughout a collaborative process. *Building relationships* was one of two of the highest ranked answers for how a watershed coordinator contributed toward positive outcomes in the watershed.

As a facilitator for the Santa Monica Bay watershed, the RCDSMM watershed coordinator maintained an objective, third-party approach. Facilitation helped to bridge and pacify relations among at-times contentious stakeholders and unite diverse stakeholders as colleagues "on the same team." One watershed coordinator remarked, "over and over again, I found that there are always some areas where everyone agreed and we could move forward on those items." The facilitator had received previous training that enhanced facilitation performance and enabled strategic approaches to overcome dilemmas. Tasks completed by the watershed coordinator included coordinating meetings that integrated educational speakers and experts, providing updates from agencies and other organizations working in the watershed, working with subcommittees on particular topics, and creating an opportunity for diverse viewpoint points to be shared. Participants expressed how "it was nice to have one primary meeting and the coordinator to encourage key stakeholder groups to have someone there from each organization at least listening." This created awareness among the various groups working in the watershed and also helped to limit redundancy in watershed efforts.

One of the major contributions of watershed coordinators to watershed management is bringing different stakeholders together to work collectively toward addressing issues in the watershed with multi-beneficial solutions. In several cases, the watershed coordinator was crucial in bringing diverse groups together by taking on the responsibility for making connections and maintaining a comfortable environment for open and candid conversation. Similarly, in some cases, watershed coordinators have coalesced contentious groups around watershed issues, enabling communities to actively participate in the development of clear and collective goals for action in the watershed and building awareness of pressing socio-ecological concerns. Many watershed coordinators have facilitated forums in which technical information was interpreted and discussed as a launch point for developing projects to address specific challenges.

Watershed coordinator grant facilitation challenges

While good facilitation begets a number of aforementioned positive outcomes, there are also challenges to effective facilitation. Necessary elements for effective facilitation include the ability of a watershed coordinator to be relatively unbiased in their approach, genuinely acting as a third-party participant. A group's perception of neutrality in facilitation not only depends on the skill of the watershed coordinator, but on the perception of the grant recipient organization and the working relationship between the watershed coordinator and grant recipient organization (e.g., contract or in-house).

In several cases, such as the Council for Watershed Health and the Shasta Valley RCD, facilitation of stakeholder groups was not the primary duty of the watershed coordinator. In a small number of cases, the watershed coordinator instituted a one-way delivery of information from the grant recipient organization to stakeholders, rather than creating a forum for two-way flows of information and understanding. Organizational ideas, motives, and beliefs were brought to stakeholders in an effort to build social consensus around the organization's cause, rather than encouraging the stakeholders to cultivate ideas of their own. For the majority of cases in this study, this was not part of facilitation work, but it underscores the challenges of a watershed coordinator being housed in an organization with particular views about its role within a group and its perception about appropriate and effective facilitation.

Project grant facilitation challenges

Facilitation practices were a common feature among watershed coordinator grants; however, in some CalFed project grants, facilitation mechanisms were implemented to address group contention as in the case of the Tuolumne River Trust. Prior to receiving CalFed grant funding, stakeholder groups were "passing around the lead"- alternating facilitators and dividing tasks with each other in the process of developing an integrated water management plan. Following a trial year alternating facilitation tasks among group members, there remained some support for the method, with one informant preferring the sense of balance among participating entities the process brought. However, as not all agreed on the method's effectiveness, the Tuolumne River Trust hired a staff member to facilitate, a role later filled by a consultant facilitator. Informant perceptions of the facilitator were mixed with some questioning the neutrality of the consultant, whereas others commended the neutral facilitation. Stakeholders who sensed a lack of neutrality attributed it to a bias toward the hosting organization and absence of a consensus-based process. Others commended the benefits of the facilitator in advancing a collective vision for the group.

By the end of the grant, the group was able to complete an integrated watershed management plan, but failed to unanimously implement the plan. Only some stakeholders were able to utilize the plan to acquire grant dollars to implement projects, while others lacked knowledge of the plan and/or questioned the plan's utility. Frayed relationships contributed to the failure to implement the plan and trust was never completely established among group members likely due to imbalances with facilitation and partisan personalities of the group.

Watershed Coordinator Training

One approach to ensuring watershed coordinators had the proper tools and training to facilitate stakeholder groups was the implementation of the Watershed Program Partnership Seminar series, which was commonly known as "bootcamp training." Following an extensive survey (1990s through mid-2000s), it became apparent there was a need for skills related to leadership,

organizational development, cross-jurisdiction partnership skills and management-related tasks. The series arose to provide "support for partnership building, adaptive performance-based management and interest-based processes" within local communities in order to help promote long-term partnerships rather than rely on outside, temporary consultants to provide these services to watershed collaborative efforts.

The Watershed Program Partnership Seminar series consisted of a two-day focused training for watershed coordinators and individuals working in watersheds in 2001, 2003 and 2006 to enhance the effectiveness of locally-driven community-based watershed management initiatives. In total 114 participants graduated from the training, including a mix of watershed coordinators and other interested individuals. The opportunity provided participants with skills to promote the development of long-lasting local partnerships. Participants practiced self-awareness skills to understand behaviors and attitudes that contribute to building and conversely eroding community partnerships, personal skills for interpersonal and group conflict, interest-based and goal-oriented approaches to build groups relationships, and organizational development skills to enhance communication among partners, efficiency, productivity and performance (California Watershed Network, 2017).

The "bootcamp" convening was also a time for watershed coordinators from around the state to network, learn from one another, and develop partnerships. One "bootcamp" participant, also part of a network of coordinators from the North Coast Watershed Coordinator Team, mentioned how some relationships among watershed coordinators developed from a single convening by the Department of Conservation, which led to longer-term interactions with several participating in the network, sharing resources, and learning from one another.[8]

Feedback from informants who participated in the seminars was very positive. Generally, watershed coordinators expressed gratitude for the opportunity to develop relations with other coordinators working on similar issues and skills for the job at hand. However, one informant did recognize that a number of the watershed coordinators hired with the Watershed Program that brought experience and were already well-equipped with the many of the skills taught at the seminars. The informant had hoped that rather than a one-way flow of information, "what would be more useful would be to have a workshop where we all share, there would be an overall plan, but with more time to share information and best practices with each other instead of experts coming and providing that. Sometimes the characterization of rural areas is that we don't have skill."

[8] According to one participant, the North Coast Watershed Coordinator Team is "a group of watershed coordinators working together to leverage resources that they collectively have. Each watershed coordinator is responsible for a certain geographic area, but has a skill set and resources available that can complement the work of others, so the goal was to work together on projects that span larger geographic areas as well as learn from one another."

Approaches to Community-Based Strategies

The Watershed Program was developed to implement local community-based strategies to maintain and improve the Bay-Delta through advancing a holistic watershed management approach. The Watershed Program recognized improvements in community capacity for watershed management as necessary for community-based strategies to be successful, and performance measures were developed to measure progress.[9] Funding watershed coordinators was one mechanism employed to advance community capacity, and specific tasks to develop community capacity and implement local community-based strategies were communicated in the request for proposals (RFP): 1) to ensure open and accurate sharing of information and 2) to convene and advance collaboration among and between various agencies, entities, groups, and individuals with interest in management of natural resources (RFP 2011). This leads to the question of, in practice, how "community-based" is defined and executed.

The duties of a watershed coordinator, as stated in the RFP, inherently define community-based strategies as collaborating with "agencies, entities, groups and individuals with interest in management of natural resources." This description resembles the most simplistic definition for "stakeholder" used in natural resource management- those who are affected by or perceive impacts by an issue (e.g., financial, psychological/emotional, spiritual, etc.) and those who are interested in an issue (Billgren and Holmén, 2008; Fischer et al., 2014). Moving from definition to practice, and building on the definition of community-based, what is the most effective way coordinators can identify and involve those "affected" or "with interest" and how do coordinators identify and engage stakeholders at the watershed scale rather than a singular natural resource management issue?

Including *all* stakeholders- *bringing everyone to the table*- is the ideal but in practice there are limitations. Prell et al. (2007) demonstrates how natural resource literature tends to view stakeholders as self-evident, which can lend to overlooking other interest groups and interested individuals, as well as the idea that "interest" can be incited as people realize their "stake" in the process by way of information sharing shifting perspectives. Reed (2008) observes a tendency to repeatedly recruit the same participants or what Reed calls the "usual suspects." Billgren and Holmén (2008) note how natural resource management approaches to stakeholder inclusion tend toward recruitment from organized groups rather than individuals. Colvin, Witt, and Lacey (2016) further this understanding of stakeholder identification processes with insight into how an individual can obtain 'stakeholder status' and the power dynamics that are inherent in this determination, a key point with respect to this project. If the responsibility for stakeholder identification is handled by a single practitioner (e.g., watershed coordinator), depending on the

[9] The 2004 Watershed Program Performance Measurement document defines community capacity as consisting of "resources, networks, organization (including local governance), attitudes, leadership and skills that allow communities to manage and sustain healthy functioning watersheds."

approach taken, this can affect who is included and who is left out despite the inclusiveness of the definition of stakeholder used. That is, the definition is conceptual or academic, and the link between the theoretical and practical is critically important.

Colvin, Witt and Lacey (2016) developed a typology for approaches to stakeholder identification, also known as stakeholder analysis, which categorizes the approaches as either "seeking" or "creating." *Seeking* refers to the act of a practitioner looking "outward into society to find stakeholders" (p262, 2016).[10] *Creating* is defined as "looking toward the landscape of relevance and the project or issue to construct templates for stakeholder identification" (p262, 2016). Watershed coordinators took various approaches to identify and engage stakeholders, including both seeking interested citizenry at large and creating opportunities for those stakeholders that have a clear linkage to the project and/or landscape of interest. Nonetheless creating may lead to the identification of issues and perspectives for which there are no readily identifiable stakeholders.

During interviews, informants, including watershed coordinators, have not clearly explicated specific methods of "stakeholder analysis" used to inform their outreach and information dissemination efforts. However, the RFP issued by the Department of Conservation directly encourages watershed coordinators to follow a process- "identify stakeholder" and "identify interests and objectives"- both important steps of a stakeholder analysis, refer back to Figure 5.1.

Watershed coordinators implemented various approaches to stakeholder identification, engagement, and information sharing. This resulted in varying degrees of inclusivity in stakeholder collaborative processes that inform community-based strategies. Understanding the stakeholder approaches across cases informs a discussion of the challenges and effectiveness of fulfilling the two aforementioned duties of a watershed coordinator (i.e., open and accurate information sharing and convening and advancing stakeholder collaboration). It also provides a better understanding of who was included or omitted in the efforts to develop community-based strategies and understanding the spectrum and interpretations of "community-based approaches" under the Watershed Program.

Approaches to information-sharing & stakeholder engagement to inform community-based approaches from case studies

A plethora of water-related initiatives are conceived by stakeholders across a given watershed, including stakeholders from a variety of sectors: community groups, landowners, businesses, nonprofits, universities, resource conservation districts (RCD), and local, state, and federal

[10] Stakeholder analysis is a process for identifying stakeholders and relationships among different stakeholders in order to analyze their needs and develop a view of both the human dimensions and institutional landscape within which they exist.

agencies. Without a structure that enables stakeholders to connect directly and share information throughout the watershed, the result can be fragmented projects with narrow objectives; project planning without implementation; implementation of a project without due consideration of impacts on local communities and other projects; and/or other less than optimal outcomes. A primary role adopted by many watershed coordinators—and directly encouraged by the 2011 to 2014 grant cycle—was that of a conveyor of information among diverse stakeholder groups in the watershed.[11] Implicit in this task is identifying, engaging and sharing information with stakeholders regarding watershed health, which involves a larger scale and scope than point source or other more geographically focused natural resource management. As such, this presents a challenge to inclusion of the appropriate diversity of people and perspectives.

Approaches to stakeholder identification, engagement, and information sharing can affect the level of inclusivity/exclusivity of local stakeholders in watershed activities. Approaches undertaken in the case studies are categorized and shared below.

With whom are watershed coordinators sharing information and engaging?

Watershed coordinators have targeted distinct groups, as well as brought diverse interests together for sharing information and encouraging collaboration. Contributing factors to the approach chosen include whether or not there was a group already convening, the needs of the organization, the duties assigned to a watershed coordinator, the scope of the issues, the role and relationship of the organization and the local community, as well as the specific grant objectives. While the categories are not strictly bound and may have overlapping participants, case observations targeted groups for convening stakeholders and sharing information, including: 1) water-related and planning professionals, 2) interested stakeholders, and 3) the public at large.

For several of the more effective grants, watershed coordinators brought together groups in an effort to create new connections around watershed health. Other efforts have successfully taken all-inclusive approaches by bringing "everyone to the table." However, for watershed efforts funded through the CalFed Watershed Program, the case study research revealed that this approach was hampered by insufficient resources and efforts to include individuals, groups and communities with limited resources or capacity to participate. This is discussed in further detail in the section (below) *Who Impacts and is Impacted by Watershed Restoration: Challenge to Engage Relevant Stakeholders*

Professional Groups. Several watershed coordinators worked primarily among professional groups to bridge efforts by coordinating local, state, and federal agencies, nonprofits and other professionals that work on watershed-related issues. For example, a watershed coordinator

[11] This is a reference to one of the aforementioned duties of a watershed coordinator listed in the 2011 to 2014 RFP- "ensuring open and accurate sharing of information."

facilitated the Ventura River Watershed Council Leadership Committee, comprised of local governmental agencies (e.g., City of Ojai, Board of Supervisors), water and sanitary districts and groundwater management agencies, land management and recreation agencies, several environmental nonprofits, and businesses. As discussed by Colvin, Witt and Lacey (2015), this approach may be a case of rounding up the "usual suspects" involved in watershed management while relinquishing opportunities for greater diversity of input into collaborative processes.

The work of the watershed coordinator for the Ventura River was essential for gathering scattered information and data from existing research, establishing an information-sharing network that initiated dialogue between potential project partners, providing the framework and contextual data to foster new project initiatives, and identifying gaps to be addressed in the watershed management plan. A challenge of working within a professional group may be ensuring good information dissemination to the public, having an understanding of local community needs, and missing stakeholders that may have interest, influence or relevant past experience to contribute to the process.

One of the watershed coordinators for the Council for Watershed Health convened focused workshops that gathered researchers and practitioners together around sustainable landscaping. Landscaping professionals learned the most innovative approaches for increasing water conservation and encouraging the use of native and drought-tolerant plants. Interview participants noted many benefits of this type of focused outreach and information-sharing, such as an expanded professional training to incorporate new, innovative water conservation techniques. One limitation of this approach is that it does not explicitly provide an opportunity for the greater public to learn or become involved, but targets a specific group of stakeholders involved in low impact development.

Interested Stakeholders. Watershed coordinators also shared information with interested stakeholders (non-water-related professionals), including volunteer groups, interest groups (e.g., agriculture), private landowners, and community organizations with concern and stake in watershed health and/or fear of regulation. Watershed coordinators held stakeholder meetings and technical workshops to encourage watershed restoration, water conservation efforts, and disseminated information through listservs. As part of the Watershed Coordinator Grant Program (WCGP) facilitation training, watershed coordinators were encouraged to implement consensus-building as a way for diverse groups to develop collective goals and strategies to improve the health of a watershed. Some efforts included bringing in technical experts to present on topics of interest, with watershed coordinators enabling stakeholders to participate in discussions by helping to interpret technical information. Several volunteer stakeholder groups were able to develop watershed assessments and management plans through collaborative forums initiated and/or maintained by watershed coordinators. Limitations include reliance on participation from already organized groups, leaving out individuals who may be interested but are not involved

with an organized group. This underscores the need to critically examine gaps in stakeholder representation.

Santa Cruz RCD and Shasta Valley RCD are two examples highlighting positive impacts of successful information sharing and engagement between watershed coordinators and interested stakeholders. The original DOC watershed coordinator program took advantage of the RCDs' traditional and frequent work with landowners by housing watershed coordinators within both organizations.

The watershed coordinator for the Santa Cruz RCD worked closely with landowners in the Pajaro Valley to promote opportunities to monitor water use through a technology and cost-sharing network among landowners and growers. This fostered high levels of participation and an average of 30% savings in water use each year, thereby reducing aquifer overdraft in the area. Working with individual landowners rather than focusing efforts on organized groups can help involve those beyond the traditional participants and include those too often left out. In Shasta Valley, the watershed coordinator provided information and technical assistance to landowners to pursue a Shasta River TMDL Conditional Waiver Program of Waste Discharge Requirement Program (Shasta TMDL Waiver).[12] The watershed coordinator assisted landowners in developing ranch plans and identifying projects to meet TMDL requirements. Results included increased landowner water quality monitoring and an increased awareness of water quality issues. This augments landscape-scale approaches through expanding efforts beyond public land.

General Public. While not all watershed coordinators worked directly with the public, a number of watershed coordinators worked to increase knowledge, engage citizenry, and cultivate awareness of watershed health and encourage water conservation by hosting informational booths at public events, creating websites, organizing volunteer watershed restoration and monitoring events, distributing e-newsletters, providing interactive mapping tools, mailing pamphlets, developing and sharing informational videos, and/or hosting documentary films. Many of these activities verge on one-way flows of information, which can raise public awareness of watershed health but may not directly consider communities' needs and concerns, especially underserved and disadvantaged communities. In developing community-based strategies, broader-based inclusion beyond information sharing is often necessary.

Other public outreach efforts were a rallying call, drumming up support for organizational pursuits. For example, the watershed coordinator funds likely enhanced the power base of the

[12] The North Coast Regional Water Quality Control Board (Regional Water Board) developed the Shasta TMDL Waiver to improve temperature and dissolved oxygen conditions in the Shasta River and its tributaries. The Waste Discharge Requirements set requirements for pollution control, monitoring, and reporting. The Regional Water Board may waive the requirement for Waste Discharge Requirements, subject to meeting conditions specified in a Conditional Waiver of WDRs.

Arroyo Seco Foundation, an environmental non-profit that enabled the organization to increase social consensus around contentious water and watershed health issues.

Bringing "Everyone" to the Table. As an information sharing hub in a watershed, some watershed coordinators were able to bring together diverse stakeholders from different realms (professional, interested stakeholders, general public) to collaboratively discuss, plan, and execute watershed initiatives. As land and wildlife management agencies and practitioners move from top-down management to more collaborative approaches that take into consideration the needs of local communities, watershed coordinators have proven invaluable in developing forums for information sharing, discussions, relationship development, and watershed management plan and project development. As quasi third-party participants, watershed coordinators have been able to navigate the murky waters of distrust and apprehension held by some stakeholders and communities whose previous experiences include being left out of information loops, insufficient transparency, and unfledged and/or at-times contentious relationships between agencies and local communities. The Battle Creek Watershed Conservancy and San Joaquin RCD are two examples of how watershed coordinators effectively brought *nearly* everyone into the collaborative process.[13]

The watershed coordinator for the Battle Creek Watershed Conservancy facilitated communication among community members, state, and federal agencies who were involved in the Battle Creek Restoration Project, a long-term, ongoing restoration project. As the largest salmon and steelhead restoration project in California, transparency and information-sharing were vital to keeping this project moving forward. Dam removal, the ultimate phase of this project, can take years to accomplish. Currently, the project is being managed by the U.S. Bureau of Reclamation with several collaborating agencies, including the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife. One consultant stated that two lasting outcomes of the project are: 1) good will between locals and agencies; and 2) the project is still moving forward. Once complete, it will encompass 51 miles of salmon and steelhead habitat.

The San Joaquin County RCD watershed coordinator also convened a multi-stakeholder collaborative group. Within the group, the watershed coordinator acted as a central hub for information and resource sharing using the watershed council and management plan as a tool and framework. The watershed coordinator actively encouraged stakeholders with different needs to connect and set common goals. Different entities presented projects and the group helped to further develop the projects. Outside of the active stakeholder group, information was shared with community members leading to a reported increase in awareness of impacts on watershed health and participation in watershed restoration efforts. Coordination activities contributed to

[13] As previously stated and further elaborated in *Social Contexts: The "Who?" Component of Ecological Restoration and Underserved Community Involvement*, disadvantaged communities were not a focus of the majority of CalFed Watershed Program grants.

many notable outcomes, including increased collaborative capacity in the Lower Mokelumne watershed, the development of California's first landowner-initiated programmatic Safe Harbor Agreement, the widespread adoption of sustainable best practices in both agricultural and urban communities, and wildlife habitat restoration across land ownership boundaries.

Who is included in community-based strategies and who decides?

There are several approaches watershed coordinators undertook to information sharing and convening a collaborative. In several cases, watershed coordinators were tasked with outreach to stakeholders, and the selection of stakeholders to engage involved the higher profile agencies and stakeholders; some communities, however, especially those disadvantaged, were left out owing to lack of understanding of their interests and roles, along with the lack of resources to support these efforts. Lastly, sometimes stakeholders beyond those typically involved or with less obvious interests were recruited by watershed coordinators and bestowed "stakeholder status" (Colvin, Witt & Lacey, 2016). The act of a watershed coordinator designating "stakeholder status" to invite participants demonstrates a level of power and control that is inherent in the position. It also underscored how coordinator bias can influence stakeholder group involvement and issue identification.

For a deeper understanding of community needs and to inform community-based strategies, clear definitions and practices must be outlined including approaches to stakeholder analysis and inclusion. The scale of a watershed, scope of watershed coordinator duties, and the scope and scale of the projects within the watershed will complicate, but also help inform a process.

The Clash of Ecological and Social Issues and Perceived Effectiveness in an Urban Setting

As observed in multiple cases, urban watershed restoration projects too often ignore social factors in project planning. Ignoring social factors is not necessarily deliberate, as it may reflect more who is and who is not involved in project design and implementation, along with an orientation that a project is solely ecological and restorative of biological processes. It is true for all projects regardless of location but especially for projects located in a heterogeneous urban landscapes that biophysical *and* social outcomes are important. Projects have been evaluated with this in mind because ignoring social implications may result in projects failing to achieve intended ecological objectives. Assessment also included consideration of how different groups are affected by a project, along with unintended consequences of projects.

Several urban restoration projects funded through the CalFed Watershed program were multi-beneficial in nature, advancing multiple objectives such as improving local water quality, replenishing local water supplies, restoring the ecological function of watersheds, reducing local flooding, improving wildlife habitat, and promoting public access and use of riparian zones (e.g., recreation, education, pedestrian byways, green spaces). In practice, these objectives were

addressed by implementing on-the-ground activities such as stream daylighting, riparian habitat rehabilitation, street or median retrofits, greenway or park development, and/or installment of stormwater capture systems.

As revealed by stakeholder interviews, in some cases the effectiveness of a project was perceived differently by individual stakeholders and community groups. Differing perceptions of success sometimes are the result of the values of the individual or organizations and sometimes the result of ignoring social implications of a project, or both, which can foment conflict at different phases of restoration projects.

Such a clash was observed in the Baxter Creek Gateway Project, which daylighted and restored a segment of a degraded stream channel in the City of El Cerrito and established a public park. In the project, the use of willows in native plant reestablishment was controversial. Willows are the most commonly used native species for riparian restoration in watershed projects across the state, and in this particular case willow use was mandated by the regional water board. Despite the mandate and those who advocated that willows are fundamental to restoring riparian health, others argued that an alternate species be used since mature willows can compromise "sightlines" with their dense, low-lying branches.

As the Gateway project site aged, compromised sightlines proved to be a factor in increasing homeless encampments, dumping, illegal activities, and consequently, safety concerns. Such activities reduce water quality by contamination through trash and introduction of biohazards into the waterway, an undesired outcome that directly countered original ecological objectives and longevity of the project's positive impact. It is important to note that a primary stimulus for the Baxter Creek Gateway Project was health and safety concerns such as illegal activities, biohazards associated with site use. While safety concerns were initially addressed, they have begun to reappear as the willow matures. This does not mean the project is a failure. Many stakeholders view the project as a valued asset for El Cerrito neighborhoods, one that has inspired neighboring municipalities to implement similar projects. This finding does, however, underscore the need for project leaders to consider differing stakeholder values and impacts, and include social dimensions in project planning along with consideration of short and long-term project outcomes. The failure to do this can result in unintended and undesirable consequences of what are otherwise well-intentioned projects.

Case study findings reveal that differences in perceptions and effectiveness of urban restoration are influenced by multiple variables: 1) the complexity of urban ecological and social landscapes, 2) stakeholders who value watersheds in distinct and multifarious ways, and 3) imbalances in the multidimensional nature of project objectives.

Complexity of urban ecological and social landscapes

As revealed in case studies, urbanized landscapes are often highly disturbed, with multiple sources of human impacts that contribute to the degradation of natural riparian habitat, stream zones, and water quality. As a result of residential and industrial development, natural streams in urban zones have historically been transformed from meandering and biodiverse waterways into concrete-lined or culverted channels (Riley 2005). Urban transformations have impacted the functioning of watershed systems, creating numerous challenges such as nonpoint source pollution from stormwater runoff, degraded wildlife habitat, decreased biodiversity, localized flooding issues, compromised water quality, and strained groundwater reserves and municipal water supplies. In case studies, efforts to address such issues commonly focused on restoring streams to an ecologically functioning and "natural" state, while also providing public benefits such as parks, pedestrian byways, green spaces, and watershed education. However, as observed in case studies, a stream's potential to return to a natural, ecologically-functioning state is not limited by ecological processes alone, but by the social context within which it lies.

The social context that affect the execution of projects includes surrounding communities, and the public and the professionals and project managers who implement the project. In several case studies, urban communities were demographically diverse in terms of ethnicity, age, socioeconomic status, education, occupation, and capacity, and represent a spectrum of socioeconomic statuses, from areas with disadvantaged and homeless communities to highly affluent neighborhoods. Diverse demographics require greater complexity in project planning, a process constantly challenged by the questions: 1) For whom is the project intended?; 2) Who is impacted by the project?; 3) Who will most interact with the project?; 4) Who benefits from the project; and 5) Do project objectives align with the needs of the watershed and communities within and adjacent to it? Addressing these questions during planning and design phases using stakeholder analyses and community surveys would likely minimize unexpected or undesired outcomes and inform a more inclusive, comprehensive, and sustainable approach to watershed enhancement.

Stakeholders who value watersheds in distinct and multifarious ways

From a project's conception to its integration into the community, diverse stakeholder groups play many roles in its execution, from initiation to planning, design, and construction to maintenance and daily use. Stakeholder interests align with elements of restoration founded in ecological and social values that can be contrasting, see Table 5.1. Similar to values categories identified in Fleisher's (2006) *Realms of Values* framework, stakeholder interests observed in case studies include motivations that are obligatory (e.g., water quality regulations), ethos-based (e.g., moral or aesthetic appeals to the natural world), economic and incentive-based (e.g., property values or safety incentives), or leisure-driven (e.g., recreation). Conflicts may arise

among stakeholders when their priorities are based on competing values and agreements regarding trade-offs between ecological and social goals are not achieved.

Table 5.1. Urban Restoration Values

Ecological Values	Social Values
Stream function	*Human water consumption*
Water quality	*Recreation*
Infiltration	*Aesthetics*
Local water supplies	*Wildlife viewing*
Local flooding and runoff mitigation	*Green space*
Wildlife habitat	*Educational opportunities*
Biodiversity	*Encampments*
	Pedestrian/cyclist pathway

Projects that embody multiple competing values—ecological versus social—may also yield outcomes where the definition of success is at stake. An outcome perceived as an asset to some stakeholders (willow establishment) might to other stakeholders be considered a failure (decreased sightlines, sanitation, and crime). This case study suggests that a thoughtful and inclusionary planning process that includes a rigorous stakeholder analysis can help stave off a late-stage clash of fundamental values.

Who Impacts and is Impacted by Watershed Restoration: Challenge to Engage Relevant Stakeholders

In some cases, challenges to engage critical landowners in planning processes resulted in less than desired outcomes, despite the merit and comprehensiveness of the project's ecological components. For example, in the American River watershed, the Sacramento Area Flood Control Agency (SAFCA) received a CalFed grant to develop a restoration plan for five miles of the Lower American River Parkway, including land acquisition and community outreach. The planning effort was ceased following the failure to acquire the five-mile stretch of land, a result many stakeholders attributed to not including necessary landowners in the process. According to interview participants, the planning effort was an endeavor respected and supported by many dedicated individuals and entities who initiated and carried out the process, and the effort was recognized by the American Planning Association in 2007, receiving a "Great Places" award. However, it lacked design considerations for key groups and individuals who closely and regularly interact with the parkway.

In addition to landowner exclusion, stakeholders also remarked on the limited inclusion of disadvantaged communities and homeless populations in the planning process, a practice

commonly observed in watershed projects.[14] Stakeholders in the SAFCA case reflected uncertainty in the practicality of engaging disadvantaged and homeless populations in project planning because of more pressing issues, such as homeless access to basic needs. Challenges with addressing basic needs is demonstrated in the Baxter Creek Gateway Project, where basic sanitation elements were ignored during the project's design due to foreseen challenges in the city's budget to maintain a bathroom facility. Ignoring potential outcomes is no solution to their resolution. Integrating sanitation facilities, for example, in project designs would likely have helped mitigate water quality impairments in and around the site, but the budget and maintenance issue would have remained.

Lessons from the Baxter Creek Gateway project disclose impacts of not involving disadvantaged and, more specifically, homeless communities and the relationships between social groups and the restored park post-construction. The Gateway Park was highly praised by several stakeholders as a community-supported endeavor with a tangible outcome—an ecologically restored portion of Baxter Creek and a surrounding public park. Despite the open and inclusive community design process, outreach mechanisms seemed to favor local homeowners and residents and other professionals concerned with the ecological condition and social safety of the creek corridor. Noting such, homeless and other disadvantaged communities were not engaged or seriously considered in the project's design, which ultimately resulted in an unforeseen recurrence of safety and water quality issues at the site.

Another project lacking attentiveness for needs of lower capacity communities includes the Elmer Avenue street retrofit implemented by the Council for Watershed Health. This example exemplifies environmental justice challenges that arise when an infrastructure project is implemented in a low-income area with maintenance responsibilities left to the community. The Council for Watershed Health and TreePeople addressed some of the challenges by providing technical capacity training, however, the added responsibility proved burdensome for some households. In thinking through longer-term solutions, inevitable technical repairs and potential community member turnover may reveal that community willingness and basic maintenance training are insufficient in creating a long-term green street culture that requires a base of resources in order to adopt.

Largely throughout case studies, multiple projects types (e.g., watershed assessment and management plan development), including watershed coordinator activities, lack full inclusivity of relevant stakeholders. The absence of full stakeholder engagement typically stems not from a place of intention but from project managers lacking knowledge of how to most appropriately engage stakeholders, or the need to engage specific stakeholder groups remaining unforeseen or not considered. Findings from case studies support the recommendation that prior to a project's

[14] "Disadvantaged communities" is a collective term used in this report to include underserved, underrepresented, and low capacity communities.

execution, a community needs assessment be conducted and stakeholder groups which might impact or be impacted by project activities be engaged in ways that encourage and incentivize the long-term stewardship of watershed resources. Case studies revealed that project managers have been challenged to actively promote stewardship activities beyond the term of a grant.

Maintenance of Implementation Projects and Aging Project Sites

One metric for measuring the success of on-the-ground project implementation targets the longevity of a project's impacts. This metric directly links to questions regarding responsibility and maintenance of projects once they have been implemented. Stakeholders across cases reported that while the CalFed Watershed program called for intermediate maintenance and monitoring activities following project completion, it lacked incentives for the development of long-term maintenance plans or accountability measures, such as designating partner roles and responsibilities, especially in projects involving public access points. As such, maintenance activities in multiple projects in this study were scant, and in some cases, fully contingent on the community capacity, volunteer availability, landowner willingness, or agency commitments. Particularly in projects implemented on publicly accessible sites, the absence of adequate maintenance contributed to the site's vulnerability and increased exposure to pollution and other anthropogenic hazards.

A prime example in the City of Los Angeles is the Woodman Avenue Multi-Beneficial Stormwater Capture Project, which was left unmaintained immediately following construction completion and became vulnerable to theft and vandalism. The project, which replaced a 56,000-square-feet concrete street median with a naturalized swale and stormwater capture system, was implemented through a partnership between the Los Angeles Department of Water and Power (LADWP), Los Angeles Bureau of Sanitation, and the Los Angeles Bureau of Street Services. Following construction, parts of the median infrastructure failed during a major rain event. LADWP committed to extending resources to improve the structural stability of the physical infrastructure. Maintenance responsibilities, however, were less clear for managing landscaping and caring for young plants. Once construction crews were no longer present, the project site was vandalized with graffiti and hundreds of young plants were stolen. Stakeholders attributed this in part to not having a maintenance plan that designated implementing entities' responsibilities at the conclusion of construction. Such designation was not entirely possible, as the Los Angeles City Charter prevents local agencies from maintaining "external projects," which stakeholders defined as grant-funded projects originating outside the Department. As a solution, LADWP signed an "Adopt-a-Median" agreement with the adjacent Kaiser Permanente Medical Center to maintain landscaping on the project site indefinitely.

The consequences of inadequate maintenance in the Baxter Creek Gateway Project—an effort to daylight a culverted stream and establish a public park—emerged years after project completion. There, "sight lines" were being compromised with matured and overgrown vegetation. Though

many consider the park a much-frequented asset of the community, the public grounds remained unguarded from vandals, which included graffiti on signage, pollution, and human waste dumping (e.g., feces and other biohazards). Despite attempts by the City of El Cerrito and other project partners to integrate long-term maintenance activities though the development of a maintenance plan and engagement of a five-to-ten person volunteer group, vandalism and pollution continue to overwhelm cleanup efforts.

As observed in implementation projects, designating maintenance responsibilities alone does not equate to preserving project outcomes. Observations of efforts in the Tennessee Hollow Watershed revealed that when coupled with designated maintenance responsibilities, inclusive community involvement, interest, and investment in restoration activities generated lasting results and a level of maintenance that preserved project outcomes. In the affluent Presidio of San Francisco where a large population of retirees live, active involvement of community members, physically and financially was a distinct outgrowth of the high level of community capacity. The project, managed by the well-connected Golden Gates National Park Conservancy (GGNPC), revitalized El Polin Springs through stream daylighting and re-vegetation of critical wetlands in the watershed's public park zones. GGNPC sustains a large resource base, enabling effective public outreach and awareness campaigns regarding watershed issues. As such, the project attracted a robust volunteer base that remains active today in helping to monitor and perform basic maintenance duties. As a result, the project has experienced few if any major incidents of vandalism or maintenance issues.

Considering the success of project maintenance in the Tennessee Hollow watershed with its high levels of financial and human capital, the question arises: Is it possible for watershed groups to replicate successful community-based maintenance programs in economically disadvantaged areas? In the Los Angeles River watershed, the Council for Watershed Health worked with neighborhood residents of a disadvantaged community to maintain a street retrofit project. The retrofit project utilized best management practices (BMPs) to manage runoff, reduce pollution, and mitigate local flooding, part of a larger effort to augment local water supplies. BMPs included the integration of resilient native plants, bioswales, and underground infiltration galleries. Project implementers selected Elmer Avenue in the Sun Valley watershed as the demonstration site, as it met a range of criteria that assured project feasibility: adequate infiltration capacity, an existing local flooding problem, owner occupied, already part of the city's plan to improve roads and infrastructure, and willingness and enthusiasm from the community. Since state bond dollars do not typically fund on-the-ground maintenance and upkeep, project planners designated post-construction maintenance responsibilities for the bioswale systems and native plant landscaping to the residents of Elmer avenue. However, the community encountered challenges to maintain the infrastructure given their low financial capacity.

Stakeholders across cases agreed that creating and implementing maintenance plans for public projects is a challenge that stems from a variety of factors: 1) though most project grants have a minimum maintenance requirement, grants do not generally fund long-term maintenance plans; 2) in some cases, because projects implemented through grants received by agencies are considered "external" to the agency, agency resources cannot be used for maintenance; and 3) grant implementers sometimes rely on citizen efforts for maintenance, which are largely contingent on the capacities of surrounding communities. Additionally, varying levels of participation with volunteer programs appear to relate with varying socioeconomic factors of the surrounding communities and the resource capacity of the projects' managing entity.

Organizational Capacity

The term "organizational capacity" refers to an organization's ability to perform work, which thereby allows it to perform its functions and achieve its goals (Cox, Jolly, Van Der Staaij, & Van Stolk, 2018). There is, however, no academic consensus on the exact meaning of the term. And though a direct linkage between building capacity and increasing social impact is difficult to establish in most cases, the concept is nonetheless widely accepted and acted upon (Venture Philanthropy Partners, 2001).

It can be argued that the watershed coordinator grant program was, in fact, a capacity-building program with a narrow focus on increasing an organization's effectiveness in a community-based "brokering" of watershed restoration activities. It can also be construed that this effort was in response to the fact that the need for land management organizations to conduct business collaboratively is historically a more recent development. As such, it is not unexpected that the capacity in this domain of many organizations might be under-developed.

Included in the 2004 call for watershed coordinator grant proposals was a specific capacity-building goal to "sustain the watershed coordinator position beyond the life of the grant…" (California Department of Conservation, n.d.). This was arguably the most ambitious element of the program, one that challenged grant recipient organizations to consider allocating the watershed coordinator "resource" such that it would become self-sustaining. Operationally, the question facing grantees was, *how much time should a watershed coordinator spend on non-project-related activities?* This is part of a larger question about capacity building in general: *What is the best strategy for making organizational capacity investments?* That is, where are the best "leverage points," the best places to intervene in a complex system where unintended and counter-intuitive consequences are possible, or even probable? ("Leverage Points," n.d.).

Answering these questions is beyond the scope of this study, as is a comprehensive assessment of the overall capacity of grant recipient organizations. Yet capacity was a recurring theme in

these case studies, albeit couched in language of *limiting factors*, the more proximal constraints on an organization's growth and performance such as knowledge, personnel, money, and time.[15]

Case studies in capacity

Three main lines of evidence emerged from case studies, each revealing the significance of organizational capacity in influencing the effectiveness of watershed coordinators: First, the effectiveness of watershed coordinators as well as the ability of a grant recipient organizations to sustain the tenure of watershed coordinators beyond the grant term appeared to be limited by its overall capacity. Generally, larger, more well-established organizations were more likely to retain coordinator positions beyond the grant term(s). Second, differences in overall capacity of organizations appear related to OCAT elements such as *Leadership, Staff and Volunteers* and *Funding*. Finally, grantees took diverse approaches in allocating their watershed coordinator "resource."

Most watershed coordinator grants were received by nonprofit organizations and Resource Conservation Districts (RCDs). However, there was no compelling evidence that successful outcomes in pursuing watershed improvement initiatives were related to the type of organization. Successes and challenges were experienced by all. However, the case studies provide evidence that the effectiveness of grant recipient organizations— through their watershed coordinators— was related to its overall capacity. For example, a capacity-building grant received by the Council for Watershed Health enabled it to develop internal capacity (primarily staffing) as well as external partnerships. It is believed that this was an important factor in their pursuit of funding, as they subsequently received a watershed coordinator grant and seven Statewide Watershed Program grants.

One scenario repeatedly observed was the significant difference in duties of watershed coordinators working in high-capacity organizations. The "luxury" of higher capacity organizations meant that coordinators could spend less time on internal capacity building efforts (e.g., grant writing) and more time conducting outreach and building public awareness, developing partnerships among stakeholder groups, and developing watershed projects and activities.

Paradoxically, in a few cases (RCD Santa Monica Mountains; Ojai Valley Land Conservancy) watershed coordinator work external to the organization garnered more than recognition and inspired capacity-building financial support from stakeholders across the watershed. The

[15] For more information the reader is referred existing models of organizational capacity such as *Organizational Capacity Assessment Tool 2.0* (OCAT) that is based on multiple case studies conducted by a major consulting firm ("Organizational Capacity Assessment Tool," n.d.). The tool measures 10 elements of an organization that make up its overall capacity (See Box 1 OCAT; Venture Philanthropy Partners, 2001). The elements are broadly conceived, for example, *Leadership, Staff, and Volunteers* would encompass both a watershed coordinator as well as the CEO.

watershed coordinator hired by the RCD of the Santa Monica Mountains focused on external work rather than internal capacity-building duties for the RCD, developing partnerships across the watershed, leveraging funds for projects, and building public awareness around water conservation. Through work with the community, the coordinator was able to secure financial support for the position from a combination of sources, thereby bridging a funding gap between granting cycles.

In cases of lower-capacity organizations, watershed coordinators devoted a larger proportion of their time to administrative duties, sometimes the majority of time. These duties included grant writing to support watershed projects, while other administrative efforts kept organizations afloat or infused new technical capabilities into the organization. Organizationally, this can be viewed as a capacity-building "success," particularly if it aligns with the DOC's goal to sustain the watershed coordinator position beyond the life of the grant. However, in lower-capacity organizations, a less than optimal outcome was observed. According to an overwhelming majority of interview informants, watershed coordination was invaluable but few grant recipients were able to procure stable and sufficient funding to maintain a full-time position beyond the term of watershed coordinator grant(s). A limited number of watershed coordinators were fully funded beyond the grant term, with the result that some organizations (Earth Resources Foundation, Battle Creek Watershed Conservancy) have either closed their doors or are less active since the loss of watershed coordinator funding.

The case studies suggest that decisions about how to allocate the watershed coordinator as a "resource" is a difficult one, particularly as there is a tradeoff between external achievements such as projects and stakeholder outreach, and capacity-building. The contrast between high- and low-capacity organizations suggest that there exists a minimum capacity that grant recipient organizations must have if they are to sustain watershed coordination beyond the term of the grant(s). Above this threshold of sustainability, or "tipping point," organizations may flourish, such as Tehama County RCD where the infusion of funds to support a watershed coordinator position led to a 10-year tenure. As one respondent described it, "Increasing the capacity of the RCD was what the watershed coordinator provided. We were able to increase in size and capabilities through the new grants and contracts that the coordinator made possible." According to another respondent, the watershed coordinator was instrumental in developing roughly $3 million in grant applications of which almost 70% were funded.

For organizations with capacities below the threshold of sustainability, the boost from watershed coordinator funds may only be temporary. After receiving a single watershed coordinator grant, one respondent associated with Shasta Valley RCD gloomily predicted that the organization will be "out of business" in two years after having "spent down the admin." As such, they can no longer afford to "chase grants." Likewise, the small but hardy Gualala River Watershed Council was unable to sustain its watershed coordinator following a single coordinator grant.

Organizational capacity summary

Evidence from the case studies portray the influence of at least four elements of organizational capacity, *Leadership, Staff, and Volunteers* and *Funding*. It is generally recognized that an organization's culture, values, leadership, and communication strategies also determine capacity and performance. However, in these case studies, no clear relationship emerged between grant-related outcomes (e.g., watershed coordinator achievements) and these variables (Cox et al., 2018) to the extent that they could be evaluated as a part of this study.

In retrospect, viewing watershed coordinator grants as selective capacity-building interventions allows some interesting insights. If future iterations of the WCGP intend to build the internal capacity of grantee organizations, then a *theory of change* may assure funders of a more enduring success. Such a theory would describe how an individual grantee organization plans to respond to the receipt of new assets, specifically how it will allocate a watershed coordinator's time internally versus externally. For an organization, high- or low-capacity, the "change" in its theory of change should provide a plausible rationale for its decisions about the critical tradeoff between increasing organizational capacity or bolstering project accomplishments. Both are valid pursuits in restoring and maintaining the health of the overall "ecosystem" of soft and green infrastructure.

Box 1. OCAT.

Box: OCAT

1. **Aspirations** - An organization's mission, vision, and overarching goals, which collectively articulate its common sense of purpose and direction
2. **Strategy** - The coherent set of actions and programs aimed at fulfilling the organization's overarching goals.
3 **Leadership, Staff and Volunteers** - The collective capabilities, experiences, potential and commitment of the organization's board, management team, staff, and volunteers.
4. **Funding** - The systems, individuals, and budgeting processes that ensure that an organization has enough financial resources to operate in a sustainable manner.
5.**Culture and Shared Values** - The connective tissue that binds together the organization, including shared values and practices, behavioral norms, and the level of the organization's performance orientation.
6. **Innovation and Adaptation** - The performance measures, information management systems, learning assessment loop mechanisms, and innovative practices that the organization has in place.
7. **Marketing and Communications** - The means through which an organization builds awareness of its cause and goals amongst its constituents and beyond.
8. **Advocacy** - (for advocacy-focused organizations).
9. **Business Processe**s - The organization's operational, risk-management, and decision-making processes that affect its ability to run successfully.
10. **Infrastructure and Organizational Structure** - The combination of governance, IT capabilities, physical infrastructure, organizational design, inter-functional coordination, and individual job descriptions that shape the organization's legal and management structure.

VI. Recommendations for Best Practices

Derived from case observations of the Watershed Program, recommendations from best practices for watershed initiatives are provided below, organized by *structural recommendations* and *institutional recommendations*. For the purpose of clarity, context is provided (numbered) and grouped by category; recommendations are italicized below the context.

Structural Recommendations

Programmatic structure

1. Objectives informed by multiple perspectives:

1.1 Inclusion of diverse perspectives was a hallmark of the CalFed Watershed Program and recognized by stakeholders as an essential practice for achieving program objectives.

> *To strengthen diverse stakeholder inclusion, we encourage granting agencies to provide leadership training and promote participatory learning through stakeholder analyses that are essential for understanding local issues upon entering planning and decision-making phases; if collaborative groups are beyond initial phases, stakeholder analysis work is still valuable for identifying gaps in stakeholder participation and improving stakeholder inclusion.*

1.2 The state's public investment in natural resource management increasingly supports and promotes activities directly related to increasing the pace and scale of forest health improvement projects.

> *With growing support for forest health improvement, we encourage programs to seize the opportunity to integrate forest and watershed communities to engage a broad range of stakeholders, including those not directly tied organizationally to forest management to advance landscape-level objectives.*

1.3 Underserved, underrepresented, and low capacity communities have been repeatedly overlooked in statewide watershed initiatives, resulting in negative impacts on watersheds and communities, slowed processes, and/or litigation.

> *Additional resources are needed to more thoughtfully engage underserved communities in water-related activities and to cultivate avenues for connecting available local resources with community needs.*

2. Technical and organizational assistance:

2.1 The Watershed Program Partnership Seminar, or "boot camp," convened watershed coordinators several times, offering access to in-depth knowledge, a shared history, a sense of belonging, and a common mission.

We recommend baseline training for prevalent watershed coordinator activities (e.g., facilitation and conflict resolution, grant writing and fundraising, communication and outreach, grant management) and specialized training for watershed coordinators to address specific challenges in the watershed and achieve a collective vision and specific project goals (e.g., GIS, permitting processes, stakeholder analysis).

By encouraging in-person coordination and cooperation with watershed coordinators in adjacent watersheds and, as appropriate, on regional and statewide levels, combined with use of online platforms, including webinars and dedicated social exchange platforms, watershed coordinators will enhance their capacity and skills to better serve their watershed.

3. Development of regional networks of watershed coordinators:

3.1 Multiple regions are isolated and lack organizational infrastructure for watershed coordinators to convene, resulting in social isolation and disjointed efforts from watershed-to-watershed. Where regional or statewide trainings or learning exchanges have been available, watershed coordinators have lauded the opportunity as beneficial and essential. The North Coast Watershed Coordinator Team demonstrated the value of maintaining a network of watershed coordinators.

We recommend that the granting agency provide opportunities for mentoring, exchanging information, and sharing resources through the establishment of regional networks of watershed coordinators with financial and technical assistance.

4. Grant management flexibility:

4.1 Indicators of success for watershed coordination do not perfectly align with indicators of improved watershed health due largely to the time lag for determining measurable outcomes. Measurable ecological impacts often stem from previous timely investments of watershed coordination efforts, including cultivation of partnerships, collaborative processes, and leveraged resources.

The granting agency needs to manage with flexibility in mind to allow for modifications in objectives and measuring outcomes (performance measures); embracing an adaptive approach and capturing of opportunities that emerge throughout coordinated process will allow for important organic and unanticipated outcomes to emerge.

Grant structure

5. Work plan flexibility:

5.1 Watersheds by nature are ecologically and socially dynamic. As such, the highest levels of effectiveness are achieved when watershed coordinators are able to match the dynamism of the watershed system and respond to issues adaptively and with flexibility.

> *Develop a balance between autonomy and narrow guidance, allowing for pursuit of multiple efforts, learning from failures, and opportunities that emerge outside the scope defined in an original work plan.*

6. Length of grant term:

6.1 This case study research along with previous research have illustrated the value of a long-term commitments to watershed collaboratives and, more specifically, watershed coordination (Leach & Sabatier, 2005).

> *Fund full-time coordinators to serve for a minimum of two years with the possibility of a two-year extension upon review.*

6.2 Specific terms should be made contingent on the existing capacity of the grant applicant. Some coordinators expressed that a longer term with part time coordination funding would be beneficial because the balance of part of the position could be funded with project specific work.

Institutional Recommendations

Integration with the current water management infrastructure

7. Integrated Regional Water Management (IRWM):

7.1 Both the cultivation of partnerships across a watershed and improvements in watershed health require time and investment. Nesting a watershed coordinator program within the current institutional setting will not only maximize efficiency and efficacy of programs, but will also allow for the expansion of existing efforts. Some IRWMs, however, lack outreach and coordination abilities to identify stakeholders and develop projects for those stakeholders to submit to the IRWM.

> *Maximize the flexibility of watershed coordinators to provide human, social, and cultural capital to IRWMs through coordinating efforts, facilitation, partnership building, leveraging resources, and involving stakeholders, including underserved communities.*

Watershed coordinators can and should work to bridge technical assistance and other gaps experienced by IRWMs in moving forward and the crosswalk between agencies (i.e., Department of Conservation and Department of Water Resources).

7.2 Overlap could mutually stabilize and further support IRWM, as well as watershed coordination, by leveraging resources and benefits of both programs for more effective outcomes. More specifically, the IRWM Disadvantaged Community Involvement Program is pursuing technical assistance for work in watersheds and communities with water-related needs. Watershed coordinators can help leverage resources and build partnerships to provide technical assistance.

Watershed coordinators should work to include stakeholders from each watershed through breaking down IRWM by watershed and helping to develop plans on a watershed scale.

8. Connections with state programs, conservancies, local efforts:

8.1 Local action and good coordination can lead to the establishment of broader stewardship objectives that have big implications—growing a population with a stewardship ethic that can translate to regional and even statewide action and policy support.

8.2 Stakeholders reported fewer redundancies of efforts and increased sharing of resources when partnerships were developed across a watershed.

Encourage watershed coordinators to work between state and local agencies to bridge gaps, take advantage of opportunities, and work with others to advance efficient resource sharing.

Investment in sustainable infrastructure

9. Institutional knowledge and lasting process:

9.1 California watershed councils and groups have declined following the 2008-2009 bond freeze, as well as with the end of the Watershed Program. Watershed councils were a vehicle for building public awareness of watershed health, as well as providing opportunities for the public to participate in watershed activities. Cultivating a culture of stewardship in the watershed can help reduce reliance on an individual (i.e., "program champions") and allow for continuity in light of watershed coordinator and/or volunteer turnover.

Establish a network of sustainably-funded, community-based watershed councils supported by the state and recognized by local governments.

9.2 Councils may be non-profit organizations, or may partner with other local and state organizations as fiscal partners, (e.g., Resource Conservation Districts). To

foster strong affiliations among California watershed councils, solicit existing organizations to serve as an umbrella membership network organization for watershed councils, e.g., the California Watershed Network, or the more ad hoc California Watershed Coalition. In addition to the advantages of sharing resources and knowledge, umbrella organization can also provide resources for watershed coordinators, including training, opportunities for knowledge exchange, and opportunities to cultivate a professional identity (e.g., establish commonly-held code of ethics, best practices, and minimum competencies for watershed coordinators).

VII. Conclusions

This study was an exploration of what worked and what did not work, and identification of lessons that can be learned from the CalFed Bay-Delta Watershed Program and the Department of Conservation (DOC) Watershed Coordinator Grant Program (WCGP). The purpose of the program was to elucidate new and creative approaches to watershed management. Through case study research of individual grants, this study dissected the complexities of measuring success and analyzed the social and hydrological diversities and other factors that impede or facilitate positive outcomes of watershed initiatives. In turn, this led to formulation of some "best practices," as well as structural and institutional enhancements to the program.

As a political orphan, the Statewide Watershed Program under DOC fared well with the residual funds left by CalFed. But after a major recession, a budget deficit, and a state bond freeze—and lacking a champion in government—the program ceased operation in 2014. Despite challenges in measuring the program's performance and fully integrating the eleven CalFed elements into program objectives, the watershed program sparked an "institutional evolution" with its investment in upper watersheds and broad scale launch of a watershed approach for resource management. The program's core characteristics, such as adaptive management and inclusivity, remain relevant and importance constituents in programs of this nature.

The two "branches" of the Watershed Program—Watershed Management Projects and Watershed Coordinator Grants—functioned as complementary thrusts in watersheds. Watershed Project Grants funded a range of activities in support of ecosystem restoration, water quality, water reliability, and levee system integrity. These activities included capacity building, project research and planning, watershed assessment, watershed management planning, large-scale monitoring and assessment, education, and implementation.

In contrast, Watershed Coordinator Grants were a "hybrid vehicle," with the twin missions of building local capacity for watershed groups and host organizations and catalyzing, or "brokering" watershed enhancements among many diverse constituents and stakeholders. Whereas a watershed project often had tangible goals and objectives (e.g., plans, monitoring data, sediment retained), watershed coordinators' roles and duties were focused more on changes in soft infrastructure, and less tangible activities like giving voice to community concerns, building community capacity, cultivating interest, driving efforts forward, bringing diverse interests to the table, and cultivating trust.

This study brought into focus the notion that as a valuable human resource, watershed coordinators should not work in a vacuum. Expectations of a coordinator are high, and the position requires multiple talents ranging from technical knowledge to the soft skills of social and emotional intelligence. One of the most common plaints heard from watershed coordinators involved social isolation from their peers. This was often coupled with praise for the intense, multi-faceted training they had received as part of a watershed "bootcamp." Often, watershed coordinators saw this and other opportunities for social networking as vital for their growth in the role, a place and time for information exchange, mentoring, and strengthening a budding professional identity.

The North Coast Watershed Coordinator Team was a grass-roots response to the unique needs of coordinators working in rural isolation, driven in part by the need to "coordinate" watershed restoration activities across the North Coast region to address coordinator isolation and to appeal to funders. One byproduct of this "banding together" was a "bonding together," where watershed coordinators encountered their professional peers in a setting that facilitated mentoring and learning. Some attributed their success in the role of watershed coordinator, at least in part, to their participation in the group's activities.

Understanding the multi-dimensional nature of success frames our assessment of the Watershed Program and identification of lessons learned. For case research, interviews with stakeholders were coupled with document analyses, which yielded a diverse array of perceptions of outcomes and lessons learned from the program. Two surveys, shaped by insights from stakeholder interviews, further clarified stakeholder perceptions of outcomes regarding what worked and what did not with watershed coordinator grants.

Processes initiated by the watershed coordinators and lauded by stakeholders include sharing information and establishing forums to address watershed issues, emboldened by characteristics exhibited by watershed coordinators—enthusiasm, commitment, ability to articulate a collective vision, and organization. As a result, relationships and trust among stakeholders, as well as participation of diverse stakeholders, strengthened over time.

Watershed coordinators performed markedly different duties, the result of a broad spectrum of roles they fulfilled, including administrator, champion, driver, connector and facilitator. The roles and approaches pursued by coordinators depended on the unique combination of community, watershed characteristics, skills of the watershed coordinator, and organizational capacity of the grant recipient. Watershed coordinators were also influential in determining who was to be part of *community-based strategies*, the approach proposed by the Watershed Program. By analyzing the status of potential stakeholders via outreach and engagement, watershed coordinators were entrusted with the vital task of deciding *who is invited into the process and who is not*.

Facilitation was provided by a number of watershed coordinators, involving a skillset, for some, supported by training in the Department of Conservation's "bootcamp." Stakeholders commended coordinators who demonstrated neutrality in facilitation, extolling the efforts as indispensable for maintaining diverse participation and creating an environment in which participants were willing and able to contribute to discussions and move toward a collective vision and action.

Watershed management is as much a social undertaking as it is ecological, and the effectiveness of restoration work and the longevity of outcomes are influenced by the people who initiate, implement, and interact with projects or efforts from their inception through completion and beyond. Assessing the effectiveness of watershed management work is complicated by different perceptions of success across citizen groups, professionals, and other stakeholders, each of whom value watersheds in distinct and diverse ways. In several cases, longevity of efforts languished with inadequate designation of responsible parties, financial resources, and volunteer capacity to maintain project work, further influencing perceptions of and on-the-ground success.

Challenges to sustain the longevity of watershed coordinator impacts persist, despite unwavering support for the concept of watershed coordination and the recognition of the invaluable contributions towards watershed health and community partnerships that exist across the state. In the world of watershed management, social landscapes parallel the complexity and dynamic nature of hydrologic systems with their varying demographics, degrees of resource accessibility (community capacity), and multi-dimensionality of project objectives. As such, identifying the *who* in the equation—who is involved, who makes decisions, who is affected, who benefits, and which institutions influence the way a project is executed— are necessary elements that determine the longevity of outcomes.

To most effectively advance the novel vision set in motion by the creators of the CalFed Watershed Program and DOC Watershed Coordinator program, we recommend greater investments in more thoughtful and inclusionary planning processes, including a rigorous stakeholder analysis that could preclude a late-stage clash of contrasting fundamental values, and encourage and incentivize the long-term stewardship of watershed resources by all stakeholder groups. The seeds have been sown by the state's initial investment in the Watershed Program. Now, increased investments in *soft infrastructure* are necessary to advance landscape-scale conversations that highlight forest-watershed connections in an era of anthropogenic climate change.

VIII. Case Studies

Table 8.1. Full List of Case Studies

Organization	Year	Grant Type	Project Title	Watershed	Award Amount	Hydrologic Region	Org Type	Rural/ Urban/ Mixed
City of Vacaville-Community Services Dept.	2000-2005	Project	Lagoon Valley Watershed Restoration	Lagoon Valley	$431,000	Sacramento River	Local Agency	urban
Los Angeles Department of Water and Power	2008-2015	Coordinator	The Woodman Avenue Multi-beneficial Stormwater Capture Project	Los Angeles River	$1,646,750	South Coast	Local Agency	urban
The River Project	2003-2008	Project	A Watershed Management Plan for Restoration Feasibility of the Tujunga Wash	Los Angeles River	$650,000	South Coast	Nonprofit	urban
Contra Costa RCD	2004-2007	Coordinator	Watershed Coordination for Alhmabra Creek	Suisun Bay	$188,730	San Francisco	RCD	urban
Contra Costa RCD	2003-2006	Project	Mt. Diablo Creek Watershed Coordinator Resource Management Planning Program	Suisun Bay	$277,117	San Francisco	RCD	urban
Sacramento Area Flood Control Agency	2004-2007	Coordinator	Watershed Coordination for Dry Creek	Dry Creek	$278,036	Sacramento River	Local Agency	urban
Sacramento Area Flood Control Agency	2003-2006	Project	Lower Amercian River Environmental Enhancement	Lower American River	$1,733,860	Sacramento River	Local Agency	urban
Earth Resource Foundation	2004-2007	Coordinator	Watershed Coordination for the Santa Ana Watershed	Santa Ana	$178,135	South Coast	Nonprofit	urban
Gualala River Watershed Council	2011-2014	Coordinator	Watershed Coordination for the Gualala-Salmon Watershed	Gualala-Salmon	$220,720	North Coast	Nonprofit	mixed
Ojai Valley Land Conservancy	2010-2014	Coordinator	Watershed Coordination for the Ventura River Watershed	Ventura River	$277,446	South Coast	Nonprofit	urban
Truckee River Watershed Council	2011-2014	Coordinator	Watershed Coordination for the Truckee River Watershed	Truckee River Watershed	$151,680	North Lahontan	Nonprofit	mixed

North Cal-Neva RCDC	2006-2009	Project	Pit River Alliance Watershed Management Strategy Development Program (Watershed Management Strategy)	Upper Pit River, Lower Pit River	$399,676	Sacramento River	Nonprofit	rural
North Cal-Neva RCDC	2001-2004	Project	Pit River Watershed Alliance Watershed Management Program (Watershed Assessment)	Upper Pit River	$542,456	Sacramento River	Nonprofit	rural
Tuolumne River Trust	2007-2010	Project	Clavey River Ecosystem Project	Clavey River	$256,140	San Joaquin River	Nonprofit	mixed
Tuolumne River Trust	2006-2009	Project	Tuolumne River Outdoor Classroom	Tuolumne River	$201,378	San Joaquin River	Nonprofit	mixed
Tuolumne River Trust	2003-2008	Project	Clavey River Watershed Assessment	Clavey River	$774,927	San Joaquin River	Nonprofit	mixed
Tuolumne River Trust	2000-2005	Project	Tuolumne River Initiative: Developing an Integrated Plan	Tuolumne River	$250,000	San Joaquin River	Nonprofit	mixed
Battle Creek Watershed Conservancy	2008-2012	Coordinator	Watershed Coordination for Battle Creek Watershed	Battle Creek	$194,653	Sacramento River	Nonprofit	rural
Battle Creek Watershed Conservancy	2004-2007	Coordinator	Watershed Coordination for Battle Creek Watershed	Battle Creek	$87,918	Sacramento River	Nonprofit	rural
Battle Creek Watershed Conservancy	2003-2008	Project	Battle Creek Watershed Stewardship	Battle Creek	$680,380	Sacramento River	Nonprofit	rural
Arroyo Seco Foundation	2012-2014	Coordinator	Watershed Coordination for the Arroyo Seco Watershed	Arroyo Seco	$274,029	South Coast	Nonprofit	urban
Arroyo Seco Foundation	2008-2011	Coordinator	Watershed Coordination for the Arroyo Seco Watershed	Arroyo Seco	$343,629	South Coast	Nonprofit	urban
Arroyo Seco Foundation	2004-2007	Coordinator	Watershed coordination for the Arroyo Seco Watershed	Arroyo Seco	$214,360	South Coast	Nonprofit	urban
Arroyo Seco Foundation	2005	Project	Arroyo Seco Watershed Sustainability Campaign	Arroyo Seco	$391,380	South Coast	Nonprofit	urban
San Joaquin County RCD	2008-2012	Coordinator	Mokelumne River Watershed Coordinator	Lower Mokelumne	$131,965	San Joaquin River	RCD	mixed

San Joaquin County RCD	2007-2010	Project	Continuing Education, Outreach, Restoration, and Monitoring in the Lower Mokelumne River	Lower Mokelumne	$890,655	San Joaquin River	RCD	mixed
San Joaquin County RCD	2004-2007	Coordinator	Mokelumne River Watershed Coordinator	Lower Mokelumne	$182,505	San Joaquin River	RCD	mixed
San Joaquin County RCD	2003-2007	Project	Lower Mokelumne River Stewardship Plan Implementation	Lower Mokelumne	$1,377,884	San Joaquin River	RCD	mixed
San Joaquin County RCD	2000-2003	Project	Murphy Creek Restoration Project	Murphy Creek	$282,500	San Joaquin River	RCD	mixed
Tehama County RCD	2011-2014	Coordinator	Cottonwood Creek Watershed Coordinator	Cottonwood Creek	$236,749	Sacramento River	RCD	rural
Tehama County RCD	2008-2012	Coordinator	Sacramento-Lower Thomes Watershed Coordinator	Thomes Creek – Sacramento River	$211,567	Sacramento River	RCD	rural
Tehama County RCD	2006-2010	Project	Tehama East Watershed Assessment	Antelope Creek, Pine Creek	$398,401	Sacramento River	RCD	rural
Tehama County RCD	2005-2010	Project	Tehama West Watershed Management Program	Thomes Creek, Elder Creek	$385,775	Sacramento River	RCD	rural
Tehama County RCD	2004-2007	Coordinator	Sacramento-Lower Thomes Watershed Coordinator	Thomes Creek-Sacramento River	$132,196	Sacramento River	RCD	rural
Tehama County RCD	2002-2006	Project	Tehama West Watershed Assessment	Thomes Creek, Elder Creek	$199,500	Sacramento River	RCD	rural
Council for Watershed Health	2011-2014	Coordinator	Watershed Coordination for the San Gabriel River Watershed	San Gabriel River	$927,582	South Coast	Nonprofit	urban
Council for Watershed Health	2008-2011	Coordinator	Watershed Coordination for the Los Angeles River Watershed	Los Angeles River	$683,768	South Coast	Nonprofit	urban
Council for Watershed Health	2007-2010	Project	Ecosystem Values of Watersheds in Southern California	Los Angeles and San Gabriel Rivers	$55,604	South Coast	Nonprofit	urban
Council for Watershed Health	2007-2010	Project	Sun Valley Neighborhood Retrofit Demonstration	Los Angeles River	$1,552,307	South Coast	Nonprofit	urban
Council for Watershed Health	2004-2007	Coordinator	Watershed Coordination for the Los Angeles and San Gabriel Watersheds	Los Angeles and San Gabriel Rivers	$133,693	South Coast	Nonprofit	urban

Council for Watershed Health	2000-2005	Project	Los Angeles and San Gabriel Rivers Watershed Council Organizational Development	Los Angeles River	$813,000	South Coast	Nonprofit	urban
Council for Watershed Health	2000-2005	Project	Study of Augmenting Groundwater Supplies Through Capture of Urban Runoff	Los Angeles River	$384,500	South Coast	Nonprofit	urban
RCD of the Santa Monica Mountains	2011-2014	Coordinator	Watershed Coordination for Malibu Creek and Topanga Creek	Malibu Creek, Topanga Creek	$155,949	South Coast	RCD	mixed
RCD of the Santa Monica Mountains	2004-2007	Coordinator	Watershed Coordination for Malibu Creek	Malibu Creek	$171,542	South Coast	RCD	mixed
El Dorado RCD	2007-2010	Project	Watershed Education Summit	South Fork American	$50,000	Sacramento River	RCD	mixed
Sacramento River Watershed Program	2003-2008	Project	Sacramento River Watershed Program- Program Support	Sacramento River Watershed	$298,782	Sacramento River	Nonprofit	mixed
City of El Cerrito	2003-2006	Project	Baxter Creek Gateway Restoration Project	Baxter Creek Watershed	$492,042	San Francisco	Local Agency	urban
Golden Gate National Park Conservancy	2008	Project	Revitalizing and Learning from the Tennessee Hollow	Tennessee Hollow	$1,039,000	San Francisco	Nonprofit	urban
Santa Cruz RCD		Coordinator	Watershed Coordination for the Pajaro	Pajaro	$295,354	Central Coast	RCD	mixed
Shasta Valley RCD	2011-2014	Coordinator	Watershed Coordination for the Shasta River Watershed and Upper Sacramento	Shasta River Watershed and Upper Sacramento	$178,135	Sacramento River	RCD	rural
Solano County Water Agency	2000-2001	Project	Lower Putah Creek Watershed Assessment and Stewardship Implementation Program	Lower Putah Creek	$600,000	Sacramento River	Local Agency	mixed
Solano County Water Agency	2002-2003	Project	Putah Creek - Yolo Housing Authority Project	Lower Putah Creek	$279,655	Sacramento River	Local Agency	mixed
Solano County Water Agency	2003-2004	Project	Community-Based Restoration of Lower Putah Creek Watershed	Lower Putah Creek	$992,236	Sacramento River	Local Agency	mixed
Solano County Water Agency	2007-2008	Project	Lower Putah Creek Winters Area Riparian Restoration Projects	Lower Putah Creek	$536,490	Sacramento River	Local Agency	mixed
Solano County Water Agency	2008-2009	Project	Lower Putah Creek Watershed Plan Priority Projects	Lower Putah Creek	$1,987,000	Sacramento River	Local Agency	mixed

Sonoma County RCD	2011-2014	Coordinator	Watershed Coordination	Petaluma	$298,782	San Francisco	RCD	mixed
Trinity County RCD	2008-2011	Coordinator	Watershed Coordination for the Trinity River	Trinity River Watershed	$234,175	North Coast	RCD	rural
Trinity County RCD	2011-2014	Coordinator	Watershed Coordination for the Gualala-Salmon Watershed	South Fork Trinity River	$259,861	North Coast	RCD	rural
Upper Putah Creek Stewardship	2007	Project	A Comprehensive Assessment of the Upper Putah Creek Watershed	Upper Putah Creek	$400,000	Sacramento River	Nonprofit	mixed

Case Study: Battle Creek Watershed Conservancy

Watershed: Battle Creek watershed
Researchers: Lauren Miller and Jonathan Kusel

Year	Grant Program	Project Title	Watershed	Award Amount
2003-2008	CalFed Watershed Program	Battle Creek Watershed Stewardship	Battle Creek	$680,380
2004-2007	Department of Conservation-Watershed Coordination Grant	Watershed Coordination for Battle Creek Watershed	Upper Cow-Battle Watershed	$87,918
2008-2012	Department of Conservation-Watershed Coordination Grant	Watershed Coordination for Battle Creek Watershed	Battle Creek/Upper Cow-Battle Watersheds	$194,653

This case study covers three grants received by the Battle Creek Watershed Conservancy (BCWC) for work in the Battle Creek Watershed. The findings of this research are based on interviews with stakeholders involved and a review of documents produced for the grants. Respondents are not identified for the purpose of confidentiality.

Battle Creek Watershed

The western slopes of Lassen Volcanic National Park are the headwaters for Battle Creek. The Battle Creek Watershed drains approximately 370 square miles of public and private land and flows into the Sacramento River. Small, unincorporated communities within the watershed include the towns of Manton, Mineral, and Viola. Battle Creek is known for high water quality and year-round, high-volume flows of water. Both of these characteristics are ideal for cold-water aquatic species such as anadromous salmon and steelhead. With approximately 250 miles of fish-bearing streams, the Battle Creek Watershed has been the focus of much investment from federal, state, and local agencies and organizations because it is one of the last major streams in California with naturally reproducing populations of steelhead and salmon. Most of the efforts have targeted issues of fish passage, sediment, and water temperature owing to the potential impacts each have on fish populations.

Organization & Grants

The BCWC is a volunteer, non-profit organization of property owners established in 1997 to ensure representation of watershed residents in planning and restoration activities of Battle Creek. The BCWC was formed to give stakeholders a voice during a time of much state and federal agency involvement and significant outside investment in the Battle Creek Watershed.

The Battle Creek Watershed Working Group (BCWWG), chaired by a watershed coordinator, was formed as a consortium of stakeholder organizations and federal and state agencies to monitor ongoing and proposed activities in the watershed, including the Battle Creek Salmon and Steelhead Restoration Project (Battle Creek Restoration Project) which specifically focuses on the restoration of approximately 48 miles of salmon and steelhead habitat. The Battle Creek Restoration Project involves the modification of Battle Creek Hydroelectric Project facilities, including removal of diversion dams; construction of fish screens and ladders; and, construction of powerhouse bypass and tailrace connectors to prevent the mixing of North Fork Battle Creek and South Battle Creek Fork waters. The Battle Creek Restoration Project also involves an increase to instream flows and includes adaptive management. The BCWWG was responsible for administrative logistics for conducting meetings and using consensus-based approaches. Related to the Battle Creek Restoration Project is the BCWC's overall goal to improve water quality and watershed conditions to support fish habitat.

The BCWC received one project grant, "Battle Creek Watershed Stewardship" in 2003 under the CalFed/California Bay Delta Authority and two Department of Conservation coordinator grants, one from 2004 to 2007 and a second from 2008 to 2012. The project grant promoted collaboration between BCWC and the Lassen National Forest. The purpose of the project grant was to reduce sediment through erosion mitigation and restoration of riparian habitats, as well as build capacity of the local landowners and resource agencies. Specific goals also involved long-term monitoring, securing technical scientific support, and implementing the Battle Creek Watershed Strategy.

The purpose of the coordinator grants included facilitation and coordination of on-going riparian restoration, sediment reduction, long-term monitoring, and wildfire planning and management projects. While the project and coordinator grants did not appear to overlap directly, participants working on the project grant did overlap at times with the watershed coordinator (e.g., BCWC and BCWWG meetings) and noted the importance of the coordinator position for facilitation among agencies, organizations, and local stakeholders. The position of watershed coordinator was created prior to the coordinator grant due to the initiation of the Battle Creek Restoration Project and the need to connect state and federal agencies working in the watershed to local landowners. The California Department of Fish and Wildlife (previously known as the California Department of Fish and Game), U.S. Fish and Wildlife and the Metropolitan Water District of Southern California (MWD) were a few of the agencies involved in exploring fish restoration opportunities in Battle Creek watershed prior to the CalFed Watershed program. Local stakeholders wanted to actively participate in decisions related to the work transpiring in their creek. To share information, receive input, and improve relations with the local stakeholders, the MWD provided some financial resources to fund the watershed coordinator position preceding the CalFed funding.

Project grant (2003-2004)

There were four major objectives of the "Battle Creek Watershed Stewardship" grant presented in the proposal, including: 1) continue to implement the Battle Creek Watershed Conservancy's Watershed Strategy and evaluate outcomes of previously implemented projects; 2) implement and monitor erosion reduction actions and restore riparian areas in the watershed; 3) design and implement a monitoring plan for stream conditions and water quality; and 4) provide community outreach and training about watershed processes, protection needs, and restoration opportunities.

The Battle Creek Watershed Stewardship collaboration with the U.S. Forest Service, Lassen National Forest enabled the BCWC to contract with the U.S. Forest Service for technical support for work in the upper Battle Creek Watershed. The Lassen National Forest was contracted to manage sediment reduction efforts in order to reduce the impacts of sediment in the stream on anadromous fish spawning habitat. The BCWC and Lassen National Forest independently monitored sediment levels in Battle Creek. Both groups found high levels of sediment related to erosion and sediment in the upper Battle Creek. Road improvement actions and road decommissioning were approaches used to address the sediment issue.

Project grant process and outcomes

The final report submitted to CalFed in 2008 divided the scope of the project into four slightly different goals with a major addition involving the production of a public investment document in order to evaluate all of the grants awarded. The outcomes of the grant are presented through findings from in-depth interviews with several of the people involved, as well as a review of final reports and deliverables. The public investment document was not used to evaluate these grants. The performance and success measures were not included in the final report for CalFed due to the extensive timeframe for expected outcomes.

The project grant began in 2003, with most of the grant used over a three-year period to contract the Lassen National Forest for implementation of the Battle Creek Watershed Stewardship project. The purpose of the project was to increase protection, implement restoration of stream conditions, and build capacity for landowners and resource agencies to manage watershed restoration efforts. Actions to reduce sediment in the stream included decommissioning road and skid trails, improvements in road crossings of streams, and restoration of riparian vegetation. Monitoring stream conditions was used as an opportunity to include the local community. The BCWC subcontracted with Terraqua, Inc., to create a stream condition monitoring plan with oversight provided by a Technical Advisory Committee consisting of Battle Creek landowners and residents, state and federal resource agencies, the grant manager, and other interested parties. Accomplishments included 18 miles of decommissioned roads, approximately two miles of road relocation, ten acres of decommissioned skid trails, roughly 13 improved road crossings of

streams, 12 miles of outsloped roads, and 16 acres of restored aspen riparian vegetation stands (BCWC Final Project Report submitted to CalFed, 2008).

Reduction of sediment levels and restoration of runoff patterns were considered some of the most significant outcomes of the project. Measurements pre- and post-project were taken. For the Panther Creek area, pre-project pool tail fines (sediment) levels were measured at 34%. By 2008 (following road decommissioning) the sediment decreased to 17%. To measure restoration of runoff patterns, measurements of pre and post-project erosion and channel extension were taken. Channel extension is a measure of the degree to which the natural channel network is increased by connecting road surfaces that deliver runoff during storm events. Significant reduction of erosion and channel extension were documented. Table I, Table II, and Table III in Appendix D provide the measured outcomes.

The Battle Creek Watershed Strategy implementation entailed restoring riparian areas and monitoring stream conditions and water quality. The objective of community outreach was also indirectly addressed as part of the Battle Creek Watershed Strategy through community participation in the Technical Advisory Committee overseeing the monitoring of the stream.

From one informant's perspective, several local landowners participated in the project by attending community meetings held by the BCWC, but the meetings were not well attended except for those "with a financial stake." However, another informant praised the landowners who did participate and suggested why participation rates may have been low by stating:

> "Anytime we are talking about small resource-based communities like Manton, land use and water use are a really big deal. I give credit for the success in developing this process to the people that lived there. Many stepped forward, took the risks that are involved with being a member of a small community, talking about change and land and water use in a small community, it's pretty brave folks."

This informant suggested that in a small community with a natural resource-based economy, speaking out is not an easy undertaking, as participants typically want to avoid tension or conflict with their neighbors.

Finally, the technical work with the Lassen National Forest and Terraqua, Inc. involved a watershed inventory, monitoring, and review. The work conducted by the Lassen National Forest and Terraqua was communicated to landowners by the watershed coordinator at board meetings and the BCWC membership meetings. The watershed coordinator created an avenue for public discussion regarding the watershed projects. In addition, the overlap with the project and coordinator grants allowed the coordinator to help landowners access information and, in so doing, gave voice to locals concerning the projects.

Watershed coordinator grants

The position of watershed coordinator was funded prior to the Department of Conservation's Watershed Coordinator Grant Program. The coordinator position lasted from the late 1990s until the end of the second coordinator grant in 2012. The same watershed coordinator remained throughout and continued to volunteer with the BCWC and the BCWWG following the end of the final coordinator grant. Throughout these years "the coordinator was a main pillar for the community to engage and especially important for these types of projects with the sheer amount of restoration that needed to be done."

The investment in the coordinator and associated process gave the community a powerful voice for over a decade and provided a forum for expression of diverse interests (e.g., local stakeholders, state agencies, federal agencies). Through engagement over an extensive period, and with outreach and education facilitated by the coordinator, common ground could be found. Good will was established between locals and agencies working in the watershed. Additionally, the coordinator expanded his/her role beyond the BCWWG and took on other community leadership roles at a landscape level bridging fire management and the work of fire councils with stakeholders involved in the BCWWG. As coordinator of the Manton Fire Safe Council, the watershed coordinator worked on various fire prevention, fuels reduction, and education projects in the watershed. The watershed coordinator also participated on the Tehama-Glenn Fire Safe Council. With the Ponderosa fire, the importance of fire management and the impacts fire has on the watershed were apparent. Through the watershed coordinator's participation with groups across the watershed, the coordinator acted as a key linkage among various organizations to coordinate a landscape level understanding and approach to management.

Coordinator grant (2004-2007)

The goal of the 2004-2007 watershed coordinator grant was to implement 1) the revised Battle Creek Watershed Community Strategy; 2) the stream condition monitoring plan (a shared objective with the CalFed Battle Creek Watershed Stewardship project); and 3) the Battle Creek Restoration Project. Additionally, the watershed coordinator expanded upon his/her role through initiating, funding, and implementing projects related to fire safety and management, as well as continued connecting the local community with the resource agencies working on the restoration project.

Coordinator grant process and outcomes

The watershed coordinator, in collaboration with the BCWC Board, revised and updated the BCWC Community Strategy (Strategy) and distributed the Strategy to BCWC members and

others. This Strategy is informed by discussion from a number of community meetings between 1997 and 1999. Best management practices for landowners in the watershed are presented, as well as a framework for Battle Creek watershed restoration and education activities. Around this time, the U.S Fish and Wildlife Service had initiated the Anadromous Fish Restoration Program and recognized the utility of the BCWC Community Strategy framework for including local watershed groups, improving relations between landowners and agencies, and increasing restoration efforts.

One of the major projects the watershed coordinator facilitated is the project grant, mentioned above, which was ongoing through 2008. This grant supported stream condition monitoring as one of its components. This grant also involved watershed improvement work by partnering with the Lassen National Forest in the upper watershed and the aforementioned stream-monitoring program. Multiple informants stressed the importance of a watershed coordinator in the partnership between Lassen National Forest and BCWC, as one informant stated:

> "The work of the watershed coordinator was important, if not essential to making the Stewardship project work. This was a partnership, with funding coming to the BCWC. There were some very substantial administrative requirements that needed to be worked out with the USFS, in terms of bonding, billing, and reimbursement. If a coordinator had not been in place, I do not think the project would have been possible. The partnerships were instrumental in Deer, Mill and Butte Creek watersheds as well in obtaining USFS and other funding for restoration work. Partnerships did a lot of good in airing differences, agreeing on work to be done, and explaining needs. They were also a source of matching funds, which made projects more competitive for other funds. The point is: no coordinator, most likely no partnership, and less funds for restoration work."

The coordinator also facilitated communication among community members, state, and federal agencies involved in the CalFed Battle Creek Restoration Project for over a decade. To share information and create a platform for communication between stakeholders, the watershed coordinator, with input from partners and stakeholders, updated the BCWC website. As the largest salmon and steelhead restoration project in California, transparency and information-sharing, practiced by the BCWWG with the encouragement of the coordinator, were vital for keeping the project proceeding, as indicated by one stakeholder:

> "It wouldn't have worked without the coordinator. We were on the eve of having to walk away. The BCWWG with a coordinator acted as a forum for compromise providing a structured way to identify and prioritize issues through time by participants. Without the coordinator, we wouldn't have had the BCWWG."

The Battle Creek Restoration Project is being managed by the U.S. Bureau of Reclamation in collaboration with partners U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Wildlife, and Pacific Gas and Electric Company. One consultant identified two lasting outcomes of the Battle Creek Restoration Project: 1) good will between locals and agencies and 2) the project is still moving forward and, once complete, will include 48 miles of habitat for salmon and steelhead to re-occupy.

The BCWC was suggested by one key informant as a model for how to achieve environmental restoration with the involvement of local communities. The coordination and bringing together of all of the agencies with the locals for watershed stewardship and restoration "deserves all of the credit and lasting effects." While the coordinator was not directly involved in the day-to-day activities with the Battle Creek Restoration Project, the coordinator provided a vital link by gathering input and sharing information between stakeholder, including the BCWC, resource agencies and partners.

Coordinator grant (2008-2012)

The second coordinator grant continued to advance the goals pursued in the 2004-2007 coordinator grant received (2004-2007). The coordinator continued to organize and facilitate the various projects in the watershed and provide information to the local community regarding the long-term Battel Creek Restoration Project. The specific goals for the second coordinator grant include: 1) facilitate and coordinate collaborative restoration projects that advance stream, meadow or riparian restoration and the treatment of sediment sources in upper Battle Creek; 2) coordinate the funding and annual implementation of long-term monitoring of stream conditions; 3) coordinate wildfire planning and management; 4) coordinate technical and scientific support for BCWC and watershed constituents; and 5) implement the Battle Creek Watershed Strategy to sustain the BCWC's core programs (DOC Watershed Coordinator Grant Program, 2007).

Coordinator grant process and outcomes

The role of the coordinator continued to be a convener between the local stakeholders and resource agencies. Designing and managing a website as a hub for information sharing on watershed projects proved to be a major accomplishment of this second coordinator grant. The watershed coordinator also continued to coordinate and facilitate the Manton Fire Safe Council to reduce fuels and promote fire safety, which is another component of protecting watershed health. Additionally, the watershed coordinator facilitated and coordinated presentations by the BCWC Science Advisor to the BCWC Board and the BCWWG.

Key Findings

While the project grant and coordinator grant did not appear to directly relate during a preliminary review of the available grant documents, following interviews with stakeholders involved, it became clear that the presence of a watershed coordinator affected the project grant. Through facilitation of the BCWC and BCWWG meetings, the coordinator created a forum for various stakeholders to communicate, share ideas, gain a better understanding, and participate in the work being conducted in their watershed. The watershed coordinator also assisted in keeping the group and project on track by managing any issues that emerged through facilitating dialogue and engaging with necessary parties to address and find solutions to challenges. The watershed coordinator was a hub for information sharing between landowners in the watershed and technical experts working on-the-ground to accomplish project goals. Finally, there is considerable reporting, monitoring, tracking, and validation of expenses with grant administration. The watershed coordinator managed all these tasks for the BCWC, which helped make the partnership work, and also provided BCWC capacity to administer the grant.

Role of a watershed coordinator

For the BCWC, an organization primarily consisting of volunteers, the watershed coordinator acted as a catalyst in developing projects in the planning stage and then moving projects from planning to implementation. The watershed coordinator connected projects to landscape-level approaches, rather than individual "piecemeal" and sometime reactive projects. Several informants, who worked on the project grant, believed conservancies with direction and encouragement provided by the watershed coordinator were the reason restoration and educational activities in the watershed were successful. The coordinator grant created opportunities for collaboration between the BCWC and government agencies, resulting in groups sharing funds for projects that BCWC could apply for that the agencies could not. The partnership enabled technical work to be accomplished for the project grant. Furthermore, a contractor hired for technical work mentioned how the contracting was kept local and as a result, the project grant helped small local businesses. "A lot of individuals locally benefited rather than huge companies." This helped build relationships between local landowners and state and federal agencies.

Providing a voice, developing trust

While the project grant focused specifically on sediment reduction and had discernible performance measures, the coordinator grant had less obvious performance measures, but did lay the foundation for a successful project grant. The coordinator grant provided capacity to pursue funding opportunities and facilitated an environment in which landowners in the community could develop a trusting relationship with agencies working in their watershed. The development

of trust ensured lasting collaboration among these various groups. While quantifiable measures of "success" are difficult to identify for the coordinator grant, qualitative success is clear: the watershed coordinator created a cohesive, functional working group. Informants perceived the coordinator grant as "invaluable" in giving a voice to the community: "Battle Creek Watershed residents had access to leaders of the community that were involved in the Working Group and the Working Group gave them a voice."

The BCWWG and the BCWC gave community members an opportunity to participate and better understand the decisions being made in their watershed. Landowner participation in the BCWWG meetings allowed for work to be carried out in the watershed, and helped avoid a litigious approach to conflict. The meetings facilitated by the watershed coordinator provided for critical information sharing and communication among the various stakeholders, and addressing conflicts that may have evolved. The approach taken by the watershed coordinator echoes an important component encouraged by the CalFed Watershed Program and expressed by one informant, "before the grants are pursued, you make sure you have willing landowners." One of the major roles of a watershed coordinator is outreach to and education of stakeholders in the watershed.

When funding ended, the watershed coordinator continued to volunteer for several months until it was no longer possible to continue. A void was left when the watershed coordinator was no longer funded. "The Department of Conservation investment was crucial" stated one respondent, as many volunteer groups in watersheds do not have the fiscal capacity to support a watershed coordinator. A lesson that extends beyond this case is when the coordination funding ceased, many watershed groups folded. The watershed coordinator links stakeholders together. With the loss of a watershed coordinator, a gap is created and the community may not be included in watershed projects, significantly reducing the capacity of the organization. Informants are looking for other mechanisms to support watershed coordination in order to prevent more local watershed groups from closing their doors and to continue the collaborative approaches to restoration and advancing watershed health promoted by the watershed coordinator.

Appendix A. Methods

One researcher traveled to Greenville and Quincy, and two researchers traveled to Sacramento to conduct three in-person interviews. Four other interviews were conducted over the phone. Interview participants included representation from the BCWC, BCWWG, U.S. Forest Service (Lassen and Plumas National Forests), U.S. Bureau of Reclamation, Terraqua Consulting Inc., California Department of Fish and Wildlife, and Metropolitan Water District of Southern California. Researchers reviewed all available documents related to the grants.

Appendix B. Interview Participants

Representatives from:

BCWC
BCWWG
U.S. Forest Service (Lassen and Plumas National Forests)
U.S. Bureau of Reclamation
Terraqua Consulting Inc.
California Department of Fish and Wildlife
Metropolitan Water District of Southern California

Appendix C. Available Grant Documents

Battle Creek Watershed Council	Individual Grant Proposal	Catalogued Description	Annual Update(s)	Individual Final Report	Catalogued Report	Other	
Project (2003-2008)		x		x		x	Lassen National Forest Service Report
Coordinator (2004-2007)			x	x	x		
Coordinator (2008-2012)	x			x	x		

Appendix D. Results

Table I. Pre and post Sediment Monitoring Results from Panther Creek

Pool Tail Fines (%)			**% particles <2mm**		
Pre	2007	2008	Pre	2007	2008
34	Dry	17	5	2	4.7

Table II. Estimates of Pre and Post Project Road Erosion

Sub-Watershed	Erosion Source (Cubic Yards)				
	Rill/Gully		Surface		Channel Diversion
	Pre	Post	Pre	Post	Post (avoided)
Onion	40	0.1	6.1	1.3	670
Panther	3	0.1	2.2	0.4	1574
Martin	69.9	16.6	4.8	0.8	1063
Nanny	80.5	0.4	57.7	23.4	3519
Summit	12.2	1.1	8.3	1.7	175
Total	205.6	18.3	79.1	27.6	7001

Table III. Estimates of Pre and Post Activity Channel Extension

Sub-Watershed	Natural Channel Length (mi)	Channel Extension			
		Miles		Percent[16]	
		Pre	Post	Pre	Post
Onion	8.2	0.7	0.1	8.7	1.3
Panther	13.9	0.3	0.1	1.9	0.5
Martin	14.2	1.0	0.2	7.2	1.3
Nanny	11.9	2.4	0.1	19.9	0.4
Summit	4.97	0.5	0.3	9.3	7.0

[16] Percent Channel Extension is the natural stream (miles) + road extension (miles)/natural stream (miles)

Case Study: City of El Cerrito

Watershed: Baxter Creek watershed
Authors: Kaily Bourg and Lauren Miller

Year	Grant Program	Project Title	Watershed	Award Amount
2003-2006	CalFed Watershed Program	Baxter Creek Gateway Restoration Project	Baxter Creek	$492,042

This case study involves an assessment of a single project grant received by the City of El Cerrito. Findings of this research are based on interviews with stakeholders involved and a review of documents associated with the grants.

Overview

In 1999, the City of El Cerrito and other partners commenced rehabilitation of a 1.64-acre degraded railroad property into a gateway park that would extend the Ohlone Greenway[17] and restore a 750-feet segment of Baxter Creek. A $350,000 California Coastal Conservancy grant combined with $97,400 from the City of El Cerrito enabled the city to purchase the adjacent creek property from Burlington Northern Railway Company in 2003. Design, construction, and other restoration elements of the site were completed in 2006 and funded by a CalFed watershed grant of $492,042. An additional $288,000 was allocated from the City of El Cerrito Redevelopment Agency to install remaining park elements such as lighting and trail development. Key partners in the conception, development and implementation of the Baxter Creek Gateway Restoration project (Gateway project) included: Friends of Baxter Creek (FOBC), City of El Cerrito, Restoration Design Group (RDG), The Watershed Project, and Hanford Applied Restoration and Conservation (Hanford ARC).

Baxter Creek Watershed

Baxter Creek watershed lies within the greater San Francisco Bay watershed and drains a highly urbanized, mostly impervious landscape in west Contra Costa County. The watershed consists of

[17] The Ohlone Greenway is a pedestrian and bicycle path that begins in Berkeley, runs through Albany and El Cerrito, and ceases at Richmond. Presently, multiple newly proposed and planned projects will link the Ohlone to the Richmond Greenway, ultimately connecting to the 400 Mile Bay Trail system. Formerly a Santa Fe Railroad right-of-way and named to honor the Ohlone indigenous tribe that historically inhabited the region, the Ohlone Greenway has become an important transportation corridor and recreational setting for residents of the East San Francisco Bay area. The Baxter Creek Gateway project forged linkage to the Richmond Greenway and provided a connection to a high-traffic Bay Area Rapid Transportation (BART) station. Source: City of El Cerrito Ohlone Greenway Master Plan, 2009. Retrieved from: http://www.el-cerrito.org/DocumentCenter/Home/View/644

three creeks that join downstream of the Gateway Project and eventually flow into the San Francisco Bay. Its headwaters originate in underground springs beneath the Mira Vista Golf Course in the El Cerrito and Richmond hills. With urban expansion, most of Baxter Creek was channelized or redirected into underground culverts. Stakeholder-identified issues concerning watershed health include reduced vegetative cover, limited biodiversity, decreased habitat value, non-point source pollution, and compromised water quality. The Gateway Park project site lies between San Pablo Avenue and Key Boulevard at Conlon Street. The urban context of the project site is exemplified by adjacent commercial development and the overhead Bay Area Rapid Transit (BART) stainless steel commuter rail system. Separate from the Gateway Park, Baxter Creek has four additional public access points at Mira Vista Park, Poinsett Park, Canyon Trail, and Booker T. Anderson.

Background

Catalyzed by a daylighting project at Poinsett Avenue[18] conceived in 1994, residents in El Cerrito and Richmond pushed for more restoration projects along Baxter Creek with the intention to improve watershed conditions, extend the Ohlone Greenway, and create safe public creek access points. Combined with desire for increased creek restoration, the Gateway project grew out of community concern over El Cerrito's proposed expansion of an adjacent shopping center onto the site. In 1995, two local residents distributed hand-written letters inviting interested neighbors to meet at the "field" to discuss a vision that would transform the space into a park with a functioning stream. The few people that met became the Friends of Baxter Creek (FOBC), and for multiple years the group actively opposed the expansion plan and voiced concerns at city council meetings. Advocates for the restoration project pushed for a multi-purpose park that would both improve the ecological and environmental conditions of the watershed and establish a park that provides a safe corridor for pedestrian and bicycle transportation, recreation, and public creek access.

The City of El Cerrito's resistance to the project eventually shifted when two newly hired city employees "began to listen" and directed resources to support the FOBC's vision for the Gateway project. As a result of outreach by FOBC and new support from city staff, El Cerrito rezoned the property in 1999 from commercial to open space, and using grant funds from California Coastal Conservancy, the city purchased the property outright from the Burlington Northern Railway Company in 2003. Once the site was purchased, the city working with FOBC secured a CalFed grant to fund the restoration design and construction of the Gateway project.

[18] The Poinsett Avenue project was conceived in 1994 over citizen discontent over the City of El Cerrito's removal of a degraded culvert on a median strip. The City of El Cerrito proposed two methods of addressing the V-shaped ditch that was left behind: replace the culvert or restore the stream to an open channel. Baxter Creek was daylighted on Poinsett Avenue in 1996. Successful outcomes and widespread support of the project set the stage for later daylighting and greenway projects along Baxter Creek. This project was part of FOBC cofounder's Master's thesis for the restoration design program at San Francisco University (Riley, 2016).

Baxter Creek Gateway Project

Gateway project planners and supporters envisioned a "natural park"[19] that incorporated a balance of ecological and urban park elements, such as improved riparian habitat, recreation, water quality, public safety and access, aesthetics, flood damage reduction, and environmental education. Summarized across four goals, intentions of the CalFed grant were: 1) restore and maintain a stretch of Baxter Creek to improve wildlife habitat and water quality and to reduce impacts of flooding; 2) build the community's capacity to maintain the Baxter Creek site; 3) encourage stewardship through watershed-wide programs for education and outreach, monitoring, and maintenance; and 4) integrate infrastructure along Baxter Creek that supports education, participation, and training for restoration activities (Final report submitted to CalFed, 2006).

Outcomes and process

In first few years following construction, performance of the Baxter Creek Gateway Project fulfilled a number of anticipated outcomes: a public park that promoted community-ownership and provided educational infrastructure, a stream corridor that both mitigated local flooding issues and contributed to improved water quality, and increased public use of the recreational and transportation green corridor. The revitalized 750-feet "ditched" creek into a 950-feet meandering stream combined with newly established native riparian and oak-grassland plant communities contributed to improved ecological functions of Baxter Creek, encapsulated by noticeable increases in wildlife and biodiversity in the immediate park area, reductions in local flooding and storm runoff, and improvement in water quality measures (Final report submitted to CalFed, 2006). From a social standpoint, linkage to the larger regional trail system and integration of park features on the site contributed to increased daily users, opportunities for public education, awareness of watershed related issues, and a network of similar restoration projects inspired along Baxter Creek.

Following the purchase of the railroad property in 2003, RDG, the contracted design group, facilitated a celebratory "Community Design Meeting." The 40-50 participants that attended were divided into subgroups and given a base plan of the site along with a craft kit and the mission to create models of the Gateway project. The curated models included a mix of elements that addressed geomorphic improvement of the creek and public park development. The subgroups presented their designs to the full meeting group and voted on desirable features. The meeting opened dialogue between the project designers and community, and created opportunity

[19] The "natural park" concept balances public access and recreational use, native species habitat support, and aesthetic elements. The concept contrasts many urban park settings that contain manicured features such as vast green lawns, picnic areas, and playgrounds. (Maintenance & Management Guide, 2006)

for the designers to incorporate elements of the community's vision in a design plan. Informants noted that some essential features, such as a seating plaza at the pathways' intersection, would not have been included without public involvement. The meeting also established an avenue for educating community members on elements of a natural park including discussions about the ecological functions fulfilled though native plant integration. The final design incorporated community-desired elements into a functional stream corridor, including park features such as a tree-lined sidewalk, elevated walls for seating and congregation, wheel chair ramps, a bike rack, boulder-lined stairs, interpretive signage, a community kiosk, and a civic plaza.

Preceding construction, the City of El Cerrito issued a "Notification of Adjoining Landowners" to all residents within 300 feet of the project and other interested stakeholders. The memo included notice of a 30-day public review period for comment on the restoration plans, and attached was an invitation to a kick-off celebration at the project site in 2006 (Final report submitted to CalFed, 2006). The kick-off celebration engaged participants in site tours and offered information about upcoming volunteer opportunities and other family activities. Outreach activities through the remainder of the design and construction processes were executed by Gateway project partner, The Watershed Project.[20] To fulfill educational programming and outreach requirements of the CalFed grant, the City of El Cerrito contracted The Watershed Project to maintain an open information network with the public, circulating information like project updates and upcoming volunteer opportunities. Beyond satisfying basic education and outreach requirements, The Watershed Project assigned a watershed coordinator to engage with and nurture relations with members of FOBC and other interested public. As part of educational outreach, the coordinator organized a five-evening workshop series focused on how to address non-point source pollution with better management of home landscapes and gardens, held two workshops focused on creek restoration techniques for interested volunteers, and presented at local schools to increase watershed awareness among students. In addition to encouraging volunteer participation, the coordinator issued electronic updates, newsletters, postcards, flyers, and information pamphlets to the public to maintain open dialogue.

Post construction, the coordinator recruited and trained a volunteer group to participate in the Baxter Creek Monitoring Program. The monitoring program focused on measuring water quality and habitat effectiveness through collection of various biophysical parameters as well as photo-documentation before, during, and post construction. A Maintenance and Management Working

[20] The Watershed Project serves the San Francisco Bay Area watersheds through a number of programs that "inspire communities to understand, appreciate and protect local watersheds." In their Capacity Building program, The Watershed Project supports grassroots groups through fiscal sponsorship or consulting grants to aid in a variety of capacity building services such as strategic planning, volunteer recruitment, and technical training. Through their grassroots startup framework, The Watershed Project contracts services to grassroots groups and projects that need assistance with components like visioning and master planning, community outreach, partnership building, and fundraising strategies. In the Gateway project, The Watershed Project provided structure and staff for outreach, education, and monitoring. Source: information retrieved from http://thewatershedproject.org/capacity-building/

Group also formed under coordination of The Watershed Project. Members of the Working group included FOBC and other volunteers, as well as representatives from RDG, The Watershed Project, and City of El Cerrito. In collaboration with Urban Creeks Council, the group composed a "Maintenance and Management Guide" to serve as a tool for coordinating immediate and long-term maintenance activities. Stakeholders noted that the Maintenance and Management Guide is no longer regularly used to maintain the site; however, it remains available for referencing maintenance-related activities.

Following construction completion and ongoing today, the City of El Cerrito assumes long-term maintenance responsibilities for the Gateway Park and coordinates a monthly volunteer group to participate in general cleanup and weeding activities. Coordination of a monthly volunteer group is an outcome considered unique by multiple stakeholders. However, despite ongoing maintenance and monthly volunteer efforts, in recent years, the site has been confronted with challenges concerning safety, water contamination, homeless encampments, and vandalism—issues similar to those that catalyzed the project's conception in 1995.

Some controversy lingers among stakeholders particularly around discussions of willow integration in urban stream restoration sites. Willow integration is not only the most commonly used native species for riparian restoration in watershed projects across the state, but as some stakeholders noted, it also mandated by the regional water board. Some stakeholders advocate that willows are absolutely fundamental to restoring riparian health. Others note that matured willows may compromise sightlines with their low-lying branches, and thus contribute to increased homeless encampments, increased use of riparian zone for dumping of trash and human fecal matter, illegal activity, and consequently, increased safety concerns. Additionally, such activities may impact water quality by contamination through trash and introduction of biohazards into the waterway.

Key Findings

Processes executed in the Baxter Creek Gateway Project offer lessons that can inform discussion and planning around small-scale urban restoration projects. As learned from the Gateway project and with goals commonly focused on addressing platforms of environmental and social needs, urban restoration projects necessitate careful delineation of process steps while considering long-term impacts on ecology in variable urban, social settings. Critical process steps identified in the Gateway project through stakeholder interviews address: active community involvement and education of watershed-related issues, thoughtful selection of project elements with consideration of site location and community needs, and foresight regarding challenges and biophysical impacts associated with ongoing human use of the site.

Positive outcomes seen in the Gateway project are in part a result of strong initiation and good process leading up to implementation. The Gateway project was completely community-initiated, with two strong leaders of FOBC consistently pushing and informing to encourage participation from other neighbors and secure support from the City of El Cerrito. As seen in the Gateway project, community initiation may contribute to a sense of community-ownership over the shared public space. Developing a sense of community-ownership becomes an important factor following a project's completion, when sufficient maintenance may hinge on volunteer commitments. To reinforce the concept of community-ownership in the Gateway project, community members were involved in every phase of the project, beginning with RDG's facilitation of the highly interactive and well-attended "Community Design Meeting." Stakeholders emphasized the importance and benefit of the meeting, including factors like integration of community ideas into the project design and a dialog that promoted adaptive and shared learning flowing between both parties. Beyond the initial design meeting, the watershed coordinator, who was contracted with The Watershed Project, nurtured and increased community participation through consistent communication regarding project updates and upcoming watershed celebrations, volunteer workday events, and presentations at local schools. Stakeholder sentiments reflect great appreciation for the aforementioned contributions, provided through watershed coordination, to increasing the organizational and technical capacity of FOBC during the Gateway project's implementation years.

In regard to challenges associated with maintenance, stakeholders fear that the recurrence of issues, such as illegal dumping and camping, counters the longevity and effectiveness of the achieved outcomes as well as continual community and "tax payer" support of similar restoration projects. Stakeholder discussions around mitigating such issues stem back to design plans, specifically the reassessment of elements that are prone to vandalism and impair sightlines. Most stakeholders agree that improved (vandal-proof) or fewer interpretive signs and structures may result in less vandalism of park elements. Changes regarding sightline concerns are more contentious, however, as they clash at the nexus of ecology, urban restoration, and social issues. It is at this nexus where the perceived success of the project differs among the entities that are engaged (e.g., city personnel, project initiators, project designers, local residents, daily park users), as there is some variance in which elements and outcomes of the project are valued most among different entities.

In highlighting the sightline issue dealing with willow planting, differing perspectives necessitates that project planners should carefully consider the variable contexts of urban restoration projects and associated social needs. Many stakeholders agree that exploration of alternative species that serve similar ecological functions may be a worthy path forward. One stakeholder reflected that when an "urban focus on ecology comes at the expense of successful urban restoration, you fail from an ecological standpoint and a social standpoint." This sentiment underscores the need for adaptive and inclusive planning at the conception of urban restoration

project, with design and maintenance plans that strongly consider a healthy balance of social needs and ecological values in urban settings.

Appendix A: Methods

This case study is based on six stakeholder interviews and a review of grant documents provided by the Department of Conservation and the City of El Cerrito. Two researchers visited El Cerrito and Berkeley to conduct five in-person interviews; one interview was conducted over the phone. See Appendix B for a list of interview participants. Interviews were recorded by handwritten notes and synthesized into this case study report. The site visit was part of a three-day trip to the San Francisco Bay region, where the two researchers conducted interviews for three cases.

Appendix B: Interview Participants

One or multiple representatives from each of the following:

City of El Cerrito
Friends of Baxter Creek
The Watershed Project
Restoration Design Group

Appendix D: Available Grant Documents and References

City of El Cerrito	Grant Proposal (Submitted to granting agency)	Quarterly or Annual Update(s)	Final Report (Submitted to granting agency)	Catalogued Description (Published by granting agency)	Catalogued Final Report (Published by granting agency)	Other
Baxter Creek Gateway Restoration Project			X	X		X

References

Maintenance & Management Guide for the Baxter Creek Gateway Restoration Project. (2006). Retrieved from http://www.el-cerrito.org/DocumentCenter/View/4104.

Riley, Ann L. (2016). *Restoring Neighborhood Streams: Planning, Design, and Construction.* Island Press/Center for Resource Economics.

Case Study: Council for Watershed Health

Watersheds: Los Angeles River and San Gabriel River watersheds
Researchers: Lauren Miller and Kaily Bourg

Year	Grant Program	Project Title	Watershed	Grant Amount Awarded	Matched Funding Amount
2004-2007	Department of Conservation-Watershed Coordination Grant	Watershed coordination for the Los Angeles and San Gabriel Watersheds	Los Angeles/ San Gabriel Watersheds	$249,854	$133,693
2008-2012	Department of Conservation-Watershed Coordination Grant	Watershed coordination for the Los Angeles and San Gabriel Watersheds	Los Angeles River Watershed	$274,631	$683,768
2011-2014	Department of Conservation-Watershed Coordination Grant	Watershed coordination for the San Gabriel River	San Gabriel River	$294,658	$927,582
2000-2005	CalFed Watershed Program	Los Angeles and San Gabriel Rivers Watershed Council Organizational Development	Los Angeles, San Gabriel River	$288,000	$813,000
2000-2005	CalFed Watershed Program	Study of Augmenting Groundwater Supplies Through Capture of Urban Runoff	Los Angeles, San Gabriel River	$971,800	$384,500
2007-2010	CalFed Watershed Program	Ecosystem Values of Watersheds in Southern California	Los Angeles River; San Gabriel River	$391,994	$55,604
2007-2010	CalFed Watershed Program	Sun Valley Neighborhood Retrofit Demonstration	Los Angeles River	$859,952	$1,552,307

This case study assesses seven grants received by the Council for Watershed Health for work in the Los Angeles and San Gabriel River Watersheds. The findings of this research are based on interviews with stakeholders involved in processes covered by the grants, as well as a review of documents associated with the grants.

Los Angeles and San Gabriel River Watersheds

The Los Angeles River Watershed is 824 square miles in size with approximately 500 square miles of heavily developed areas. The river's headwaters originate in the Santa Monica, Santa Susana, and San Gabriel Mountains, stretching 55 miles through the San Fernando Valley to Long Beach where it joins the Pacific Ocean. Highly developed residential and commercial areas make up the San Fernando Valley. Major tributaries to the river in this segment are the Pacoima Wash, Tujunga Wash, Burbank Western Channel, and Verdugo Wash. While much of the river is concrete-lined, a soft-bottomed segment remains in Sepulveda Flood Control Basin, a 2,150-acre area in the San Fernando Valley designed to collect flood waters during storms. A rocky, unlined

bottom remains in the Glendale Narrows, the section of the river that is publicly used for hiking, horseback riding, and bird watching, and
runs through Griffith and Elysian Parks. South of the Glendale Narrows, major tributaries to the Los Angeles River include the Arroyo Seco, the Rio Hondo, and Compton Creek. From its confluence with the Arroyo Seco to the Pacific, the Los Angeles River is surrounded by residential, commercial, and industrial infrastructure including rail yards, freeways, government and commercial buildings, and major refineries and petroleum products storage facilities. Water quality in the middle and lower watershed are impaired due to the density of urban activities and high levels of pollutants associated with stormwater runoff.

The San Gabriel River Watershed is in southeastern side of Los Angeles County and is 689 square miles in area. The River's source begins in the San Gabriel Mountains and extends to Long Beach where it joins the Pacific Ocean. The San Gabriel River is hydraulically connected to the Los Angeles River by the Whittier Narrows Reservoir. Much of the upper portion of the watershed contains undisturbed riparian and woodland habitats within the Angeles National Forest and San Gabriel Mountains National Monument. The East and West forks of the San Gabriel are heavily used by recreationists. The river is concrete-lined in the lower, urbanized portion of the watershed. Water quality in the middle and lower watershed is impaired due to high levels of residential and commercial activities, as well as the presence of several landfills.

Organization & Grants

Previously known as the Los Angeles and San Gabriel Rivers Watershed Council, the nonprofit changed its name to the Council for Watershed Health in July 2011. The mission of the organization is to advance the sustainability of the region's watersheds, rivers, stream and habitat through science-based research, education, and inclusive stakeholder engagement. Founded in 1996, the organization provides leadership, guidance, and technical assistance to agencies and organizations to promote sound watershed planning and management practice.

The Council for Watershed Health received four project grants and three coordination grants throughout the course of the CalFed Statewide Watershed Program. The four project grants (two in 2000 and two in 2007) were used to build organizational capacity, develop partnerships, and assess best management practices for stormwater capture and groundwater infiltration systems. In addition to the support for the watershed project grants, the Council for Watershed Health received three coordination grants (2004-2007; 2008-2012; 2011-2014) enabling the organization to maintain a watershed coordinator for ten consecutive years. Several grants overlapped, providing financial support to develop projects from conception through implementation. Project grants piloted best management practices and monitored on-the-ground impacts, which in turn, paralleled workshops hosted by watershed coordination funding.

Project Grant (2000)- Organizational Development

One of the project grants received in 2000 funded the "Los Angeles and San Gabriel Rivers Watershed Council Organizational Development" project. Although the grant was awarded as a project grant, the funding supported staff for the purposes of expanding community and organizational capacity to manage the watershed. The idea was to transition from voluntary staff to sponsoring a full-time professional to develop in-house capacity. Hired staff could foster a collaborative network by establishing partnerships and assisting in the development of the organization, advancement of projects, and creating long-term fiscal support for Council for Watershed Health staff.

To qualify for the CalFed grant, the group had to demonstrate how project outcomes would positively impact the Bay-Delta Region, which in turn, shaped project goals. Goals included: 1) managing the watershed for sustainable economic vitality, environmental health, and sustainability; 2) assisting communities in efficient water use; 3) restoring wildlife habitats; 4) improving water quality to support recreation; 5) maintaining outreach efforts; and 6) establishing an ongoing relationship with the CalFed watershed program.

Project process and outcomes

The framing of this project grant was similar to a coordinator grant and set the stage for 10 years of Department of Conservation coordination funding, enabling the Council for Watershed Health to increase outreach, technical capabilities, and funding support. The funding augmented staff salaries based on the amount of time devoted to CalFed Watershed Program activities. One distinction from the coordinator grants is that these funds were divided among numerous staff positions with portions allocated to the executive director, office manager, and staff positions for outreach services and technical support.

Staff supported by CalFed funds conducted outreach efforts to engage with the public at monthly stakeholder meetings and quarterly newsletters. Through their outreach efforts, the Council for Watershed Health formed partnerships with other organizations and expanded information sharing networks with the Lower Los Angeles Rivers and Mountains Conservancy and the Los Angeles County of Public Works. In collaboration with the Los Angeles Regional Water Quality Control Board, the Council for Watershed Health held a workshop on stream restoration. The Council for Watershed Health increased their network of partners through participation in the California Watershed Council Workgroup meetings and the California Watershed Network Forum. Outreach efforts led to long-term partnerships with communities, organizations, and agencies working in the Los Angeles and San Gabriel Rivers Watersheds.
Building organizational capacity was a principle component of grant funding. The grant enabled an expansion of technical capabilities and specifically information systems of the Council for

Watershed Health through the development of a website, equipment and software upgrades, as well as improvement of the organization's Geographic Information System (GIS) capabilities. The website was developed as an outreach and information sharing tool with general topics to reach a wider audience. The grant helped fund a GIS specialist who created base materials for generating map products. The grant also provided financial support for the Council for Watershed Health to enhance their resource collection, refine their accounting system, develop an accounting policy and procedure manual, as well as prepare proposals for additional grant support.

The CalFed grant allowed the Council for Watershed Health to increase their organizational capacity that in turn helped the nonprofit develop other funding opportunities, both from local agencies and from other grant programs. The grant increased awareness and recognition of the capabilities of the organization, as well as the role of the Council for Watershed Health in the watershed as a collaborator, organizer, information hub, and facilitator. While many of the goals presented in the grant were achieved, there were shortfalls in producing publications, an outcome described in grant objectives.

Project Grant (2000)- Augmenting Groundwater Supplies & Project Grant (2007)-Sun Valley Neighborhood Retrofit Demonstration

A second project grant received by the Council for Watershed Health in 2000 funded the "Study of Augmenting Groundwater Supplies through Capture of Urban Runoff" project. This grant laid the foundation for the overall Los Angeles Basin Water Augmentation Study (WAS) in which the Council for Watershed Health researchers tested and established water infiltration solutions that not only increase supplies of water, but also reduce water quality impacts from urban runoff. The project culminated with the 2007 "Sun Valley Neighborhood Retrofit Demonstration" project. The demonstration project directly emerged from the research stage of this project. These two grants are discussed together.

The purpose of the 2000 CalFed grant was to conduct a preliminary feasibility study of capturing urban stormwater to increase groundwater supplies. Objectives of this grant were: 1) assess water quality implications of infiltrated urban runoff; 2) assess effectiveness of various infiltration BMPs in reducing pollutants; 3) quantify the amount of stormwater that could be secured; and 4) develop an implementation plan to deploy infiltration devices in appropriate locations, and guidelines for sustainability.

The 2007 CalFed grant aimed to demonstrate an integrated, comprehensive approach to resource management through a retrofit of Elmer Avenue, a residential street. The project utilized BMPs to manage runoff, pollution reduction, and flooding, while also promoting water conservation and urban wildlife habitat enhancement.

Project process and outcomes

The Council for Watershed Health initiated the Water Augmentation Study for the purposes of capturing water, improving surface pollution issues, mitigating flooding, and augmenting water supplies. In addition to the CalFed grant, funding was provided by larger water entities, including the Metropolitan Water District (MWD) and the Los Angeles Department of Water and Power (LADWP). Funding supported the Council for Watershed Health to implement multiple phases of research to understand pollution trends and the relationship between urban water infiltration and soil and water quality. This led to the installation of 5 BMPs on various land uses with different methods of infiltration to increase demonstration project variety and monitor several methods (e.g., trench drains, bioswales, and underground infiltration galleries).

Phase I was initiated in 2000 with monitoring a retrofit of "Hall House," a residential site, with the intention of retaining all stormwater onsite. The Hall House project was implemented by TreePeople, a partner non-profit, using other funds. Following two years of monitoring the Hall House pilot, several sites were added for monitoring purposes with Proposition 50 and Proposition 15 funds in 2003. Additional pilot sites included retrofits for the IMAX (commercial in Santa Monica) and Broadous School in Pacoima. The Council for Watershed Health installed the monitoring equipment for the pilot sites, as part of the first phase of the CalFed grants. The final phase of the project was in part funded by the 2007 CalFed project grant for the Sun Valley demonstration project, a retrofit of Elmer Avenue. Throughout the phased work, the project manager contracted Geomatrix for site assessment and soil monitoring. A technical advisory committee (TAC) oversaw the project, consisting representatives from Metropolitan Water District, the California Department of Water Resources, the City of Santa Monica, Los Angeles County Department of Public Works, United States Department of Interior Bureau of Reclamation, the Los Angeles Department of Water and Power, the Water Replenishment District of Southern California and the State Water Resources Control Board.[21] Two additional nonprofits, TreePeople and Urban Semillas, were contracted by the Council for Watershed Health for the retrofit. The project manager for the Augmentation Study acted as a liaison with the TAC and provided needed outreach and consultation to the community. Through outreach and consultation efforts, residents became more involved with the project, and trust was built among the various stakeholders. Several informants agreed that this was "a model story." Criteria used to select demonstration project sites included an area: 1) that could accomplish good infiltration; 2) with a larger volume of water on the street; and 3) that is mostly owner occupied. Three places were identified that fit these criteria and staff went door to door knocking

[21] Funding for the Elmer Avenue project was provided by the U.S. Department of Interior Bureau of Reclamation and California Department of Water Resources (Prop 50). Additional funding and match support were provided by the Los Angeles City Bureau of Sanitation, the Los Angeles City Bureau Street Services, the Los Angeles City Bureau of Street Lighting, the Los Angeles Department of Water and Power, the Los Angeles Department of Water and Power, the Los Angeles County Department of Public Works, the Metropolitan Water District of Southern California, the Water Replenishment District of Southern California, Dr. Bowman Cutter (UCR/Pomona College), Tree People, the University of California Riverside, and the City of Santa Monica Environmental Programs Division.

in the neighborhoods. According to informants, the vast majority of Elmer Avenue community residents were receptive, enthusiastic, and because they community had previous experience in coordinated efforts, almost immediately jumped on board with the whole idea.

While the Elmer Avenue site stands as a demonstration project, maintenance beyond the lifespan of the project is an ongoing concern for some informants, though this concern is not universal. The concern relates to the residents' ability to maintain the system, as bond funding does not cover on-the ground maintenance and upkeep. Residents were charged with these responsibilities. The community is predominately low-income and lacks the financial capacity for repairs. This highlights an environmental justice situation in defining if bioswales are considered water infrastructure and who should be held financially responsible for maintenance. To help ameliorate some of the concerns, the Council for Watershed Health contracted with TreePeople to provide workshops for maintenance and upkeep for residents. Without financial assistance, these workshops built technical capacity for the community to be able to care for the new forms of vegetation and bioswales. Several informants noted the extraordinary participation from community members and viewed the community as a strong partner. Following the completion of the project, the community supported many tours of the site as Elmer Avenue became a demonstration project for water capture and infiltration systems in Los Angeles. However, this does not address the conceivable future financial burdens of repairs.

Succeeding project completion and ribbon-cutting, extensive monitoring to provide information on several best management practices (BMPs), the impact of the project on the community, and data on what is needed in an urban landscape to support a healthy watershed. Monitoring was extensive until funding became sparse. According to participants, Elmer Avenue was the first of its kind in terms of a water capture system as part of a multi-beneficial stormwater project in Los Angeles. Lessons learned from the project influenced later work with Los Angeles native plants, including the creation of a plant palette. The palette was negotiated between the watershed coordinator and architects with the City of Los Angeles. Through research they worked to identify the heartiest and most resilient native plants. This is a key point of overlap between the watershed coordinator grants and the project grant, as the coordinator was involved in developing materials and carrying out trainings for landscape retrofit maintenance and native plant care.

In August 2014, the Sun Valley Multi-Benefit Project received the Envision Platinum award that included the Elmer Avenue project. The award is a nationwide third-party verification and award program that recognizes projects that have achieved higher levels of sustainability. Envision sustainability uses five categories to measure infrastructure projects: quality of life, leadership, natural world, resource allocation, and climate and risk, which all contribute to the scoring of the project's social, economic, and environmental impacts in a community in planning, design, and construction phases of projects. The Los Angeles County Board of Supervisors accepted the

award on behalf of the entire project team. The multi-beneficial nature of the project consisted of flood protection, improved watershed health, increased open space and recreational opportunities, and increased habitat for wildlife.

According to the Institute for Sustainable Infrastructure, the Los Angeles County Public Works Director, Gail Farber, views the success of this endeavor as "the county's most comprehensive effort to date to include watershed management and sustainability principles into Public Works' horizontal infrastructure projects. The evaluation of this project by the industry's leading sustainability rating system has allowed Public Works to benchmark the plan and showcase the County's ongoing commitment to sustainable practices."[22]

Project Grant (2007)- Ecosystem Values of Watersheds in Southern California

In 2007, the Council for Watershed Health received a grant to support a project "Ecosystem Values of Watersheds in Southern California." Documentation for this project grant cycle is limited. Informants identified grant objectives and outcomes. According to informants, the goal of the grant was to create a watershed assessment framework to be utilized in measuring and reporting on the ecosystem and socio-economic benefits and conditions in southern California watersheds. This tool could have provided a structure for evaluating the success of CalFed investment in water management plans.

Project process and outcomes

As a collaborative process, faculty from the University of California Los Angeles, the University of Southern California, the University of California at Davis, as well as employees of the Forest Service participated in the project, as did staff of the California Office of Environmental Health Hazard Assessment. The starting point for the project was developing a basic understanding of how to define and measure watershed health. Research was conducted to compile a meta-review to understand the extent of which these questions have been explored and documented in previous studies. The Chesapeake Bay Program and Sacramento River Watershed Program were assessed, as these programs were grappling with similar questions.

Arroyo Seco watershed was the pilot for the development of a report card. The report card consisted of a suite of indicators and measurements to determine the condition of the watershed. Owing to the small size of the Arroyo Seco compared with the Los Angeles River watershed, the group determined Arroyo Seco to be a more tractable pilot study.
Outcomes include what one informant described as "neat stuff," but overall a difficult project. This same informant explained, "We were run over by reality in asserting that big goals can be measured by small indicators. However, we were also the first people asking about working at a

[22] https://sustainableinfrastructure.org/envision/project-awards/sun-valley-watershed/

watershed scale." Owing to the challenge of capturing an extensive number of relevant variables in a standardized report card, stakeholders considered the urban context a complicating factor. In terms of "success" the group admittedly did not reach their aspirations as the process proved to be demanding due to the complexity of assessing all aspects of watershed health. The research did yield "Southern California Watershed Assessment Framework," an ecological, economic, and social health assessment framework, piloted with the Arroyo Seco River watershed.

Following the end of the grant, the working group received a grant from the Environmental Protection Agency to build on the work conducted for the Arroyo Seco report card and expand to other watersheds such as the Los Angeles River Watershed. Following the first EPA grant, the working group counted on receiving a second follow-on grant from the EPA to complete the work, but the EPA went in a different direction with their next grant cycle. The working group was unable to complete the project due to lack of funding.

The meta-study proved to be more than they bargained for but valuable from a learning standpoint. Lessons learned from the project include a realization that there are important characteristics in a watershed that may be challenging to measure, but are worthwhile to include to lay the foundation for determining and achieving watershed objectives, such as social structure and relationships. The social structure and relationships within a watershed-community can impact the success and/or failure of watershed initiatives; the watershed-community can also experience the benefits and/or shortcomings of work in the watershed (e.g. improvements in water quality and quantity, maintenance of projects, restoration work on public and private land). One stakeholder emphasized the importance of avoiding the fallacy that "if you don't measure it, you can't change it."

Watershed Coordination Grants

The Council for Watershed Health received three successive watershed coordination grants for the Los Angeles River and San Gabriel River watersheds (2004-2007; 2008-2011; 2011-2014). The goals of all three coordination grants focused on sustainable landscape practices and low impact development. One watershed coordinator pursued the objectives related to sustainable landscape for 10 years. A second watershed coordinator joined for several years (2011-2014) with a slightly different role and different funding, focusing on the Compton Creek Watershed, initiating a Compton Creek Watershed Management Plan and Steering Committee, attending watershed-related meetings across the lower Los Angeles watershed and sharing information and updates among stakeholders.

Watershed Coordination (2004-2007)

The first watershed coordination grant aimed "to develop and promulgate a program that highlights both the water conservation and ecosystem restoration benefits of sustainable landscape practices" in the Los Angeles and San Gabriel watersheds. The Department of Conservation granted $249,854 in coordination funding. The watershed coordinator received 54% additional financial support from the state, totaling to $133,693.

Process and outcomes

Prior to applying for the DOC Watershed Coordination grant, the Council for Watershed Health formed a Landscape and Ethic Committee with participants from the California Native Plant Society, Rancho Santa Ana Botanic Garden, Metropolitan Water District, TreePeople, North East Trees, the Rivers and Mountains Conservancy, and the Los Angeles Unified School District, among other organizations. The voluntary committee included both board members and non-board members of the Council for Watershed Health. The purpose of the committee was to promote sustainable landscaping initiatives. As the Landscape and Ethics Committee (Committee) was developing, the watershed coordinator grant opportunity emerged. The Committee needed staff support and accordingly the Council for Watershed Health applied for and received a watershed coordinator grant that was used to hire a staff person for the sustainable landscape effort.

The Committee initially concentrated on policy development for sustainable landscapes. However, upon the arrival of the watershed coordinator and following the guidance of the committee, the coordinator shifted the focus away from policy and towards educational efforts. While the Committee set the direction, one former committee member stated, "The watershed coordination maintained a level of autonomy." Educational efforts consisted of some informative projects for the general public, with the bulk of the efforts focused on educational programs targeting professionals. According to one informant, owing to the abundance of nonprofits working in the area, the focus of the Council for Watershed Health geared their efforts towards professionals, a targeted group that lacked access to low impact development/sustainable landscape professional and continuing education programs.

The watershed coordinator developed a website and database for native landscaping species recommendations known as the Plant Profiler.[23] To promote the functionality of the website, the watershed coordinator gave presentations, building awareness of the tool. The site is still active and is a resource used by landscape architects, biologists, and planners for ecological restoration and landscaping in the watershed. With additional funding from the California Department of

[23] The Plant Profiler. (n.d.). Retrieved June 08, 2017, from http://www.theplantprofiler.com/

Food & Agriculture, the watershed coordinator also developed WeedWatch, another information-sharing and outreach effort. WeedWatch increased awareness of invasive species and included a poster and wallet card with a list of the "Terrible Ten" invasive plants. WeedWatch material is still being distributed. With the help of the watershed coordinator, the Metropolitan Water District overhauled the agency's plant list for landscape projects, removing invasive species and high-water use vegetation, and replacing these with native plants. Lastly, the watershed coordinator published a SAFE Landscapes calendar and guidebook to provide tips and create a better understanding of invasive species.

The watershed coordinator planned and organized both on-the-ground demonstration workshops, as well as informative landscape seminars. One on-the-ground project presented native and water-efficient plant landscaping at Griffith Observatory. The coordinator organized five landscape seminars catering to landscape designers, builders, architects, and planners. For the seminars designed for professionals, experts presented on the most up-to-date innovations with sustainable landscaping techniques and native vegetation. Without continuing education programs in the landscaping profession, the seminars provided the latest tools and techniques for watershed-friendly landscaping and water conservation techniques for over 160 professional participants during this grant cycle. Sustainable Landscape seminars have continued with over 1000 participants learning best practices, policy updates, and participating in site tours. Prior to the seminars, awareness of native plants among landscape professional was low and there were no native plant nurseries in the area. Complimenting this effort, the watershed coordinator co-developed a Native Seed Resources Program, providing native plant seeds to growers for watershed restoration, landscape development, and to help sustain populations of native plants.

Reflecting on these efforts, stakeholders observed a transformation in the perception of landscaping professionals and from little consideration of watershed implications to a more pervasive understanding of water management and native plants in landscaping. Native plant nurseries have emerged and are an ongoing effort, as obtaining native plants in large quantities remains a challenge for large landscape projects. Additionally, disparate groups were brought together creating a community of landscape planners and architects that did not previously exist.

Watershed Coordination (2008-2011)

The Council for Watershed Health received a second watershed coordination grant (2008-2011) for continued work on water conservation and sustainable landscaping. Specific grant objectives included: 1) increase the use of native and water efficient plants with the adoption of policies and landscape ordinances by local jurisdictions; 2) augment the availability of local native plants appropriate for habitat restoration and river adjacent landscaping initiatives; 3) reduce the use of invasive plants that degrade wildlife habitat, water quality and supply; 4) educate and inspire groups such as master gardeners, garden opinion leaders, landscape and garden design, build and

maintenance professionals and public officials; 5) collaborate and coordinators with other watershed organizations to support the development of regional programs; 6) share our high quality water use efficiency and ecosystem restoration materials; and 7) develop funding opportunities to sustain watershed efforts in the region. The Department of Conservation granted $274,631 for this round of coordination grant funding. The watershed coordinator raised $683,768 in additional funding for projects in the watershed. Work focused on the Los Angeles watershed during this round of funding.

Process and outcomes

The second coordination grant (2008-2011) leveraged on the successes of the first coordination grant (2004-2007) received by the Council for Watershed Health. Sustainable landscape seminars continued, with ten additional seminars held during this grant cycle. Local water supply and reliability of water supply were two additional topics covered by the seminars. Over 500 professionals participated in the seminars with 90% of 586 seminar participants' surveyed stating "they would work to improve their water use efficiency by implementing some of the landscape design and maintenance practices they learned about during the workshop." The Landscape Ethics Committee continued to meet and provide guidance to the watershed coordinator during thirty meetings with agencies and organizations.

In addition to professional seminars, the watershed coordinator partnered with the County of Los Angeles to develop the Drought Tolerant Landscape Ordinance resulting in 34 cities in the county updating their own landscape ordinances for more sustainable practices. Following a similar theme, the watershed coordination worked with the Los Angeles Unified School District to assist in the repeal and replacement of the District's Approved Plant List, with a list of drought tolerant plants. Finally, the watershed coordinator partnered with the City of Los Angeles to train 50 of their employees, as well as participants from the North East Trees on sustainable landscape practices and maintenance.

Taking a landscape level approach, the watershed coordinator addressed the relationship between fire and watershed health. In 2009 there was a devastating fire, the Station Fire, at the San Gabriel Mountains Station. The watershed coordinator held a symposium on post-fire natural resource conservation and recovery challenges with 132 participants. With matching funds from the National Park Service, the watershed coordinator increased fire awareness by distributing 48,000 sustainable and fire landscape calendars and guidebooks.

The watershed coordinator assumed various roles and partnered with numerous organizations to improve the use of drought tolerant plants and invasive plant management. The coordinator was chair of the Los Angeles County Weed Management Area (WMA) group that administered an invasive species management program, distributing ten small grants for weed control. Part of the

program included a community lending program for weed control tools, development and distribution of literature on the benefits of weed removal, and replanting with water efficient plants. Working with the City of Los Angeles Green Gardener Program, the watershed coordinator assisted in curricula development to train 120 gardeners in water use efficiency and the benefits of ecosystem restoration. Other water use efficiency endeavors included a partnership with the County of Los Angeles Parks and Recreation Department to develop a recycled and reclaimed water forum.

Watershed Coordination (2011-2014)

The final coordination grant received by the Council for Watershed Health maintained the overarching goals of promoting sustainable landscaping, yet also expanding into a few additional realms as demonstrated by the extensive list of objectives. These included: 1) promote the adoption by cities of low impact development (LID) ordinances and related standards; 2) increase the amount of local water supply by increasing storm water infiltration through decentralized strategies; 3) acquire funding and create partnerships that will upgrade existing storm water drains; 4) acquire funding and create partnerships that will upgrade existing storm water control infrastructure to improve water quality, including trash separation devices and low flow diversion systems; 5) promote water quality improvement projects identified through previous DOC watershed coordination and the IRWM groups; 6) improve water quality through reducing non-point discharges from nurseries, irrigated agriculture, and open space lands; 7) teach landscape professionals best management practices for designing, installing, and maintaining low water use landscapes; 8) encourage municipalities to adopt land-use policies that protect open space and affect the development of open space lands in the watershed; 9) identify and prioritize parcels for land acquisition throughout the watershed; 10) encourage private land trusts and public agencies to collaborate closely on strategies to increase protected open space lands; 11) initiate watershed management plans where they have not been completed; 12) remove invasive, non-native plant species from riparian and wetland habitat; 13) reduce the demand for and purchases of invasive, non-native plants by landscapers and residents; 14) leverage DOC funding by collaborating with watershed coordinators around the region to support the development of regional programs with a goal of improving quality water use efficiency and ecosystem restoration materials; 15) communicate the results of this project to demonstrate the value of sustained funding for watershed coordination.

For this final coordination grant, two coordinators worked part-time with the Council for Watershed Health in the San Gabriel watershed. The watershed coordinator that was hired for the first two grants (water coordinator 1) remained and continued to work on sustainable landscaping. The second watershed coordinator (watershed coordinator 2) worked to develop relationships and partnerships with other groups in the watershed.

Watershed coordinator 1 continued the sustainable landscape and low impact development seminars, reaching over 300 participants during this grant period. Related to the continued efforts, the watershed coordinator aided in the development of the Native Seed Resource Coalition. The coordinator developed partnerships with the Los Angeles City Engineering, the National Park Service, the California State Parks to build a cooperative nursey network to provide local native plants to support community-based restoration projects in the watershed. Additionally, the watershed coordinator developed a symposium on sediment management in the Los Angeles Basin allowing for the public, and agencies, like the Los Angeles County Department of Public Works, to learn about sustainable sediment management plans in the region. Approximately 100 water agencies and public work personnel participated in this event. Due to the 2009 Station Fire and 2010-2011 winter of heavy precipitation, large volumes of sediment entered flood-controlled areas and water conservation infrastructure, sparking more stakeholder interest.

Watershed coordinator 2 attended watershed meetings throughout the San Gabriel River Watershed. By sharing information from one meeting to another, the watershed coordinator worked to raise awareness among groups of on-going watershed activities. An informant discussed how watershed activities remained in silos, with many organizations working in the watershed separately. The coordinator worked to break down these silos to create partnerships and encourage multi-purpose projects. For example, according to one informant, the county was planning bike trails and the city was planning a park in the same vicinity simultaneously, but without knowledge of the other project. Watershed coordinator 2 connected these two parties, which led to a joint, multi-beneficial project.

Other projects either highlighted by a coordinator or contained within a final report include: involvement in the City of El Monte's MS4 Permit compliance; distribution of an annual landscaping lightly calendar to homeowners; the development of a landscaping lightly workshop held at the Los Angeles County Arboretum with 310 participants; development and distribution of a water efficiency blog and e-newsletter; coordination of twelve quarterly Los Angeles Weed Management Area meetings; and support for disadvantaged community outreach efforts. The list of endeavors undertaken by the watershed coordinators is exhaustive, paralleling the extensive list of objectives for the third coordination grant.

Key Findings

Major outcomes from overall efforts supported by the CalFed Watershed Program include: widespread adoption of low-impact development/sustainable landscaping, development of a model for water augmentation/stormwater capture projects, increased organizational capacity for the Council for Watershed Health, and the establishment of a strong collaborative network of stakeholders in the San Gabriel watershed.

Organizational capacity & grant overlap

The Council for Watershed Health received a preliminary grant to foster organizational capacity and "establish an ongoing relationship with the CalFed Watershed Program." Demonstrated by the seven grants received by the organization, the Council for Watershed Health was highly successful in developing a lasting relationship with the Watershed Program, acquiring over $3.3 million in grant funding from the CalFed program, as well as over $4.5 million in additional matching funds from a number of state agencies for watershed improvement projects.

The two grants received in 2000, the *Los Angeles and San Gabriel Rivers Watershed Council Organizational Development* and the *Study of Augmenting Groundwater Supplied Through Capture of Urban Runoff*, were both foundational for the organization. One grant was specifically dedicated to developing the capacity of the organization, enabling the Council for Watershed Health to build technical capabilities, conduct outreach to stakeholders, establish partnerships with other organizations and agencies, and prepare proposals for additional grant support. As a direct result of the grant, the organization became increasingly recognized for its capabilities as a collaborator, organizer, information-sharing hub, and facilitator. The organization was able to augment its funding opportunities, both from local agencies and from other grant sources. The organizational capacity grant helped build the Council for Watershed Health from a small nonprofit barely scraping by to a research and information-sharing center. The influential role that the Council for Watershed Health developed in the watershed is evidenced by the strong insistence from informants of surrounding watersheds that our research team pursue this case. Other organizations in the region look proudly upon the work that was accomplished and how the Council for Watershed Health emerged as a leading organization in watershed management in the Los Angeles and San Gabriel Rivers Watersheds.

The groundwater augmentation project grant received in 2000 launched nearly a decade- long project from inception through implementation and monitoring. The preliminary grant focused on researching prototypes for stormwater capture and groundwater infiltration systems and monitoring impacts on water quality and quantity. Multiple pilot projects were monitored and results were used to inform a demonstration project supported in part by a 2007 CalFed grant, the Elmer Avenue Retrofit. Part of the multi-beneficial project included native plant landscaping for the neighborhood. Parallel to these efforts, the watershed coordinator hired for three consecutive coordination grants (2004-2014) hosted seminars for professionals on sustainable low-impact landscaping techniques and pursued multiple efforts for making native seeds and nurseries more accessible in the region. As a result of the many overlapping efforts and campaign to raise awareness and promote more sustainable landscaping, Los Angeles landscape architects collaborated with the watershed coordinator to create a plant palette of native plants to use for projects across the city. Multiple native plant nurseries have emerged to meet the demand for native and water efficient landscaping. The level of awareness of sustainable landscaping has

increased in the professional realm as a result of the workshops hosted by the Council for Watershed Health and research conducted that led to the Elmer Avenue project.

Several of the grants received by the Council for Watershed Health provided the financial resources needed to develop the resources of the organization and increase the overall capacity of their organization (i.e. Organizational Development grant (2000); watershed coordinator grants (2004-2007; 2008-2011; 2011-2014)). With more staff available, in part due to receiving three consecutive watershed coordinator grants, outreach and collaborative efforts increased, and the Council developed strong partnerships with other organizations and agencies. With the successful implementation of a large-scale augmentation project that was based on research and monitoring pursued by the organization, local stakeholders recognized the value of the organization's role in watershed management. As a rising leader in watershed management in the region, the Council for Watershed Health found its niche in professional development with the help of the CalFed Watershed Program.

Environmental justice considerations

Maintenance can be particularly challenging with infrastructure projects as designating a responsible party with the financial and technical capacity to manage the task is necessary. While essential, designating a responsible party is at times neglected. The Elmer Avenue site exemplifies environmental justice challenges that arise when an infrastructure project is implemented in a low-income area with maintenance responsibilities bestowed to the community. The Council for Watershed Health and TreePeople addressed some of the challenges by providing technical capacity training. However, in thinking through longer-term solutions, inevitable repairs, and potential community member turn-over, is technical training sufficient? Who is, or should be, responsible for bioswale repairs?

Structure of watershed coordination

The Council for Watershed Health initially applied for the coordination grant funding in order to have a staff person to lead the low-impact development/sustainable landscaping efforts. One watershed coordinator fulfilled this role for three consecutive grant cycles. During the third grant cycle, the organization brought on a second part-time coordinator to provide a supporting role in watershed activities, in effect expanding efforts in more general ways. The watershed coordination program for the Council for Watershed Health was executed by two distinct approaches with two very different roles determined by the organization: 1) a watershed coordinator as a leader with a project focused orientation; 2) a watershed coordinator in a supporting role without a particular project focus. The watershed coordinator in a leadership role hosted the low impact development/sustainable landscaping seminars. Direct and indirect measurable outcomes include the number of participants, number of workshops, the development

and city-wide adoption of a native plant palette, and the adoption of legal ordinances for development. The second watershed coordinator acted in a supportive capacity, rather than in a leadership role, attending meetings throughout the watershed and sharing information among stakeholders. The focus of this second coordinator position was challenging as there was not one specific project task as addressed by a key informant, “the focus of the position needs to be clearer, although, the tasks need to be flexible to achieve that focus.” Direct impacts of the second watershed coordinator are not as easily measured nor discussed in detail in the watershed coordination grant reports.

The position of watershed coordinator was defined by the organization in a manner to address the organizational needs. While the roles were distinct, stakeholders recognized the value of the watershed coordination program in raising overall awareness of the watershed and its health and a better understanding of human impacts on the watershed, especially in landscaping decisions. The value of the watershed coordinator was not lost with the unique responsibilities each coordinator was tasked with, as one respondent stated, “However the position is defined, it is worthwhile and useful and appreciated.”

Appendix A. Methods

Two researchers spent five days visiting stakeholders and touring watershed project sites in the Ventura River Watershed, the Santa Ana River Watershed, the Los Angeles River Watershed, and the San Gabriel River Watershed for grants received by the Ojai Valley Land Conservancy, Earth Resource Foundation, the River Project, the Los Angeles Department of Water and Power and Council for Watershed Health. Three in-person and five phone interviews were conducted for the grants received by the Council for Watershed Health with a diverse group of stakeholders, including numerous former staff and board members of the Council for Watershed Health, academia, and the Santa Ana Watershed Project Authority. All available documents were reviewed.

Appendix B. Available Grant Documents

Council for Watershed Health	Individual Grant Proposal	Catalogued Description	Annual Update(s)	Individual Final Report	Catalogued Final Reports	Other	
2004-2007 (Coordination Grant)					x		
2008-2012 (Coordination Grant)				x	x		
2011-2014 (Coordination Grant)				x			
2000-2001 (Project Grant) Los Angeles and San Gabriel Rivers Watershed Council Organizational Development		x		x			
2000-2001 (Project Grant) Study of Augmenting Groundwater Supplies Through Capture of Urban Runoff		x		x		x	Project Report & Project Summary
2007 (Project Grant) Ecosystem Values of Watersheds in Southern California						x	Arroyo Seco Report Card
2007 (Project Grant) Sun Valley Neighborhood Retrofit Demonstration						x	Project Report & Publication

References

http://www.waterboards.ca.gov/losangeles/water_issues/programs/regional_program/Water_Quality_and_Watersheds/san_gabriel_river_watershed/summary.shtml

http://www.waterboards.ca.gov/losangeles/water_issues/programs/regional_program/Water_Quality_and_Watersheds/los_angeles_river_watershed/la_summary.shtml

Case Study: Ojai Valley Land Conservancy

Watershed: Ventura River Watershed
Researchers: Kaily Bourg and Lauren Miller

Year	Grant Program	Project Title	Watershed	Award Amount
2010-2014	DOC Watershed Program	Watershed Coordination for the Ventura River Watershed	Ventura River	$277,446
2014	DOC Watershed Program	Drought Emergency Response Extension	Ventura River	$3,397.84

This case study involves an assessment of a single coordinator grant received by the Ojai Valley Land Conservancy. Findings of this research are based on interviews with stakeholders involved and a review of documents associated with the grants.

Overview

The Ojai Valley Land Conservancy (OVLC) received a Department of Conservation Watershed Coordinator Grant in 2011 on behalf of the Ventura River Watershed Council and hosted the position during the three-year grant period. The watershed coordinator grant was extended by six months in 2014 as part of the grant program's Drought Emergency Response Extension. OVLC is a nonprofit land protection organization supported by private donations and is an active member of the Ventura River Watershed Council leadership committee. The Council maintains a balanced and diverse leadership committee with stakeholder representation from government, water and sanitary, land management and recreation, environmental, and business and landowner entities. See *Appendix A* for list of current participants.

Following the Department of Conservation grant period, a collection of stakeholders extended financial resources to support a part-time coordinator position for the Ventura River watershed. For the first few years following the grant, the position was contracted and housed by the Ventura County Watershed Protection District. The position is currently housed at the Casitas Municipal Water District. The Council continues to meet at least six times per year and serves as a forum for stakeholders to discuss projects and watershed improvement efforts in the Ventura River watershed.

The Ventura River Watershed

The Ventura River watershed comprises 226 square miles and is the smallest of three major watersheds in Ventura County. Major watersheds in Ventura County include the Ventura River, Santa Clara River, and Calleguas Creek. The Ventura River stretches 33.5 miles from its

headwaters in the Transverse Ranges to the Pacific Ocean near the city of Ventura. Major tributaries include Matilija Creek, North Fork Matilija Creek, San Antonio Creek, and Canada Larga. Lake Casitas is the major water supply reservoir in the watershed. Agricultural and municipal water demands in the Ventura River watershed are met with 100% local water supplies. The northern portion of the watershed lies in the Los Padres National Forest, and the southern half encompasses the cities of Ventura and Ojai and several unincorporated communities. Agriculture is the dominant land use in the watershed, consisting of mostly small, multi-generational family farms. Only 13% of the land in the watershed is developed, and 57% is open land in protected status (Management Plan, 2015).

Stakeholders consider the Ventura River watershed a model for addressing watershed management issues in California as the watershed contains an active consensus-based stakeholder group working to address a range of issues that commonly affect water quality and water supply throughout the state. Key elements represented in the Ventura River watershed include a mix of urban and rural communities, agricultural land use, forest, open space, a large obsolete dam (Matilija Dam), a functioning reservoir, water diversion systems, and numerous public and private water agencies. Additionally, the Ventura River watershed provides habitat for one of the southern-most steelhead populations in the state.

Background

The Ventura River Watershed Council formed in 2006, stemming from the countywide Integrated Regional Water Management Plan (IRWMP) developed by the Watersheds Coalition of Ventura County (WCVC). California Coastal Conservancy's Wetlands Recovery Task Force of Ventura County originally proposed the formation of the council (Management Plan, 2015). During its first five years, the council was coordinated by the WCVC program manager and focused primarily on IRWM processes.

The DOC watershed coordinator grant presented an opportunity to develop a comprehensive watershed management plan for the Ventura River watershed and improve the governance structure of the council and diversity of stakeholders represented. The Ojai Valley Land Conservancy worked with other members of the council to apply for the grant, and accepted the grant award on behalf of the council in 2011.

2011-2014 Watershed Coordination Grant and Drought Emergency Response Extension

Grant summary

The Ventura River Watershed Council identified several goals to be accomplished during the term of the watershed coordinator grant: build a more robust council, develop a mission

statement, design and maintain a website, establish a formal governance structure, boost stakeholder participation in council activities, and develop a watershed management plan for the Ventura River watershed. Specific tasks outlined in the work plan include: (1) identify common goals for the watershed and develop new goals and objectives, (2) agree upon measures of success for each of the identified goals, (3) assess the gaps between current and desired conditions, (4) develop a resource inventory, (4) identify actions to achieve shared watershed goals, (5) complete a formal management plan for the Ventura River watershed, and (6) begin to coordinate the implementation of actions identified in the plan, including securing funding sources (Final report submitted to DOC, 2014).

Four tasks were added during the grant's six-month Drought Emergency Response Extension, including the development and advertisement of a "Save More Water" website; the facilitation of drought-focused discussions at council meetings; completion of the Ventura River Watershed Management Plan with added emphasis on drought readiness, water conservation, and water use efficiency; and coordination with the Ventura County IRWMP to pursue additional grant funding.

Throughout the course of the grant, a range of accomplishments were achieved that both satisfied grant goals and contributed to successful outcomes. The watershed coordinator facilitated processes that led to the development of the council's mission statement, logo, website, and governance charter.[24] Additionally, as a result of the coordinator's facilitation and outreach efforts, stakeholder involvement in meetings nearly tripled and the council's leadership committee further diversified, including more business and landowner representatives. The watershed coordinator and supporting staff compiled an online-accessible inventory of watershed-related materials, produced an online watershed atlas that included 47 maps and an interactive online map viewer, and issued nearly 35 e-newsletters each year to a distribution list of roughly 350 stakeholders and interested public. Throughout the course of the grant, the coordinator was able to secure an additional $98,500 to augment funding for watershed coordination support staff and the development of the management plan, enabling the plan's completion and council approval by March 2015. The management plan remains an active resource in the watershed today by establishing a platform in which stakeholders can pursue funding opportunities, enhance projects, and connect with other interests in the watershed.

Ventura River Watershed Management Plan

Through an inclusive stakeholder process, the watershed coordinator worked with council stakeholders and paid consultants and volunteers to author an 837-page Ventura River Watershed Management Plan over the course of two and a half years. Stakeholders characterized the management plan as a fair reflection of diverse voices, highly comprehensive, technical, and

[24] http://venturawatershed.org/wp-content/uploads/2015/01/VRWC-Charter_Dec-2014.pdf

resourceful. With facilitation from the watershed coordinator, council members identified a purpose, goals, objectives, and values to guide the development of the plan. Four components identified in the plan's purpose are to: tell the story of the watershed, identify and prioritize water-related concerns in the watershed, outline a strategy to solve shared problems and collectively manage shared resources, and expand funding opportunities (Management Plan, 2015). The watershed coordinator facilitated the formation of Technical Advisory Committees (TACs) within the Council to refine language surrounding identified goals and draft sections of the plan.

The management plan frames actions and projects into six focused "campaigns." The group determined the campaign approach to be more effective than identifying priority projects in a "short-term action plan" due to the campaigns' ability to incorporate broader perspectives, allow new projects to be framed within existing concepts, and acknowledge the cyclical nature of watershed management. The six campaigns include: (1) River Connections, (2) Resiliency Through Infrastructure and Policy, (3) Extreme Efficiency, (4) Watershed-Smart Landscapes and Farms, (5) Arundo-Free Watershed, and (6) Healthy San Antonio Creek (Management Plan, 2015). Specific projects are organized into tiers; tier-one projects are feasible projects that have gained some level of stakeholder support, and tier-two projects are more conceptual. Each campaign is led by a sub-committee of council members, and identified projects are achievable by individuals or organizations working independently or collectively. The Arundo-Free Watershed Campaign and the San Antonio Creek Campaign have been the most active of the six.

With guidance from the watershed coordinator, drafts of each section of the plan were circulated to council members for approval. On more contentious topics, the watershed coordinator facilitated and worked with opposing viewpoints to develop and refine language that effectively represented the different perspectives. The watershed coordinator ultimately made the final decision on items included in the management plan, and most stakeholders agreed that decisions made were fair. Stakeholders noted that contentious moments during the process did not change the overarching priorities of the council.

Outcomes and process

Overall efforts stemming from the Ventura River Watershed Council under the guidance and facilitation of a full-time coordinator have resulted in numerous positive environmental, social, and economic outcomes in the Ventura River watershed. The council was made more robust through consistent coordination, facilitation, and continued outreach, which resulted in a larger and more diversified council as participation nearly tripled. Under a full-time watershed coordinator, council meetings took place more frequently, including two evening meetings each year that promoted public participation. During the first year of full-time coordination, the watershed coordinator developed a governance charter, which was accepted and approved by the

council, and set the ground rules for engagement among entities during council activities. Improved governance structure of the council enabled, as a stakeholder described, "fruitful collaboration" and nurtured the development of new and stronger relationships between diverse entities in the watershed. Stakeholders emphasized that the governance structure effectively promoted an increased understanding of how different groups depend on and value resources in the watershed. The working environment of the council provides a forum that is both productive and accepting of differences where members can openly disagree, establish a compromise, and move forward in achieving mutually identified goals. Differing views were depersonalized, and entities did not compete over grant opportunities but instead supported each other while considering the greater benefit of the watershed.

During the grant program, the watershed coordinator secured an additional $98,500 in grant funding from the Bureau of Reclamation to support the development of the management plan. In partnership with the WCVC, the watershed coordinator helped bring in over $3.2 million to the watershed to implement projects through the IRWM program. Many stakeholders agree that the DOC grant program provided a seed that led stakeholders to further recognize the value of watershed coordination and financially support the position beyond the terms of the grant. The range of outcomes accomplished under the watershed coordinator grant demonstrated to the members of the watershed council the value of ongoing watershed coordination, resulting in the present arrangement where most stakeholders in the council contribute to a collective fund to maintain a part-time (30%) watershed coordinator position in the Ventura River watershed still today. The funds support the watershed coordinator's facilitation of six yearly meetings and fulfillment of associated logistical tasks, though many stakeholders have noted that the shift from full-time to part-time has resulted in fewer meetings overall, less website maintenance, and fewer e-newsletters issued. While some characterize the council as having a "shifting dynamic" and "limping along," others say despite the decrease in coordination capacity, the group is still quite functional.

The existence a comprehensive management plan and an active watershed council has provided a ready vehicle for discussions focused on planning and implementing projects and has been an important forum in coordinating landscape-level initiatives (e.g., post-fire recovery). The comprehensive management plan encouraged the integration and advancement of current studies, including topics like surface and groundwater interaction, water supply and demand, water quality, and in-stream flows, throughout the watershed. The studies continue to use the council as a forum to coordinate efforts, leverage fiscal resources, and incorporate broad stakeholder feedback into the planning process.

The Ventura River was identified as one of five priority streams for the California Water Action Plan Instream Flow Program in 2016.[25] As part of the action plan, the State Water Resources Control Board (SWRCB) and the California Department of Fish and Wildlife (CDFW) are working to identify actions that would establish instream flows for stream systems that support anadromous fish habitat in the five pilot streams selected. While numerous factors influenced the selection of priority streams, many stakeholders noted that the existence of an active and formal watershed council and a comprehensive management plan for the Ventura River watershed likely contributed to its selection for the instream flow program.

Council discussions resulted in increased support from local, state, federal, and private agencies to remove the Matilija Dam, an endeavor that has been a priority in the watershed for many years. Once described as "the elephant in the room," the Matilija Dam project is now moving forward with secured funding and stakeholder and political support. Construction of the Matilija Dam was completed in 1948, and studies to remove the dam began in 1998 with support from Ventura County. Data revealed that the Matilija reservoir capacity was reduced by 90% due to sediment entrapment, which prompted officials to classify the dam as obsolete. The watershed coordinator has participated in the Matilija Funding Committee that has successfully secured funding for the dam removal design as well as downstream projects that must be completed prior to dam removal. Removal of the dam will help the recovery of anadromous fish populations and replenish natural sediment on Ventura Beach.

The structure set in place by the council and ongoing coordination continues to advance watershed-level objectives, as well as landscape-level objectives, as demonstrated in recent recovery efforts of the Thomas Fire[26] in December 2017. Stakeholders noted that the council has been an important social resource to the post-fire recovery process by providing an available forum for discussions regarding recovery and restoration efforts in the watershed – and the landscape. The network established through the council has enabled response teams to more effectively conduct flood risk preparation, habitat restoration, and drought preparedness, and provide information to residents on what they can and should do.

Key Findings

Outcomes resulting from collaborative efforts in the Ventura River watershed demonstrate the power of a network of people and resources linked and driven by passionate individuals and effective watershed coordination. Notable outcomes stem from focused projects to broad accomplishments, such as a watershed management plan that ultimately has led to increased project implementation. Stakeholders recognize the watershed coordinator as a central liaison

[25] http://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_flows/cwap_enhancing/

[26] The Thomas Fire started on December 4, 2017 and burned a total of 281,893 acres in Southern California. The estimated containment date for the fire is January 20, 2018. Source: https://inciweb.nwcg.gov/incident/5670/

between diverse groups and a "champion" who made many significant outcomes possible. This sentiment is reflected in the stakeholders' continued contributions to fund a part-time watershed coordinator succeeding the three-year grant term.

Key outcomes summarized:

- Improved trust and respect among diverse stakeholders
- Improved communication
- Improved coordination among stakeholder interests
- Increased funding for project implementation
- Improved access to data and information through the watershed management plan, website and meetings
- Enhanced ability to receive grant funding
- Enhanced ability to coordinate important initiatives and campaigns including recovery from the recent Thomas Fire
- Enhanced ability for stakeholders to respond to regulatory requirements and participate in watershed-based studies and research

From day one in the position the watershed coordinator identified the need to be the "wheel at the center of it all." This involved reaching out to all the interests in the watershed and linking them together and to the existing watershed council, a task stakeholders recognized as energy-intensive, but a necessary step to develop and foster new relationships and trust. The watershed council provided a ready vehicle for open dialogue between diverse groups where contentious topics could be discussed, collective goals could be identified, and next steps could be established and incorporated into a comprehensive plan. With consensus-based input from stakeholders, the watershed coordinator curated a mission statement and governance charter for the council, which set ground rules for inclusive and respectful engagement and further nurtured trust development. The coordinator's primary role during the first year was not only to boost stakeholder participation, but also to bring together and organize scattered information that could be used by individuals and groups who held interests in the watershed. By reviewing other management plans and compiling data from existing research in the Ventura River watershed, the watershed coordinator established an information-sharing network that opened communication between potential project partnerships, provided frameworks and contextual data for new project initiation, and identified gaps to be addressed in the watershed management plan. The council's capacity was augmented through grant funds from the Bureau of Reclamation, which enabled the coordinator to hire consultants and interns to help produce the plan and maintain the logistical tasks associated with council needs. Logistical tasks included writing meeting agendas and minutes, preparing and distributing e-newsletters, and updating the website. During meetings and other events, the watershed coordinator facilitated decision-making processes and mediated conflicts by reinforcing the importance of the governance charter. Many stakeholders reflected that the governance charter legitimatized the process and mitigated

exclusivity or one entity from dominating a discussion. It put in place a process that was respected and followed.

As "the glue" that bound entities and resources together, the watershed coordinator embodied characteristics, as described by stakeholders, that both contributed to and resulted in effective coordination, including: dedicated, focused, creative, passionate, humble, a champion, one with creditable objectiveness, and one with the ability to convert challenges into opportunities. The watershed coordinator was a good fit for the position for likely many reasons, including having previous experience in the watershed through employment with the County of Ventura. Stakeholders regarded the watershed coordinator's previous experience in the region as a beneficial tool that increased access to capital and resources.

The council faces many challenges in moving forward without a full-time or even a half-time watershed coordinator. When sufficiently supported, a watershed coordinator can save time and money across efforts in the watershed and improve watershed awareness by nurturing trust development, reducing redundancies and overlap, and linking together resources and partners to accomplish multi-beneficial projects. While stakeholders recognize the value of the watershed coordinator and appreciate the capacity that has been built, small agencies and organizations often struggle to secure extra funding to support the position. Mandated processes, such as the Sustainable Groundwater Management Act (SGMA), typically receive priority funding and resource allocation from local agency budgets. Stakeholders predict that the collective fund for basic coordination tasks will continue; however, they do not foresee a significant increase in allocated dollars. The current fund stands at around $28,000 for one year of watershed coordination. As a result of the foundations established by preceding fulltime coordination efforts, the part-time coordinator is able to maintain the group's momentum. However, stakeholders noted that the reduction in coordinator hours has necessitated that some duties be taken on by other organizations (e.g., the Watershed Protection District has taken on website hosting and maintenance, etc.).

Stakeholders anticipate the watershed council and management plan to remain an active resource for all interests in the Ventura River watershed, and they predict implementation of outlined projects will be a multi-decadal process. Though implementation of the plan is voluntary and fluctuates with the budgets and boards of organizations and agencies, and may also be contingent on the longevity of the watershed council, many stakeholders are confident that the fruits of watershed coordination will continue long into the future. As one stakeholder summarized, "There is a lot at stake and local stakeholders continue to share a vision and passion for maintaining a healthy watershed for future generations. Everyone recognizes the value of collaboration – that we all need to work together to address the big challenges facing the watershed."

Appendix A: Ventura River Watershed Council – Leadership Committee

Government
Ventura County Board of Supervisors
Ventura County Watershed Protection District
City of Ventura, Ventura Water
City of Ojai
California Coastal Conservancy

Water and Sanitary
Casitas Water District
Ventura River County WD
Ojai Valley Sanitary District
Meiners Oaks Water District
Ojai Basin Groundwater Management Agency

Land Management/Recreation
Ventura County RCD
Ojai Valley Land Conservancy
Ventura Hillsides Conservancy

Environmental
Surfrider Foundation
Santa Barbara Channelkeeper
Ojai Valley Green Coalition, Watershed Council
Friends of the Ventura River

Business/Landowner
Ventura County Farm Bureau
Pixie Growers Association
Oil Extraction—Aera Energy
Ventura County Coalition of Labor, Agriculture and Business

Appendix B: Methods

This case study is based on nine stakeholder interviews and a review of grant documents provided by the Department of Conservation and the Ventura River Watershed Council. Two researchers visited Ventura, California to conduct six in-person interviews; three interviews were conducted over the phone. See Appendix C for a list of interview participants. Interviews were recorded by handwritten or typed notes and synthesized into this case study report. The visit to Ventura was part of a five-day trip to the South Coast region, where the two researchers conducted interviews for a total of 11 grants.

Appendix C: Interview Participants

Interview participants include one or multiple representative (s) from each of the following stakeholder groups:

Ojai Valley Land Conservancy
Watersheds Coalition of Ventura County
Surfrider Foundation, Ventura County Chapter
Ventura County Coalition of Labor, Agriculture, and Business
Ventura County Watershed Protection District
Ventura County Supervisor Bennett's Office

Appendix D: Available Grant Documents and References

Ojai Valley Land Conservancy	Grant Proposal (Submitted to granting agency)	Quarterly or Annual Update(s)	Final Report (Submitted to granting agency)	Catalogued Description (Published by granting agency)	Catalogued Final Report (Published by granting agency)	Other
Watershed Coordination for the Ventura River Watershed			X			X

References

Walter, L. Ventura River Watershed Management Plan. Prepared for the Ventura River Watershed Council. March 2015. Retrieved from http://venturawatershed.org/wp-content/uploads/2011/12/VRWCPlan_Complete.pdf

Case Study: San Joaquin County Resource Conservation District

Watershed: Lower Mokelumne River watershed
Authors: Kaily Bourg and Jonathan Kusel

Year	Grant Program	Project Title	Watershed	Award Amount
1998-2002	CalFed Ecosystem Restoration Coordination Program	Lower Mokelumne River Watershed Stewardship Program	Lower Mokelumne	$159,000
2000-2002	Department of Conservation-Resource Conservation District Watershed Coordinator Grant Program - Pilot	Mokelumne River Watershed Coordinator	Lower Mokelumne	$37,500
2000-2003	**CalFed Watershed Program**	**Murphy Creek Restoration Project**	**Murphy Creek**	**$282,500**
2002-2004	Department of Conservation-Resource Conservation District Watershed Coordinator Grant Program – Pilot Extension	Mokelumne River Watershed Coordinator	Lower Mokelumne	$47,668
2003-2007	**CalFed Watershed Program**	**Lower Mokelumne River Stewardship Plan Implementation**	**Lower Mokelumne**	**$1,377,884**
2004-2007	**Department of Conservation-Watershed Coordinator Grant Program**	**Mokelumne River Watershed Coordinator**	**Lower Mokelumne**	**$182,505**
2007-2010	**CalFed Watershed Program**	**Continuing Education, Outreach, Restoration, and Monitoring in the Lower Mokelumne River**	**Lower Mokelumne**	**$890,655**
2008-2012	**Department of Conservation-Watershed Coordinator Grant Program**	**Mokelumne River Watershed Coordinator**	**Lower Mokelumne**	**$131,965**

Note: Bolded grants are included in the scope of this study. Un-bolded grants are not included in the study due to differences in programmatic and administrative objectives but are discussed here because they are fundamental in understanding the subsequent grants.

Overview

Watershed improvement efforts in the Lower Mokelumne River Watershed stem from a central community-driven *Lower Mokelumne River Watershed Stewardship Plan* (Plan), a plan developed and implemented through a steering committee of diverse entities and stakeholder interests across the watershed. The development and implementation of the plan was largely funded through CalFed Watershed grants starting in 1998. Collaborative efforts throughout the development process were driven by the coordination and facilitation of a watershed coordinator, whose position was funded by grants awarded to San Joaquin County Resource Conservation

District (SJCRCD) through the Department of Conservation (DOC) Watershed Coordination Program.

Of the grants awarded to SJCRCD, five are included in the scope of this assessment, and three are included in a background review because it was determined that their inclusion is fundamental in understanding the subsequent grants. Major entities and stakeholders involved in collaborative efforts include: SJCRCD, the City of Lodi, East Bay Municipal Utility District (EBMUD), Lower Mokelumne River Partnership (a Joint Settlement Agreement of EBMUD, U.S. Fish and Wildlife Service, and California Department of Fish and Wildlife), San Joaquin County Council of Governments (COG), Lodi Winegrape Commission, and numerous private land owners throughout the watershed.

Lower Mokelumne River Watershed

Situated along the northern border of San Joaquin County, the Lower Mokelumne River Watershed begins at the base of the Camanche Dam and extends to the confluence of the Cosumnes and Mokelumne Rivers. This 52,688-acre watershed lies largely within the bounds of San Joaquin County with almost 2,000 acres stretching into Sacramento County and Amador County. With only one incorporated city, the City of Lodi, the Lower Mokelumne River Watershed is more than 95% privately owned and widely used for agriculture.

The Mokelumne River drains nearly 661 square miles, making it the largest eastside tributary to the Bay-Delta. Major tributaries to the Lower Mokelumne River include Murphy Creek and Jahant Slough. A history of mining, agriculture, water diversions, levees, and other human activity has led to a decline in natural riparian and aquatic habitat conditions in the watershed, underscoring the need for watershed restoration work and adoption of sustainable practices. The river has been on the Environmental Protection Agency's 303(d) list for impaired waterways since 1992 for copper and zinc pollutants and, more recently, on the 2010 list for chlorpyrifos, mercury, and dissolved oxygen.

Background

1998 CalFed Ecosystem Restoration Coordination Program - Lower Mokelumne River Watershed Stewardship Program

In 1998, representatives from EBMUD, along with technical support from California State University, Sacramento, and the Lodi Winegrape Commission worked with SJCRCD to prepare a grant proposal for a Lower Mokelumne River Watershed Stewardship Program with three principal goals in mind: (1) to develop and implement a community-based stewardship program, (2) to continue and expand environmental farm plans, and (3) to expand biological monitoring

programs to include neotropical landbirds (proposal submitted to CalFed, 1998). The efforts accomplished through this grant are considered the catalyst for the long-term collaboration in the Lower Mokelumne River Watershed and the origin of the Lower Mokelumne River Watershed Stewardship Planning Committee (Committee) that continues to meet today.

Preceding the development of the proposal, biologists from EBMUD's Lodi office were working to restore and monitor anadromous fish habitat in the Lower Mokelumne in response to a protest as part of a Federal Energy Regulatory Commission (FERC) re-licensing process. This effort led EBMUD biologists to initiate relationships with landowners along the Mokelumne River to increase river access, leading to active participation with the Lodi Winegrape Commission. At the same time, members of the Lodi Winegrape Commission were crafting a *Lodi Winegrower's Workbook* to serve as a self-assessment of integrated and sustainable farming practices—a workbook that would later serve as a model for the *Mokelumne River Watershed Owner's Manual*, a project spearheaded by the watershed coordinator and members of the Committee. The first version of the *Lodi Winegrower's Workbook* was published in 2000.

During this time, the City of Lodi's wastewater facility was fined $20,000 by the State Water Resource Control Board (SWRCB) concerning high chlorine discharge. The Public Works Director at the time successfully negotiated with SWRCB to allocate $10,000 of the fine toward a water quality education program in Lodi. Furthermore, the Public Works Director secured an additional $16,000 from the City of Lodi City Council, enabling the development of a citizen-monitoring program, known as Storm Drain Detectives.

With a tangible goal and funding in place from the 1998 grant award for the development of a community-based stewardship program and the invested interest of local landowners, the Special Projects Coordinator at SJCRCD identified and convened diverse interests, forming the Lower Mokelumne River Watershed Stewardship Planning Committee. In its early years, stakeholder representation in the committee included staff from SJCRCD, biologists from EBMUD, California Department of Fish and Wildlife, San Joaquin County Department of Public Works, San Joaquin County Department of Education, City of Lodi Parks and Recreation, City of Lodi Municipal Service Center, City of Lodi Department of Public Works, City of Lodi-Lodi Lake Docents Program, Friends of Lodi Lake, Woodbridge Irrigation District, Sierra Club Conservation Committee, University of California Cooperative Extension, Western Agricultural Appraisals, San Joaquin County Agricultural Commissioner, San Joaquin Farm Bureau Federation, California Farm Bureau Federation, Lodi Winegrape Commission, Lange Twins Family Winery and Vineyard, Rossini Farms, Mohr-Fry Ranches, and Vino Farms (*The Lower Mokelumne River Watershed Stewardship Plan*, 2002). Together, they mobilized and crafted *The Lower Mokelumne River Watershed Stewardship Plan* (Plan). The Plan originally addressed nine elements of watershed management including: education, recreation, agriculture, biological resources, water quality, flood management, cultural resources, economic development, and

emergency services and fire prevention. Humboldt State University provided additional support in developing the Plan regarding the restoration of riparian habitat and contributed Geographic Information Systems (GIS) support. This original grant led to a Plan that catalyzed and laid the critical groundwork for the future of watershed management in the Lower Mokelumne.

2000 pilot Watershed Coordinator Grant Program

In 2000, the SJCRCD successfully submitted a proposal to the DOC's pilot Watershed Coordinator Grant Program for Resource Conservation Districts. The Plan was critical in the development of the proposal. The DOC and SJCRCD signed a grant agreement in spring of 2001, and soon after the SJCRCD hired a full-time watershed coordinator, who remained with the group through 2014 with recurrent funding through the DOC Watershed Coordinator Program.

The watershed coordinator's primary objectives during the grant period were to reduce non-point source pollution resulting from urban/residential land uses and address the disconnect between the agricultural and urban communities regarding watershed management (report submitted to DOC, 2002). This entailed a large educational and outreach initiative and led to the development of a *Reflections in the River* video—scripted and narrated by the watershed coordinator, and the *Mokelumne River Watershed Owner's Manual* (2002). The Manual serves as a self-assessment tool for residents in the watershed to reduce the amount of run-off and contaminants generated on home properties. The watershed coordinator also organized and executed outreach events and educational workshops in the community and in the classroom, and worked with landowners along the Mokelumne River on projects geared toward restoring riparian habitat (report submitted to DOC, 2002).

2002 extension to pilot Watershed Coordinator Grant Program

The DOC extended the original grant for watershed coordination by 18 months between the years 2002 and 2004. The extension of the grant was a continuation of the original, though the coordinator's role shifted in the transition. In the earlier grant, the coordinator focused on developing specific projects and products (i.e., *Lower Mokelumne Watershed Owner's Manual* and *Reflections in the River*), while also getting to know the people in the watershed and forming necessary relationships. Time spent forming relationships was critical in strengthening the role of coordination in the watershed and enabled transition into more project implementation and capacity building with the Committee.

With facilitation from the watershed coordinator and stimulus from within the Committee, the Plan was amended to include a restoration element, which enabled restoration in the watershed to be executed under guidance of formally identified, agreed-upon goals. Discussions around the amendment nearly derailed the restoration element with concern from the biologists that

restoration activities were being pursued without proper guidance, and landowners were concerned about establishing standards that might later become regulatory.

From an idea propelled by agricultural interests, the coordinator collaborated with representatives from the City of Lodi to develop a voluntary citizen-monitoring program that would effectively co-exist with the City of Lodi's Storm Drain Detectives program. This new program would encourage agricultural monitoring upstream and downstream from the Lodi city limits. The voluntary citizen-monitoring efforts shifted when a new regulation came into effect that required farmer participation. This led to the formation of a locally based watershed coalition that complied with the new regulation requirements, and the SJCRCD allocated general funds to support the watershed coordinator to assist with facilitation activities in the coalition. In addition, the coordinator continued to advance outreach efforts and maintain relationships with EBMUD and the Lodi Winegrape Commission to advance and submit grant proposals for more restoration work throughout the watershed (report submitted to DOC, 2004).

Watershed Coordination Grants

2004-2007 Watershed coordinator grant

As described in the final report, the purpose of this grant was to increase water quality; improve coordination and collaboration among government agencies, other organizations, and the Committee; and implement a strategy that would ensure continued support for local watershed activities. During the three-year grant period, the watershed coordinator focused on three objectives: (1) to promote and increase diverse stakeholder participation in the Committee, (2) to increase involvement of school systems and educational institutions in watershed improvement efforts, and (3) to work across agricultural and urban-suburban areas to improve education about runoff control and non-point source pollution (final report submitted to DOC, 2007).

With facilitation and coordination from the watershed coordinator, the number and diversity of active participants in the Committee increased by 20%; this increase included a flux of new landowner participation. The Committee adopted an annual watershed stewardship award, funded through the Lower Mokelumne Partnership (Joint Settlement Agreement of EBMUD, California Department of Fish and Game, and U.S. Fish and Wildlife Service). The award was effective in increasing attention and awareness of the goals of the Plan and highlighted principle players in the watershed, which allowed the Committee and the public to recognize the successes that were occurring. The coordinator facilitated the award process and worked with sponsors on award criteria, disseminating nomination packets, and organizing the award ceremony and publicity. The coordinator expanded educational opportunities by working closely with landowners and the Center for Land-Based Learning's Student and Landowner Education and Watershed Stewardship program (SLEWS) to identify sites on landowner property where

students could participate in restoration projects like planting, monitoring, and removing non-native invasive species. Working with the Lodi Winegrape Commission, the watershed coordinator organized multiple workshops for urban-suburban homeowners to learn about reducing runoff and non-point source pollution (Final report submitted to DOC, 2007). The workshops were modeled after the Winegrape Commission's workshops for winegrape growers that encouraged the adoption of sustainable farming practices. Unlike the growers' workshops, the homeowner self-assessment workshops presented a challenge in recruiting volunteers to join in the effort. As a result, the initiative did not generate much support.

Through collaboration with multiple stakeholders, the watershed coordinator and the Committee secured over $2,000,000 in additional grants for watershed improvement and advancing the goals of the Plan in the Lower Mokelumne. Included in these grants was the 2007 CalFed grant for Continuing Education, Outreach, and Restoration in the Lower Mokelumne River Watershed (final report submitted to DOC, 2007).

2008-2012 Watershed coordinator grant

This grant was a continuation of the preceding grant; purpose and objectives were the same. Key outcomes include organizing watershed tours, expanding SLEWS work in the watershed, expanding the Lodi Storm Drain Detectives Program, updating the *Lower Mokelumne River Owner's Manual*, and refining the Plan (annual report summited to DOC, 2011). During this grant period, the watershed coordinator and Committee were able to secure an additional $1,009,000 for restoration projects (final report summary published by DOC, 2012).

Watershed Project Grants

2000-2003 Project grant – Murphy Creek Restoration Project

Though the Murphy Creek Restoration Project occurred concurrent to a watershed coordinator grant, the efforts were separate. Planning and implementation of the project was already underway at the time the watershed coordinator was hired by the SJCRCD. Once hired, the watershed coordinator offered assistance to the project, eventually becoming the lead project manager, and helped compile the final report. The Murphy Creek Restoration Project was an initiative catalyzed by landowners along Murphy Creek with hope of restoring riparian zones that were damaged by livestock use. As active participants of the Committee and with guidance and consultation from EBMUD, a coalition of seven landowners worked with the SJCRCD to help secure funds for restoration. EMBUD became the lead agency in the CEQA and NEPA process and was the permit holder, and SJCRCD was the grant recipient and project manager. The landowners outlined four goals for the project: (1) restore rearing and spawning habitat for Chinook salmon and steelhead, (2) to restore native riparian vegetation to encourage

reestablishment of neotropical migratory birds and other wildlife species, (3) improve water quality and water flows with Murphy Creek, and (4) promote sustainable agricultural practices that continue to support livestock and vineyard production within the watershed (final report submitted to CalFed, 2003). These goals addressed and enabled the execution of multiple elements identified in the Plan.

The major accomplishment was the removal of an earthen livestock dam on the Sparrowk Property. Removal of the dam opened a 0.8-mile stretch of spawning and rearing habitat to anadromous salmonids. Additionally, fencing was installed to prevent livestock from entering the creek, and three landowners installed off-watering systems on their properties. Native grasses were planted at the dam removal site to reduce sedimentation from entering the stream. Further downstream on two private properties, stream banks were re-sloped and stabilized and large gravel were added to streambeds to enhance stream function. Crews from California Conservation Corps (CCC) removed 100 yards of non-native invasive species (NIS) Himalayan blackberry vines near the dam removal site. However, it was determined that herbicide application was necessary, and the task was subcontracted to a restoration company. SLEWS, over the course of five field trips, and students from Lodi High School's Sun Academy participated in site mapping, plant identification, bird watching, planting and monitoring. The planning and execution of the project helped to build trust among diverse stakeholders and dispelled exaggerated stereotypes of landowners and agencies. Such trust enabled willingness from landowners to open their properties and project sites to various tours.

2003-2007 Project grant – Lower Mokelumne River Watershed Stewardship Plan Implementation

This grant sought to implement elements of the Plan through an identified set of goals and associated tasks. Tasks included: (1) implement the Lodi Winegrape Commission's winegrape grower's self-assessment plan, (2) develop a walnut grower's self-assessment plan, (3) develop a conceptual strategic framework to prioritize riparian habitat protection, enhancement, and restoration projects, (4) develop a pesticide environmental risk indicator model, (5) monitor downstream water quality in the Lower Mokelumne near vineyards, (6) monitor pest and pesticide use in vineyards near the river, (7) continue implementation of the Lodi Storm Drain Detectives Program, and (8) continue to conduct education and outreach (final report submitted to CalFed, 2007).

Implementing the winegrape grower's self-assessment plan has led to more than 1,500 acres of certified sustainable winegrapes in the Lodi region. The walnut grower's self-assessment program was unable to advance due to difficulties in securing a subcontract agreement with the University of California. The Committee developed ranking criteria for restoration projects that were broadly accepted by both landowners and a peer review, and it developed a conservation

handbook, which was made available to landowners who expressed an interest in conducting habitat restoration on their properties. As part of a confidential and voluntary self-testing effort to address discharge from their properties, farmers were unable to secure a lab to test for sulfur, one of the proposed baseline measurements for water quality testing near the vineyards (final report submitted to CalFed, 2007). The voluntary self-testing program dissipated instantly when the regional water board mandated the Irrigated Lands Regulatory program. Additionally, as a result of this grant, participation in the Storm Drains Detective and the Lodi Lake Docents programs increased and gained more public attention.

2007-2010 Project grant – Continuing Education, Outreach, Restoration, and Monitoring in the Lower Mokelumne River

This project was designed to continue implementation of goals and activities outlined in the Plan. Completion of tasks was made possible by subcontracting the Center for Land-Based Learning, the City of Lodi, Point Reyes Bird Observatory (Point Blue), and the Lower Mokelumne River Partnership. The goals of the project were: (1) implement programs identified in the Plan, (2) work with the City of Lodi to expand water quality and conservation education programs in cooperation with Lodi Public Schools and city property, (3) gauge the effectiveness of previous education and outreach efforts, (4) restore 20 acres of Valley Foothill Riparian Habitat, and (5) conduct monitoring to implement adaptive management and evaluate the effectiveness of habitat restoration activities (Final report submitted to CalFed, 2010). Progress was made with each of the goals throughout the course of the grant period with only one major holdback—the state bonds freeze in 2008-2009, which halted all projects and activities being implemented by the grant funds. Two projects that were in part locally funded, the Lodi Storm Drain Detective Program and the Center for Land-Based Learning's SLEWS program, were able to continue activity during the freeze. The remaining projects were offered an extension to the grant agreement between 2009-2010 (final report submitted to CalFed, 2010).

Addressing the goals of the grant, SJCRCD in partnership with the Lower Mokelumne Partnership, the San Joaquin Council of Governments, and the Natural Resources Conservation Service performed riparian restoration work on more than 80 acres in the watershed, all of which were completed using only matching funds. Monitoring efforts generally revealed that restoration activities had a positive effect number of bird species present in the watershed. In partnership with the Center for Land-Based Learning, 225 students were recruited and completed the SLEWS program in San Joaquin County. Students in the SLEWS program participated in habitat restoration activities on roughly 100 acres of land. This grant also advanced the City of Lodi's watershed education and outreach programs including the Lodi Lake Docents program, the Lodi Storm Drain Detective Program, and an after school program. It also supported the installment of Lodi Lake interpretive panels, an issue of watershed brochures, the development of a Mokelumne River Watershed Curriculum for Lodi Public Schools, and a survey of

residents' knowledge and attitudes about the Lower Mokelumne River. Additionally, the SJCRCD helped to enroll three additional landowners enrolled in a Safe Harbor Agreement for the valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (final report submitted to CalFed, 2010).

Unique Outcomes

This section highlights most significant outcomes that a number of stakeholder participants shared and this analysis revealed as important components in discussing the sweeping impact of Lower Mokelumne River Watershed Stewardship Committee and Plan. These outcomes are the result of the overall Lower Mokelumne Watershed Stewardship initiative and would more than likely not been achieved with a single grant. These consistent and long-term efforts driven by stakeholders and the watershed coordinator allowed for deeper outcomes to occur that have not only local, but statewide, national, and even international implications.

Safe Harbor Agreement

In partnership with SJCRCD, EBMUD, Lodi Winegrape Commission, Environmental Defense, and U.S. Fish and Wildlife Service, landowners in the Lower Mokelumne River Watershed signed the first non-mitigation programmatic safe harbor agreement in the State of California. It was developed in light of a habitat restoration project involving the planting of elderberry bushes. Elderberry bushes are key habitat for valley elderberry longhorn beetles, which are protected under the Endangered Species Act. Valley elderberry longhorn beetles can be killed in the course of ordinary farming operations. As a result of this, landowners negotiated an agreement that would provide legal protection if they harm the beetle, as long as measures were put in place to provide protective habitat for the beetles. This involved a three-year voluntary effort. While some landowners were skeptical of the effort, one landowner noted, the greater outcome is the evolution of viewpoints of the diverse people that came together to make this happen. Many involved in the Lower Mokelumne River Watershed stewardship initiative agree the development of the Safe Harbor Agreement and trust fostered between stakeholders involved is the most significant outcome of all. Additionally, in 2013, the restoration work in the Lower Mokelumne River Watershed was recognized and cited in the congressional record for contributing to the proposed delisting of the beetle from the threatened species list.

The Lodi Rules for Sustainable Winegrowing

The Lodi Rules for Sustainable Winegrowing, established in 2005, promotes the adoption of sustainable viticulture practice among winegrape growers throughout the Lodi region. Lodi Rules was the first third party sustainable winegrowing certification program in the state.

"Sustainable viticulture" is a term used when principles of sustainable agriculture are practiced in the vineyard (Lodi Rules, 2013). The Lodi Rules program grew out of the *Lodi Winegrower's Workbook* and was developed through a partnership between the Lodi Winegrape Commission and Protected Harvest. The Lodi Rules program addresses consumer perception of Lodi winegrapes, winegrape marketability and quality, agricultural impact on the environment and human health, and wildlife habitat and biodiversity throughout the region (Lodi Rules, 2013).

Growers who achieve the Lodi Rules certification standards display a Certified Green seal on wine bottle labels. One component of certification requires growers to attend meetings with a local watershed stewardship group. For growers in the Lodi region, this means attending the Lower Mokelumne River Watershed Stewardship Committee meetings. This requirement in the Lodi Rules increases landowner participation in the Committee meetings. The *Lodi Winegrower's Workbook* and the Lodi Rules program have served as models for California's statewide sustainable winegrowing program, and have sparked interest in Oregon and Washington. The program has recently gained international attention with the prospect of being adopted in Israel and other winegrowing regions around the world.

Key Findings

Watershed improvement activities in the Lower Mokelumne River Watershed have led to an array of environmental, economic, and social outcomes that not only display, but also contribute to high levels of organizational, technical, and grant-acquiring capacity within the Lower Mokelumne River Watershed Stewardship Committee. Products that came out of the supported grants and continue to influence the implementation of projects include the *Lower Mokelumne River Watershed Stewardship Plan*, the *Mokelumne River Watershed Owner's Manual*, the *Lodi Winegrower's Workbook,* and the Lodi Rules Certification Program.

Significant environmental outcomes include the development of California's first programmatic Safe Harbor Agreement, the removal of the Murphy Creek dam, wildlife habitat restored across property boundaries, and more broadly, widespread adoption of sustainable best practices in both agricultural and urban communities. From an economic standpoint, the adoption of sustainable best practices in the field has shown to be a valuable marketing mechanism for Lodi winegrape growers, resulting in a boost in the marketability and reputation of Lodi winegrapes. Another major economic outcome has been the stewardship group's ability to secure additional project funding through additional grant awards and support from EBMUD and the Lower Mokelumne Partnership. In realizing the benefit of multi-stakeholder collaboration and watershed coordination, EBMUD and the Lower Mokelumne Partnership shifted from only funding on-the-ground projects to also funding initiatives that would contribute to expanding watershed education to benefit watershed-based social outcomes. Such activities changed the way agencies and organizations viewed the importance of watershed management. Beyond agencies and

organizations, shifts in perspectives spread throughout the stakeholder group, leading to one of the most significant social outcomes of the watershed activities—trust and relationships built among diverse interests, false stereotypes dispelled, and standing viewpoints evolved. Additionally, coordination became more effective throughout the course of practicing collaborative processes while stakeholders with different needs were encouraged to connect and set common goals. Outside of the stakeholder group, rural and urban community members gained awareness of their own and the other's impacts on watershed health, and numerous youth learned about and participated in watershed restoration efforts.

These outcomes were achieved and contributed to by an aggregate of key elements as identified through stakeholder interviews and information conveyed in the final report. Overlapping key elements include sufficient grant funding, clear programmatic goals outlined in a watershed management plan, inclusive and diverse stakeholder participation in the development and implementation of the management plan, effective and consistent coordination, and an adaptive process. Driving these elements forward was a watershed coordinator, whose position was predominantly funded by DOC Watershed Coordination Grant Program with additional support from the Lower Mokelumne River Partnership. The watershed coordinator fulfilled many essential roles that contributed to the positive outcomes seen throughout the watershed. The coordinator increased stakeholder participation, promoted collaboration, and facilitated trust building in both interpersonal relationships and formal partnerships. The coordinator helped to increase organizational and technical capacity in the group by gathering and distributing information to the stakeholder participants, finding the resources needed to plan and implement projects, enlisting the expertise of state and federal agency personnel and partners, and contributing an overarching narrative for grant proposals. The coordinator kept the group and the partnerships alive by fulfilling the logistical role of writing and consolidating agendas and minutes, maintaining an open space for diverse ideas and communication, advancing the overarching goals outlined in the management plan, and engaging an adaptive management process. The watershed coordinator displayed an assortment of characteristics that contributed to effective coordination—likeable, kind, confident, an effective communicator, an attentive listener, a nurturer, a catalyzer, and the glue that connects visions and maintains stakeholder engagement.

The process in which key elements were exercised and outcomes were achieved in the Lower Mokelumne is characterized as voluntary, community-driven, and adaptive. Several interview participants noted that stakeholders, landowners especially, are "more willing" and "more empowered" to participate under voluntary circumstances. It was the looming "threat" of regulation that originally mobilized landowners and other stakeholders, who had the mindset of, "We're going to get in front of this and regulate ourselves." The stewardship group that formed out of this has maintained a non-confrontational, community-led approach to watershed activities where self-interests are addressed through collective action. The watershed coordinator

reinforced this approach by "keeping the community in the lead" and "keeping the management plan as the answer." Through an adaptive process and goals identified in the existing management plan, the watershed coordinator guided the group through visioning exercises, identified joint goals, explored roads that lead to outcomes, and forged the partnerships and compromise needed to get there. The coordinator regularly charted successes, outcomes, and challenges, and then worked with the group to identify next steps. Stakeholders, through this process, believed in their work, gained trust amongst each other, increased levels of participation, and further supported the overall efforts.

In recent years, there has not been full funding for a watershed coordinator in the Lower Mokelumne River Watershed. Following the departure of the watershed coordinator, the group shared some of the coordination tasks that had been provided for over a decade, and recently EBMUD has extended funding for a part-time position, though many noted that part-time is inadequate to maintain the momentum and provide the needed attention to the myriad of issues of the watershed group. The group now grapples with whether one entity or a shared effort should financially support coordination. Many in the Committee have recognized a decline in motivation and stakeholder participation, a slow-down of projects, and a decrease in grant-writing capacity from the SJCRCD. One informant expressed the fear that without the presence of a watershed coordinator, everyone may retreat to working in individual bubbles. Without the enterprise of a central watershed coordinator, it is a challenge for individuals to harness energy and collectively move forward.

Appendix A: Methods

This case study is based on nine stakeholder interviews and a review of grant documents provided by the Department of Conservation, the SJCRCD website, and multiple stakeholders (See *Appendix A* for Available Documents). Seven out of nine interviews were made possible with a two-day visit to the City of Lodi by two Sierra Institute researchers; two interviews occurred over the phone. Stakeholders interviewed include former staff of the SJCRCD, including Special Projects Manager and Watershed Coordinator, the Watershed Program Coordinator with the City of Lodi, the Project Manager with the San Joaquin Council of Governments, a former biologist and a Watershed Planning Analyst with East Bay Municipal Utility District, former Sustainable Winegrowing Director of the Lodi Winegrape Commission, and two local stewards and landowners associated with Lange Twins Family Winery and Vineyard and Vino Farms (See *Appendix B* for List of Interview Participants).

Appendix B: Interview Participants

Representatives from one or more of the following:

San Joaquin County Resource Conservation District
City of Lodi
Vino Farms
East Bay Municipal Utility District
Lange Twins Family Vineyard and Winery
San Joaquin Council of Governments
Lodi Winegrape Commission
East Bay Municipal Utility District

Appendix C: Available Grant Documents and References

San Joaquin County Resource Conservation District	Grant Proposal (Submitted to granting agency)	Quarterly or Annual Update(s)	Final Report (Submitted to granting agency)	Catalogued Description (Published by granting agency)	Catalogued Final Report (Published by granting agency)	Other
Murphy Creek Restoration Project (2000-2003)			X	X		
Lower Mokelumne River Stewardship Plan Implementation (2003-2007)			X	X		
Mokelumne River Watershed Coordinator (2007-2007)			X		X	
Continuing Education, Outreach, Restoration, and Monitoring in the Lower Mokelumne River (2007-2010)			X			
Mokelumne River Watershed Coordinator (2008-2012)	X	X			X	

References

Lodi Winegrape Commission. (2013). The Lodi Rules for Sustainable Winegrowing Certification Standards, Second Edition. Lodi Winegrape Commission, Lodi, CA.

San Joaquin County Resource Conservation District. (2002). *Lower Mokelumne River Watershed Stewardship Plan*. Lodi, CA.

San Joaquin County Resource Conservation District. (2002). *Mokelumne River Watershed Owner's Manual*. Lodi, CA.

Case Study: Solano County Water Agency

Watershed: Lower Putah Creek watershed
Researcher: Jeff Borchers

Year	Grant Program	Project Title	Watershed	Award Amount
2000-2001	CalFed Watershed Program	Lower Putah Creek Watershed Assessment and Stewardship Implementation Program	Lower Putah Creek, 18020162	$600,000
2002-2003	CalFed Watershed Program	Putah Creek - Yolo Housing Authority Project	Lower Putah Creek, 18020162	$279,655
2003-2004	CalFed Watershed Program	Community-Based Restoration of Lower Putah Creek Watershed	Lower Putah Creek, 18020162	$992,236
2007	CalFed Watershed Program	Lower Putah Creek Winters Area Riparian Restoration Projects	Lower Putah Creek, 18020162	$536,490
2008	CalFed Watershed Program	Lower Putah Creek Watershed Plan Priority Projects	Lower Putah Creek, 18020162	$1,987,000

Overview

This case study involved an assessment of five CalFed Watershed Program grants to Solano County Water Agency between 2000 and 2008. Findings of this research are based on interviews with stakeholders involved and a review of documents associated with the grants.

Lower Putah Creek Watershed[27]

Located in west-central California, Putah Creek watershed encompasses 638 square miles and is a tributary of the Sacramento River. The creek originates in the Macaymas Mountains in Napa and Lake counties, and flows eastward 81 miles into Berryessa Reservoir behind Monticello Dam. Water released from the dam flows an additional 8 miles to a second dam, the Putah Diversion Dam (PDD), where most is diverted south to users in Solano County. The stream section below the PDD is the central focus of this case study, hereafter referred to as lower Putah Creek. This section of the creek flows 23 miles across Yolo and Solano Counties to the Yolo

[27] This section draws from several sources: Rubin (1988); Smith, 1991; Kiernan, Moyle, & Crain, 2012; and Moyle, Marchetti, Baldrige, & Taylor, 1998).

Bypass, a flood control channel that empties into Sacramento River. Approximately 72% of lower Putah Creek flows through private lands ("The Pied Piper guides creek restoration, restores peace," 2014).

Background

The Putah Creek watershed was once home to the Patwin people, whose livelihoods depended on resident and anadromous fish. Following Euro-American settlement of California, the region grew increasingly agricultural, particularly in the 19th century when the creek was used primarily as a ditch for flood control, drainage, gravel mining, and trash disposal. In 1957, the U.S. Bureau of Reclamation completed the Solano Project, which included Monticello Dam (forming Berryessa Reservoir) and the Putah Diversion Dam (PDD; forming Lake Solano). The project provides water for agricultural, municipal, and industrial uses, as well as flood control and recreational opportunities. Notwithstanding the degradation and dams of the 19th and 20th centuries, the creek—particularly between the two dams—continued to support remnant populations of native and nonnative fishes.

Putah Creek has a long history of conflict and litigation stretching back to the inception of the Solano Project by the Bureau of Reclamation. As early as the 1940s, when the project was under consideration by the Bureau, diverse parties

> opposed the project because they anticipated that it would adversely affect Putah Creek below the proposed [Putah] Diversion Dam. Surface diverters on the lower creek anticipated that project diversions would interfere with the exercise of their rights to divert water naturally occurring in the lower creek. Groundwater users feared that reduced flows in the lower creek would interfere with the exercise of their rights to pump groundwater by percolation from the creek (Smith, 1991, p. 6)

Presaging more recent conflicts, California's Department of Fish and Game (now Department of Fish and Wildlife) was also in opposition at the time, maintaining that appropriation of water by the Bureau would destroy fish in the creek.

Despite opposition, the project was finally completed in 1957. In the decades that followed, issues of fisheries, water rights, and groundwater recharge imbued conflicts around water *release schedules* from Monticello Dam. The State Water Rights Board (now the State Water Resources Control Board) exercised jurisdiction several times over the years, finally establishing a "fixed release schedule" in 1970. The intent was primarily to recharge groundwater and fulfill riparian rights, not address the health of fish populations. There were many challenges to this schedule over the years, but in the end the revised release schedule perpetuated the previous disregard of fish in lower Putah Creek.

In the summer of 1989, after three years of drought, some 20 miles of lower Putah Creek went dry. The resulting die-offs of fish and impact on riparian wildlife prompted a local non-profit organization, Putah Creek Council (PCC), to file a lawsuit against Solano County Water Agency and one of its member units, Solano Irrigation District. PCC's mission includes "advocacy, education, and community-based stewardship" in protecting and enhancing Putah Creek ("Our Mission, Vision, Values, and Guiding Principles | Putah Creek Council," n.d.). The lawsuit sought to increase flows in lower Putah Creek, and the non-profit eventually was joined in the suit by several municipalities and the Regents of the University of California. [28]

After years of legal maneuvering, the case finally went to trial in 1996. Five weeks later, and after lengthy scientific testimonies, the court ordered a 50% increase in the minimum release schedule to maintain surface water flow from the PDD to the Yolo Bypass (Moyle et al., 1998). This ruling in favor of plaintiffs—plus the threat of a precedent-setting appeals case—stimulated appetite for negotiations among all parties. By 2000, the Putah Creek Accord had been hammered out and signed, thereby establishing and implementing a final flow regime based in science, one mimicking ecologically significant components of the creek's historic flow regime (California Superior Court, 2000; Grantham & Moyle, 2014). The Accord even went beyond the court's mandates to include additional spring and winter "pulse flows" for anadromous fish, including fall-run chinook salmon (Ross, 2014).

Organizations and Grants

Formed in 1951, the Solano County Water Agency (SCWA) is a wholesale water supply agency representing all local agencies involved in water and flood management in the county. Its Board of Directors includes members of the Solano County Board of Supervisors, mayors of Solano County cities, and directors from agricultural districts that provide retail water. The agency also engages in flood management and, congruent with the Putah Creek Accord, habitat conservation activities ("Solano County Water Agency : About Us," n.d.).

The Putah Creek Accord committed SCWA to pay $410,000 annually toward creek restoration projects through a new committee of representatives from both counties, the *Lower Putah Creek Coordinating Committee* (LPCCC)("Saving Putah Creek: A dramatic victory in court," n.d.). The committee was the political centerpiece of the Accord, which also enjoined SCWA to fund the permanent position of *Streamkeeper*, to be overseen by the LPCCC.[29] The Accord also

[28] UC Davis and the City of Davis joined later as complainants.
[29] The Lower Putah Creek Coordinating Committee consists of: Cities of Davis, Fairfield, Suisun City, Vacaville, Vallejo and Winters; Counties of Solano and Yolo; Solano and Yolo Riparian Landowners; Maine Prairie Water District; Solano County Water Agency; Solano Irrigation District; Putah Creek Council and University of California, Davis ("LPCCC," 2015).

directed SCWA to provide administrative support for the LPCCC, its committees, and the Streamkeeper.

The LPCCC provides a forum to support restoration projects, secure grant funds, advocate for specific projects, and disseminate information, but it has no regulatory or land use authority (Solano County Water Agency, 2018). Its many responsibilities under the Accord include grant seeking, maintaining an active public education and information program, and monitoring.

Duties of the Streamkeeper are diverse, and include preparing reports to the LPCCC on all aspects of lower Putah Creek, attending LPCCC meetings, weekly monitoring and recording stream flows and diversions, coordinating field trips and projects to enhance the natural values of lower Putah Creek, and reporting to the LPCCC activities harmful to the health of lower Putah Creek (California Superior Court. 2000). Informants in this study pointed out that the original vision of the Streamkeeper role was someone who "polices" for violators of the Accord, specifically, any illegal diversions of flow in lower Putah Creek.

CalFed watershed project grants

In all, the LPCCC received five CalFed grants that were aligned with the Accord's mandates for "preservation and enhancement," "public projects," and monitoring (California Superior Court, 2000). The grants were thematically aligned to address infestations of invasive weeds, eroding banks, habitat loss and degradation, flood-related problems, and non-point source pollution.

2000-2001 Project grant: Lower Putah Creek Watershed Assessment and Stewardship Implementation Program

The first of the five CalFed grants received by SCWA, *Lower Putah Creek Watershed Assessment and Stewardship Implementation Program*, defined and initiated an approach to "restore ecosystem processes and aquatic and terrestrial habitats in the lower Putah Creek watershed, including lower Putah Creek and its tributaries" ("Watershed Program Archive - CalFed," n.d.). Described as a *Watershed Management Action Plan* (WMAP), this long-term, three-phased strategy consisted of:

- Phase I: Stewardship Process—Evaluate the opportunities and constraints for resource enhancement within the watershed, using the priorities determined by the community.
- Phase II: Resource Assessment—Document the history and present conditions of the creek and watershed and provides a comprehensive assessment of the biological, physical and cultural resources.
- Phase III: Implementation—Initiate technically defensible and sustainable restoration and enhancement projects, subject to funding, permits and regulatory approvals (Solano County Water Agency, 2006; The Flow, 2002).

A total of 36% of this CalFed grant focused on conducting a comprehensive physical and biological resource assessment in support of the larger WMAP (Solano County Water Agency, n.d.). Another 34% was allocated to implementation, primarily an *Adopt-A-Reach Community Stewardship*, a multifaceted, community-based stewardship program contracted to Putah Creek Council. The program involves community groups and volunteers as creek stewards, with work done on both public and private lands, the latter with full consent of landowners ("Putah Creek Council Volunteer Opportunities - VolunteerMatch," n.d.).

Phase I activities continued a previously-funded process of seeking input and participation from diverse stakeholders to identify key ecosystem issues affecting lower Putah Creek and its tributaries.[30] This input was, and continued to be in subsequent CalFed grants, critical to the development of a stakeholder-based WMAP.

With just 6% allocated to fish habitat and wildlife enhancements, Phase III was more about future intent than applied work. It was generally agreed that as the project progresses, additional Phase III projects would be identified for funding by other sources (CalFed Bay-Delta Program, n.d.). The WMAP itself was designed to be a dynamic "conceptual and planning framework" that could be updated with new information and ideas for watershed enhancement "in a manner that is compatible with and respectful of landowner priorities, interests, and concerns" (Putah Creek Council, n.d.).

2002-2003 Project grant: Putah Creek – Yolo Housing Authority Project

With the second of its five CalFed grants, the SCWA initiated a vigorous cleanup campaign along one of lower Putah Creek's most degraded reaches near Yolo Housing Authority (YHA), a public housing development in Winters, CA. In addition to "nonnative vegetation," the densely populated site was described as having "more submerged tires and other debris per square foot than at any other location in lower Putah Creek." As such, the eight acres of riparian habitat was seen as a chokepoint along an important wildlife migration pathway from the north coast to the Bay–Delta (CalFed Bay-Delta Program, n.d.).

Restoration planning for this grant was informed by a vigorous outreach effort spearheaded by a

[30] According to the proposal for this grant, "[s]takeholder organizing and facilitation began with formation of the LPCCC and continues with implementation of a CalFed-funded Stewardship grant. The grant was originally awarded to the Solano County Department of Environmental Management (SCDEM) and is jointly implemented by SCDEM, the LPCCC, and the Putah Creek Streamkeeper."

succession of community liaisons. The first liaison, supported by the UC Davis Public Service Research Program, interviewed residents and ultimately drafted a "grass roots restoration plan" that encourages continued interest in Putah Creek after the restoration work is completed (Garzon, 2004; Putah Creek Council, 2004).

Using mechanical and chemical means of abatement, the project removed 60 (non-native) eucalyptus trees as well as 2.5 acres of Himalayan blackberry and other invasive species such as tree-of-heaven. The eucalyptus logs were used for bank stabilization, and chipped slash provided mulch for native vegetation. In the course of the work, 10 truckloads of trash were removed. Fish habitat was enhanced with two rock weirs designed to retain spawning gravels and narrow an over-widened channel to create higher, and more natural, flow velocities)EDAW, 2008).

At all stages of the project, residents of the YHA property were informed about creek restoration and invited to participate. The first community liaison was able to elicit participation from 24 households in the course of conducting a survey of community values, needs, attitudes and uses of the creek (Garzon, 2004). Principles of stewardship were fostered by having residents (especially children) participate in restoration activities such as planting native vegetation, removing weeds, disposing of trash, and attending an aquatic insect identification event.

2003-2004 Project grant: Community-Based Restoration of Lower Putah Creek Watershed

The overall goal of this project was to foster "an informed and engaged stakeholder community that is active in watershed planning, restoration and monitoring." To that end, 1170 volunteers participated in 48 educational restoration and monitoring events that included restoration planting, benthic invertebrate monitoring, weed control, cleanup, and community seminars and educational events. The latter included a series of *Creek Speak!* seminars on all aspects of Putah Creek's human and natural history. A guidebook, *Putah Creek: Flowing Through our Communities and our Lives*, also was published (Solano County Water Agency, 2010).

On a purely educational note, along the *Putah Creek Discovery Corridor*, a total of 1775 individuals attended 120 docent-led public outings.[31] Thirty of the docents were trained as part of

[31] Putah Creek Discovery Corridor refers to the 6.5 mile inter-dam reach of Putah Creek that lies between Monticello Dam and Putah Diversion Dam. The area is known for its relatively healthy riparian zone and fish populations, and was the focus of an early (ca. 2004) outreach effort to forge a "cooperative" among diverse agencies, businesses, landowners, and other. The planning effort involved the LPCCC, Bureau of Reclamation, Bureau of Land Management, Solano County Parks, Yolo County Parks, U.C. Davis John Muir Center for the Environment, Blue Ridge Berryessa Natural Area, California Audubon, Solano Resource Conservation District, Yolo Resource Conservation District and City of Winters.

this project. Thousands of students from scores of local schools (K-12, college) were involved in numerous events. As a result of the extensive outreach and educational activities, the list of existing partnerships (Putah Creek Council, U.C. Davis Riparian Reserve) grew to include members of Putah Creek Discovery Corridor (i.e., the cooperative), local schools, and government agencies.

The restoration work achieved in this grant was bolstered by a large amount of matching funds. The amount from this grant, $992,236, was supplemented with an additional $4.374 million from other sources, including the previously discussed *Putah Creek – Yolo Housing Authority Project*. The high profile afforded by these funds, as well as the expansion of public and agency participation, stimulated interest in the future of the creek. From a planning perspective, this CalFed grant was crucial in advancing stakeholder involvement in designating and prioritizing future projects along lower Putah Creek.

The logical context for such a vision was the pre-existing 2005 Watershed Management Action plan (WMAP), which represented extensive physical and biological assessments of lower Putah Creek. The start of this process was a series of "stewardship meetings" in 2006 in Winters, California involving approximately 100 landowners and other stakeholders. Over several weeks, a working group defined four main projects types for lower Putah Creek: *invasive species removal*, *bank stabilization*, *trash clean-up*, and *fish and wildlife habitat enhancement*. In addition, the group developed a set of eight selection criteria for prioritizing areas for restoration:

- High level of landowner cooperation
- Landowner commitment to long-term maintenance
- On-site availability of materials for restoration
- Project qualifies for available/multiple funding sources
- Project is on lands contiguous with other restoration or enhancement projects
- Project location allows for public education
- Project is located upstream
- Project includes multiple project types

Of the 63 potential projects identified, the area known as Winters Putah Creek Nature Park, in Winters, CA, emerged as top priority, along with the upstream Dry Creek confluence with Putah Creek (EDAW, 2008). Part of the motivation of private landowner stakeholders was to reduce trespass by increasing access to public lands (EDAW, 2008). The selection of Winters as top priority was not without scientific merit, however, as project types and selection criteria were guided by fluvial geomorphology theory. In practical terms, this translated to a selection of projects that would contribute to an overarching geomorphological restoration of a previously self-sustaining ecosystem.

2007 Project grant: Lower Putah Creek Winters Area Riparian Restoration Projects

The fourth in the series of CalFed project grants represents a significantly expanded scope and vision for the watershed, one that emerged from the previously discussed stakeholder process and WMAP resources assessment.[32]

The City of Winters, CA has been described by one respondent as a "willing municipality" that was already engaged in downtown revitalization. Before its restoration, the Winters Putah Creek Nature Park area had been characterized by its "stagnant water, lack of shade, lack of continuous floodplains, and prevalence of foreign vegetation [which] has created a place with diminished abundance of wildlife" ("Selecting Priorities: Winters Putah Creek Park | Putah Creek Council," n.d.). One resident of Winters noted that an Audubon bird count had shown a "dead zone" in the Putah Creek reaches around the city. Another stated that creek area was "one large blackberry bramble."

In addition, since 1995 the City of Winters has had a Putah Creek Master Plan, which proposed improved recreational access, invasive weed control, and refurbishment of a 1907 railroad trestle bridge as a bike and pedestrian crossing. The bridge work was completed in 2005, linking the city-side north bank with the less developed south bank.

The grant proposal requested $536,490 to achieve a number of objectives that dovetailed with other funding sources that amounted to $739,534. This sum included cash and in-kind resources from the California River Parkways Program ($452,000), SCWA ($170,000), and "volunteers" ($97,374). The CalFed proposal had two main objectives: (1) establish a 15-foot-wide native vegetation hedgerow (to exclude traffic and dumping) along three miles of the south bank of lower Putah Creek across from the City of Winters, and (2) extend bank re-vegetation for 3600 linear feet along Dry Creek on the southwestern boundary of the city.[33] Activities included installing a water supply, providing for erosion control, trash cleanup, and monitoring wildlife.

Most of this work was supported by both CalFed funds and the other funding sources. However, the $452,000 received by LPCCC from California River Parkways Program was designated for removal of a 1930s-era percolation dam that failed in 1952. The rationale for its removal is detailed in the Winters Putah Creek Nature Park Master Plan, including a determination from the Department of Fish and Game that the dam inhibited salmonid migration.

[32] Much of the information below is drawn from the original proposal to CalFed, *Lower Putah Creek Watershed Winters Area Riparian Restoration Projects*, specifically three documents: Exhibit B-Project Budget and Full Proposal Application (Sections 1 and 2).

[33] Previous restoration work had been completed at the Dry Creek confluence with Putah Creek, supported by a $310,000 grant from the Urban Streams Restoration Program, California Department of Water Resources.

This CalFed grant engaged a number of groups, as "implementing partners" in pursuit of project goals. These entities, deploying scientists, students, community volunteers, and advocates, included the following:

UC Davis	Terrestrial biomonitoring	$72,000
Audubon California	Establish native vegetation	$116,625
Center for Land-Based Learning	Student learning events	$60,225
Putah Creek Council	Volunteer coordination	$112,950
Solano County RCD	Establish native vegetation	$20,160
Yolo County RCD	Establish native vegetation	$19,125

A public advisory group formed by the city, Winters Putah Creek Committee (WPCC), was instrumental in coordinating restoration work in the center third of the three mile reach of Putah Creek. This group also hosted community workshops to present information and solicit input to the development of the Putah Creek Nature Park Master Plan. Given the complexity of stream restoration, topics included stream geomorphology, historical and current stream conditions, percolation dam removal, vegetation management, and creek "realignment."

2008 Project grant: Lower Putah Creek Watershed Plan Priority Projects

The final CalFed grant received by SCWA expanded significantly on previous restoration work initiated with the 2007 CalFed project grant and other funding. It continues to fulfill the vision of the WMAP, to restore the lower Putah Creek watershed to an ecologically self-sustaining condition (Solano County Water Agency, 2008). The 2008 CalFed grant focused on the highly disturbed channel form of the creek, with its past history of manipulation for water storage, flood conveyance, and gravel extraction. It also continued the work of stabilizing stream banks, enhancing habitat, and removing invasive plants.

The negative ecological impacts of a stream channel that is "out of natural form" are numerous, and described by the current condition of lower Putah Creek. The creek has "a much larger cross sectional area of wetted channel than the creek can restore on its own," partly because native vegetation has been supplanted by invasive species such as arundo, Himalaya blackberry, and eucalyptus. These species—plus a history of gravel mining—have resulted in a creek with both excessive channel width and depth. This translates to warmer waters, as well as a long-term disruption of spawning gravel replenishment for fish reproduction.

This grant amount, $1,987,000, coupled with significant funds from the California River Parkways Program and local and federal match dollars, levied a total sum of $4,710,513 for the overall project. The centerpiece of the larger, combined project was to restore natural channel

dimensions by rebuilding floodplains, an engineering feat that effectively expands floodplains, narrows the channel, and restores the creek's "competency" to mobilize spawning gravels and create a host of other benefits. The ecological rationale—drawn from current theories in fluvial geomorphology—is that such manipulations will eventually restore the stream channel's capacity for self-renewal and create a "more naturally-functioning ecosystem appropriate to *current flows*," which is mainly a function of the Putah Creek Accord's release schedule (Solano County Water Agency, 2015; UC Davis Museum of Wildlife and Fish Biology, 2015).

Partners as contractors on the 2008 CalFed grant included most of the entities from the 2007 grant: Putah Creek Council, U.C. Davis Museum of Wildlife and Fish Biology, Audubon California, Solano RCD, Center for Land-Based Learning, and Yolo RCD. In addition, a consulting fluvial geomorphologist from Streamwise and engineering firm Wallace-Kuhl were retained for channel realignment work. Notably, the largest allocation from this grant ($517,000) was to U.C. Davis for biological monitoring, primarily of birds reliant on the creek's habitat and insects.

Key Findings

One prominent scientist-advocate interviewed for this study and who is knowledgeable about many such projects in California, stated, "the Lower Putah Creek is one of the better projects…top 15%." One prominent fisheries biologist who has worked closely in the recovery effort, characterized the success of the overall venture:

> With the establishment of permanent flows, riparian plants, birds and other organisms began to flourish…as did restoration projects, such as removing large amounts of trash, planting native vegetation and undertaking large-scale improvements of the stream channel. These major changes were the result of a combination of factors: (1) enthusiastic citizenry, led by the Putah Creek Council; (2) a full-time stream keeper to manage the creek and restoration projects; (3) a cooperative water agency; (4) cooperative riparian landowners; and (5) annual monitoring of both aquatic and terrestrial organisms" (Moyle, 2014, p.1338).

In the sections that follow, the legal, scientific, and social factors that contributed to the success of the CalFed projects (and others) are discussed.

Lawsuit and accord

The first, and earliest step towards effective collaboration and restoration work in lower Putah Creek was, ironically, the initial 1989 lawsuit brought against SCWA by the PCC. This was new territory for what one respondent called a "science focused" organization that "refused to

denigrate or demonize the opposition." But a three-year drought, coupled with large fish kills, motivated the PCC's legal action, which ultimately ended with a judgement in their favor.

This legal judgement offered creative "sideboards" for collaboration among the former legal adversaries, including (1) a revised flow schedule for the dry season (i.e., increased flows); (2) an annual financial allocation for restoration work from SCWA; (3) formation of the quasi-independent LPCCC; and (4) a Streamkeeper position. The first product of this collaboration was the establishment of the Putah Creek Accord, a formal final settlement among PCC, SCWA, and other litigants.

Within the agency, the commonly-held view is that the Accord is a significant success. One individual lauded the fact that the LPCCC is "hitched" to the "stability of the water agency" (SCWA), which is committed to providing an annual baseline level of funding out of its budget for the Streamkeeper position and restoration work. Moreover, because the Accord has "genius" behind it, it is like "playing a winning hand."

Although the outcome of such a "coerced collaboration" can never be guaranteed, it is likely that after 10 years of conflict, all parties were exhausted and ready to seek resolution. It is also possible that other factors were at play, including the appeal of applying a rigorous scientific perspective in managing water resources as an ecosystem service to be sustained.

Science and scientists

The lawsuit brought by the PCC against SCWA and other parties had an additional benefit: it brought science and scientists to the fore, first in testimony, then in giving the Putah Creek Accord a rigorous empirical framework, followed by extensive involvement in planning, monitoring, and direct participation. One agency employee ventured that because of the litigation (and proximity to U.C. Davis), Putah Creek is one of the most studied creeks for its size.

The scientific door opened by litigation and the resulting Accord set the stage for testing cutting-edge theories in geomorphology and ecology. The Accord mandated four types of releases and instream flows from the Putah Diversion Dam into lower Putah Creek: rearing, spawning, supplemental, and drought year. The goal was to define a release schedule that would resemble the historical *natural flow regime* in ways that would benefit key species of fish and riparian habitats, especially regarding the timing of releases (Poff et al., 1997).[34] Because of competing water demands, the Accord defined a less-than-natural release schedule, one designed to retain ecologically significant components of the hydrograph—functional flows—rather than mimic the

[34] Parameters of a natural flow regime include magnitude, frequency, duration, timing, and rate of change.

full natural flow regime (Yarnell et al., 2015). This "pulse-flow" model had, almost from the outset, a positive impact, appearing as migrating fall-run Chinook salmon.

The natural flow regime concept suggested not only the judicious use of water for fish health, but it also provided a foundation for re-designing the morphology of the stream channel:

> In rivers, the physical structure of the environment and, thus, of the habitat, is defined largely by physical processes, especially the movement of water and sediment within the channel and between the channel and floodplain. To understand the biodiversity, production, and sustainability of river ecosystems, it is necessary to appreciate the central organizing role played by a dynamically varying physical environment (Poff et al., 1997, p. 771).

Embedded in the natural flow regime concept is a scientific rationale for *geomorphological restoration* of lower Putah Creek, an approach that emerged as a high priority in the planning process. A previous study of lower Putah Creek had revealed an excess of pool habitat and elevated floodplains, a legacy of gravel mining and invasive plant species (Yates, 2003; Solano County Water Agency, 2010). Geomorphological restoration assumes as its target a stream channel morphology that would emerge over time as a product of the current "dynamically varying physical environment." This environment, of course, now includes the Accord's new flow regime. Rather than waiting for centuries, with good predictive models the new morphology could be engineered, as has been done in the Winters area projects using earth moving equipment, native vegetation, invasive species removal, and bank stabilization.

Outreach and collaboration

According to one landowner interviewed, along the banks of lower Putah Creek there are approximately 130 landowners, many of them growers of almonds and walnuts. A large proportion of these individuals eventually participated in the planning and execution of restoration projects on private and public lands. This level of engagement has been vital to the success of restoration process, but its beginnings have been described as a "slow start." Not only had a major lawsuit just been settled after 10 years of conflict, but starting in 1989, SCWA had sued all the private landowners along lower Putah Creek (and UC Davis) over water diversions. In the words of one reporter, "[t]his…poisoned any relationship between landowners and the water agencies for the next decade…" ("Chapter Four," n.d.; "Chapter Three," n.d.). These factors, plus the vision of the Streamkeeper as a policeman for violators of the Accord (i.e., illegal diversions), made for an uphill battle to engage stakeholders.

Though slow to start, progress was nonetheless evident. One interviewee referred to a stakeholder outreach and facilitation around 2000 just after the formation of LPCCC. He

characterized the meetings as having "lots of venting," yet believes that it ultimately "stimulated restoration." Other attempts to engage landowners followed, each including facilitations by Dennis Bowker and consulting group, MIG. By 2006, there were working agreements in place with 49 landowners ("Chapter Four," n.d.). These agreements are substantial achievements, in that they represent private landowners who have entrusted a government agency (SCWA operating through LPCCC) to complete engineering projects along the creek.

Now, according to one of the earliest landowners to engage, there are roughly 150 landowners "on board," with three fourths "cooperating" and two-thirds with signed agreements with SCWA/LPCCC. This individual, as well as most of the interviewees in the study, attribute this level of engagement to the unique skill set of the Streamkeeper who has remained in that position since 2000. Trained as a horticulturist, this SCWA employee gives much credit for his successes to CalFed's "watershed program philosophy" and the training he received in community partnership building as part of consultant Dennis Bowker's "watershed boot camp." In his words, this was a philosophy that seeks "holistic solutions that do not vilify." A final, but not insignificant factor in this successful engagement, is the decision by SCWA to contract with former legal adversary, PCC, to conduct outreach efforts among stakeholders.

While building support among landowners for some well-funded planning and restoration projects (e.g., the 2006 "stewardship meetings" in Winters), the Streamkeeper continued to "police" illegal water diversions. According to one respondent, in 2008, a drought year, there were five "flow violations" in one month that nearly led to another round of lawsuits against offending landowners. This time, however, the Streamkeeper and SCWA leadership brought in Dennis Bowker to facilitate a "self-policing" agreement among the parties. One interviewee lauds Bowker with having done "good therapy with hostile land owners."

Finally, it must be noted that there has been vocal opposition from several individuals in the Winters community against "geomorphological engineering" and what they deem "an unproven and radical method of Creek channel narrowing and relocation using heavy equipment and imported fill..." ("What We Oppose,"n.d.). Although this type of engineering is not unproven, the scope and extent of proposed changes to the creek channel does suggest that project proponents carry the burden of proof. Conversely, advocates who view lower Putah Creek as "a natural ecosystem that should largely be left to its own devices" also bear the burden of proof regarding their hands-off approach. In short, there are the risks of action to be weighed against the risks of inaction, a task that calls for the best available science conducted with extensive and intensive monitoring, the hallmark of adaptive management. To all appearances, this has been the approach taken in lower Putah Creek, where there has been in-depth participation by top scientists and subject matter experts in designing, planning, and executing restoration projects that will likely hold many lessons.

Lessons Learned

The LPCCC and its fiscal sponsor, the SCWA, have applied a long-term disciplined and coherent strategy to achieve or exceed the original objectives of the CalFed watershed program. With copious matching funds from other granting agencies, the organization has leveraged a unique confluence of circumstances, events, and resources into notable accomplishments, namely the ecological restoration of a degraded stream ecosystem and the invigoration of the social landscape that surrounds it.

With the signing of the Putah Creek Accord, SCWA, through the LPCCC and its Streamkeeper "point person," was well-positioned to capitalize on the 2000 implementation of the CalFed Watershed Program. In effect (and perhaps inadvertently), the Accord carved into legal stone a "community-based and locally led approach to achieving the goals of the CalFed Program." ("Watershed Program Archive - CalFed," n.d.). Indeed, most respondents in this study viewed the CalFed grants as "foundational," and that they were instrumental in leveraging other funding sources.

That foundation, while fiscally generous, was also philosophically imbued with the spirit of the watershed approach as promulgated by individuals like Dennis Bowker. The approach, with its emphasis on collaboration and stakeholder involvement, became the *modus operandi* of the LPCCC and its Streamkeeper. One could assert that their willingness to adopt that approach was borne out of crisis—years of litigation, drought, and environmental degradation. However, there are indications that the legal mandate to collaborate was embraced—not just tolerated—by all parties as they forged a binding Putah Creek Accord.

The acceptance of the Accord and the LPCCC was apparently a gradual process for SCWA, a growing interest with each new grant received by LPCCC and with the prospect of working with landowners less litigiously. One respondent speculated (with fondness) that SCWA's leader at the time of the Accord may have had a "green" side to him. Whether true or not, it is clear that SCWA's leadership and organizational culture have exhibited agility and flexibility in the face of change. This was not preordained, however. When asked how to replicate the successes seen in lower Putah Creek, one respondent replied, "culture eats strategy for breakfast." The implication is that one may encounter deep pockets of resistance to new ideas in an organization or a community. It also implies the converse, that an organizational "crisis" such as that faced by SCWA may bring an "adaptive response," wherein a new culture is allowed to take root, and even encouraged (Gunderson & Holling, 2002). Almost always, though, it is leadership that must lead the way by example, and SCWA's leadership has been successful in accommodating and supporting the culturally-distinct needs of LPCCC and its Streamkeeper (Cameron & Quinn, 2006).

Methods

One researcher traveled to Davis and Winters to conduct eight in-person interviews. Several telephone interviews with some of these interviewees took place both before and after face-to-face encounters. Interview participants represented various entities, including Solano County Water Agency, UC Davis, City of Winters, Lower Putah Creek Coordinating Committee, and Community Water Center. In addition, the researcher reviewed all available documents related to the grants, as well as numerous online resources documenting grant activities and their public perceptions.

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Appendix I. Methods

Appendix I-A. Overview

The California Department of Conservation (DOC) contracted the Sierra Institute for Community and Environment to conduct a retroactive study of watershed project and coordinator grants issued during the CalFed Bay-Delta Watershed and Department of Conservation Watershed Programs (Statewide Watershed Program) from 2000-2014. The research did not include the DOC Watershed Coordinator pilot program (2000-2002) because this was not funded through CalFed and had distinct programmatic objectives. The purpose of the research was to better understand what works, what has not worked, and what lessons can be learned to inform future watershed initiatives. To achieve a deeper understanding of the outcomes of the Statewide Watershed Program, the research team assessed project and watershed group origins; goals and objectives; linkages and partnerships; performance measures; challenges; and social, environmental, economic, and community outcomes—both deliberate and unintended.

Mixed-methods approach

Initial research steps involved the creation of a database to encompass all Statewide Watershed Program coordinator and project grants. Over three hundred grants issued during the program were recorded in the database. Sierra Institute used an in-depth case study approach with the goal of assessing a minimum of 30 project and 15 coordinator grants. The research team used a mixed-methods approach, and through the use of consistent research procedures, conceptual themes emerged and were confirmed with subsequent cases. Sierra Institute implemented qualitative and quantitative methods utilizing semi-structured interviews, surveys, and an analysis of grant-related documents (Coughlin, 1999; Mullen, William & Allison, 1999; Kusel et al., 2002; Giddings, 2006; Kusel et al., 2006; Rosenberg, Stacy & Margerum, 2008). While semi-structured interviews were utilized in all cases, given the extensive time period of watershed grant that are covered (2000-2014), the institutional memory of stakeholders from dated cases was unreliable at times. To mitigate this concern, multiple forms of triangulation were used, including:1) multiple methods (e.g., interviews; survey; document analysis of available grant documents, additional project material, and supplemental sources such as videos provided by/posted by grant recipients); 2) multiple researchers assigned to the majority of cases to ensure consistency of data interpretation; and 3) interviews with a minimum of three stakeholders for each case, ideally from diverse perspectives to achieve representativeness.

Case selection & pilot studies

Case study selection was purposeful with an estimated number of grants selected in each of 10 CalWater hydrologic regions based on percent of total funding by region and informed by a cursory review of literature. Geographic diversity was accounted for by selecting a variety of

urban, rural and mixed watersheds. Duration of projects, overlap between coordinator and project grants, and overlap among grants and watersheds were also considered with the creation of two additional databases. Some grants had significant overlap with participants and geography; accordingly, we selected additional studies from the region to ensure we captured a diverse set of cases in our selection process. Researchers calculated total number of grants meeting each criterion in order to determine the number of grants to be reviewed per Cal Water hydrologic region. The overlapping cases led to additional cases that several regions have beyond the original estimated case number for a particular region, see Tables I & II below).

Utilizing the selected methodology, the research team compiled a list of grants for a pilot study. consisting of four coordinator grants and three project grants held by three distinct recipients. Both rural and urban watersheds were represented, as well as a nonprofit, a RCD, and a local agency. One of the main challenges noted during the pilot study was revisiting grants that were administered 10-12 years ago. The extent of personnel turnover impeded efforts to secure contact information for participants. However, with tools such as LinkedIn and a "snowball" referral methodology (described below), we were able to make contact with many key participants. In some cases, phone interviews were conducted with individuals who had relocated.

Data collection

Semi-structured interview questions were adapted for each case and were based on a review of the available literature (see Appendix B for sample interview questions). For the institutional analysis, a separate interview template was developed and tailored to each case (See Appendix C). Snowball referral was the primary method used to obtain contact information for stakeholders involved in each grant and for the institutional analysis (Neuman, 2009; Ishak and Bakar, 2014). Snowball referral expanded the interview participant pool of key stakeholders with active participants suggesting future interview participants. This allowed our team to speak with stakeholders not explicitly mentioned in grant documentation, but who were involved in grant activities. Inclusion of stakeholders from diverse backgrounds was also sought to ensure representation of perspectives and experiences. This enabled our team to reach a point of "saturation" when names were repeatedly recommended and no new names were provided. Saturation indicated a natural point to initiate closure of the search for informants. However, our approach remained adaptive, and if a new development emerged, we pursued those leads. Confidentiality was maintained; however, participants had the option of providing their name to be included in the report.

Two researchers were involved in most cases, with most interviews conducted in-person. The majority of cases maintained the practice of a lead researcher performing interviews with a second researcher taking detailed notes. Researchers debriefed interview notes and their interpretations.

An online survey instrument, informed by interviews and a literature review, was created and shared with all informants associated with watershed coordinator grants (See Appendix D). The survey instrument was developed to ensure a more precise quantitative understanding of the representativeness of our research participants, the components of watershed coordination that contributed to positive outcomes, the outcomes that were attributed to processes undertaken by the watershed coordination, and the characteristics of an exemplary watershed coordinator.

Table I. Case Selection Criteria

Criteria	Rationale	Literature Examples	Approach
CalWater regions (10)	To account for differences in context	(Coughlin, 1999); (Kusel et al., 2002); (Imperial, 2005); (Kusel et al., 2006)	Created database and sorted by region
Funding amount	Stable, diverse, and adequate funding have been a metric of "success" for numerous watershed assessment projects	(Kenney, 2000); (Sommarstrom, 2000); (Kusel et al., 2002); (Kusel et al., 2006)	Used database to sort and aggregate funding amount per grant and by watershed, HUC 8 region, CalWater region
Urban vs. rural	To address differences that exist between urban and rural settings	(Imperial, 2005); (Hardy & Koontz, 2010)	Used a GIS layer of urban vs. rural data and census data
Duration (multiple grants)	To assess how effective projects are over the long run and how/why they are sustained	(Coughlin et al, 1999); (Leach, Pelkey, & Sabatier, 2002)	Created a database with the number of grants per watershed, per organization, and assessed the overlap between grants

Table II. Number of Projects and Funding per Region for Watershed Project Grants

CalWater Hydrologic Regions	Total Funding	Number of Projects	Funding Ratio	Grant Ratio	Estimate Project Grant Selection (Funding Ratio)	Actual No. of Project Grant
North Coast	$442,670	3	0.0060	0.0175	1	0
Sacramento River	$38,901,962	85	0.5261	0.4971	16	16
San Francisco	$10,132,261	28	0.1370	0.1637	4	3
San Joaquin	$15,041,683	35	0.2034	0.2047	6	7
South Coast	$8,516,410	17	0.1152	0.0994	3	7
Tulare Lake	$916,000	3	0.0124	0.0175	1	0
Totals	$73,950,986	171			31	33

Table III. Number of Grants and Funding per Region for Watershed Coordinator Grants

CalWater Hydrologic Region	Total Funding	No. of Grants	Funding Ratio	Grant Ratio	Estimate Project Selection (Funding Ratio)	Actual No. of Coordinator Grants
Central Coast	$1,288,417	6	0.0495	0.04580	1	1
Colorado River	$189,524	1	0.0073	0.00763	0	0

North Coast	$2,610,861	13	0.1004	0.09924	2	3
North Lahontan	$1,095,150	5	0.0421	0.03817	1	1
Sacramento River	$9,290,426	50	0.3571	0.38168	5	7
San Francisco	$3,022,343	15	0.1162	0.11450	2	2
San Joaquin River	$3,806,797	20	0.1463	0.15267	2	2
South Coast	$3,234,366	14	0.1243	0.10687	2	10
South Lahontan	$388,725	2	0.0149	0.01527	0	0
Tulare Lake	$1,089,717	5	0.0419	0.03817	1	0
Totals	$26,016,326	131			16	26

Table IV. Number of Project Grants by Organization Type

Watershed Project Organization Type	No. of Grants	Grant Ratio	Estimate Grant Selection (Funding Ratio)	Actual No. of Grants
Local Agency	42	0.2456	7	9
State Agency	1	0.0058	0	-
Federal Agency	5	0.0292	1	-
Nonprofit	80	0.4678	14	16
Resource Conservation District	41	0.2398	7	8
University	2	0.0117	0	-
Total	171		30	33

Table V. Number of Watershed Coordinator Grants by Organization Type

Watershed Coordinator Organization Type	No. of Grants	Grant Ratio	Estimate Grant Selection (Funding Ratio)	Actual No. of Grants
Local Agency	12	0.0916	1	1
State Agency	1	0.0076	0	
Nonprofit	51	0.3893	6	12
Resource Conservation District	67	0.5115	8	13
Total	131		15	26

Appendix I-B. Case Study Interview Template

Categories of Interests	Specific Information	Semi-structured Interview Questions
Affiliation/Involvement with organization	• Involvement (Project Coordinator, Stakeholder, Volunteer, etc.) • Organization Information • Agency Capacity-Staffing, Composition, Size • Membership/Participation • Leadership • Authority/Structure	**[Affiliation/Involvement]** How were you involved with the watershed coordinator/project grant? **[Affiliation/Involvement]** What is the agency/organization with which you are/were affiliated with? For how long? **[Organization Information]** Please describe the mission statement of the agency/organization. **[Agency Capacity]** What was the size and composition of the organization? How many staff? **[Membership/Participation]** Please describe the level of stakeholder involvement. Were diverse interests represented? How committed were participants? **[Leadership]** Please describe the leadership role for this project. Was there a coordinator throughout? **[Authority]** Was there an advisory board overseeing the project? Were their other organizations needed for approval? How autonomous was this project?
Originating Factors & Role of Community	• Local initiation with the project • Local support of the project • Community/Culture	**[Origin]** How did this project form? Was this a local initiative? Was there local support for these efforts? To what extent? **[Role of Community]** How does/did the local community context affect watershed management?
Objectives of Project	• Specific goals of the project • Scope of the project (geographic & temporal) • Scope of activities • Achievements • Easiest to achieve • Most difficult to achieve • Bridges & Barriers • Other organizations involved in achievements	**[Objectives]** What were the specific goals? Which CalFed objectives were addressed? How? **[Scale and scope]** What was the scope of the project geographically and temporally? Was this appropriate for the project funding and time period? **[Measuring success/Achievements]** To what extent were the goals of the project met? What were the easiest to achieve? What were the most difficult? **[Measuring success/Achievements]** What were the biggest barriers to success? What were some of the bridges to success? Did other organizations help to achieve these goals
Issues/Challenges of Project	• Biophysical • Institutional • Organizational • Access to Resources • Technical	**[Issue Definition]** What are the environmental issues in the watershed that you are/were concerned with? Did you face any limitations in addressing this? What kind of limitations/challenges (institutional, organizational, access to resources, technical)?
Funding	• Duration and stability of funding	**[Funding]** Has funding been stable for this project? Was the funding sufficient enough to

	• Sufficiency of funding to accomplish tasks	accomplish the desired tasks? Are there other funding sources that were acquired? Has any funding continued?
Linkages	• Collaborations • Community networks/support • Agency support	**[Collaboration]** What kinds of partnerships and collaborations were formed? Have these endured? **[Collaboration]** How has the project connected to the community? Is there support? How is the relationship with the local community? Is there a sense of trust? **[Collaboration]** How has the project worked with the funding agency? Has there been sufficient support? How is the relationship with the funding agency? Is there a level of trust built in that relationship?
Environmental Outcomes	• Measured outcomes • Environmental monitoring	**[Environmental Outcomes]** What kinds of environmental monitoring are/were in place for measured environmental outcomes? Are there specific, measurable environmental outcomes?
Social Outcomes	• Relationship building • Communication • Trust	**[Social Outcomes]** What were social outcomes from this project? Was there relationship building with the community and trust building? Were there improvements in communication?
Organizational activities and performance	• Training in collaboration • Productive use of resources • Decision-making • Adaptability • Communication • Relationship-building • Education/outreach	**[Organizational Activities]** Was there any kind of training for collaboration or anyone with collaborative experience within the organization? **[Organizational Performance]** Was the organization able to use the resources productively? **[Organizational Performance]** How were decisions made? Was this done fairly? How so? Is there accountability in the decision-making? **[Organizational Performance]** How much room was there for adaptability during the project? **[Organizational Performance]** Please describe the education and outreach that occurred with this grant.
Organizational outcomes	• Implementation of projects • Extent of agreement among participants • Perceived effects on specific problems • Perceived effects on human and social capital	**[Organizational Performance]** Did the project reach implementation? If so, what was implemented? If not, was the planning implemented at a later date? **[Organizational Performance]** Was there agreement and/or support among the participants throughout the process? For implementation to occur? **[Organizational Performance]** What were the perceived effects on the specific problem? **[Organizational Performance]** What were the perceived effects on human and social capital?
Contacts	• Snowball referral	**[Contacts]** Could you please recommend some other key informants that I should speak with?

Appendix I-C. Institutional Analysis Survey Template

Categories	CalFed (Collaboration)	CalFed Bay-Delta Program	CalFed Watershed Program	DOC Watershed Coordinator Program
**** Throughout this conversation, please clarify details like years, funding sources and challenges, and main players involved.**				
[Program Structure]	Could you begin by describing the structure (relationships and connections) of CalFed, CalFed Watershed Program, DOC Watershed Coordinator Program?			
[Program Origins]	What catalyzed the formation of CalFed?	Can you discuss processes and decisions that shaped the Bay-Delta Program?	What factors influenced the inclusion of a "Watershed Program?"	What catalyzed the formation of the DOC Watershed Coordinator Program?
[Program Involvement]	Who participated in CalFed? (Who were the main players?) How did these different entities come to participate?	What were the roles of each participating entity in implementing the Bay-Delta Program?	Who created and managed the Watershed Program?	Who was involved in its formation and throughout the program's administration?
[Objectives]	What were the main objectives of CalFed?	What were main objectives of the Bay-Delta Program?	What were the objectives of the Watershed program? How did these differ from objectives of other Bay-Delta sub-programs? Did these objectives evolve?	What were the initial objectives of the DOC watershed coordinator program? How did these objectives evolve?
[Grant selection process]			How were projects prioritized/selected? What was the criteria? Who was involved in the process?	How were projects prioritized/selected? What was the criteria? Who was involved in the process?
[Program participation]	How did participation and/or objectives shift and/or evolve overtime?		How did different state agencies come to administer the program (DWR, SWRCB)? Was this mechanism effective?	• Can you discuss the relationship between DOC and RCDs? • Can you describe the overlap of DOC and CalFed in this program?
[Transformations/Changes]	Can you discuss any other major changes/transformations the occurred during the programs' active years in the structure of CalFed, the Bay-Delta Program, the			

	CalFed Watershed Program, and the DOC Watershed Coordinator Program (or the way that they are administered)? • The Little Hoover review did a review of CalFed in 2005 – What factors sparked the need for a review? Were the Commission's recommendations applied or implemented? • Can you discuss specifically the transformation of the watershed programs into the Statewide Watershed Program? What were the implications of this transformation?			
[Benefits]			How did the program benefit overall CalFed and Bay-Delta Program Objectives?	How did the program benefit overall CalFed and Bay-Delta Program Objectives?
[Challenges/ Limitations]	What were the biggest challenges for CalFed to be considered "successful"?		Please describe some limitations within the program.	Please describe some limitations within the program.
[Effectiveness]	From your perspective, how effective was the CalFed collaboration in achieving its objectives?	How effective was the overall Bay-Delta Program in achieving its objectives?	How effective was the CalFed Watershed Program?	How effective was the Watershed Coordinator Program?
[Program Ends]	What events led up to the end of CalFed?		What events led up to the end of the Statewide Watershed program?	
[Lessons Learned] *Programmatic*			From a programmatic standpoint, How could the program be improved?	From a programmatic standpoint, How could the program be improved?
[Lessons Learned] *Big Picture*	How might overall statewide watershed improvement efforts be improved, considering things like structure, agency players, relationships, processes, and program specifics?			

Appendix I-D. Watershed Coordinator Grant Survey Instrument I

Survey Participation

Thank you for participating in an interview with the Sierra Institute for Community and Environment for our CalFed Statewide Watershed Program study overseen by the Department of Conservation. We have developed a survey instrument informed by stakeholder interviews and a literature review and would greatly appreciate your responses. Please answer all questions. The survey should take between ten and fifteen minutes. All surveys are confidential. No responses will be linked to you.

Background Information

* 1. What organization/agency received the Department of Conservation watershed coordinator grant(s) you are familiar with?

* 2. Which watershed(s) did the grant(s) address?

* 3. Please check those periods in which you were involved in watershed coordinator grant work.
- 2000-2003
- 2004-2007
- 2008-2011 2011-2014
- 2014 extension
- Other (please specify)

* 4. Following the end of DOC watershed coordinator grant funds, has a watershed coordinator position been maintained in the watershed(s) you listed in Q2?
- Yes
- No
- Not sure

If yes, please describe any changes or additional details about the position (e.g., full-time to part-time, another organization hosts the position, the position is funded through a different mechanism, etc.)

5. Is there an active Integrated Regional Watershed Management (IRWM) group that includes the watershed(s) you listed in Q2?
- Yes
- No
- Not sure

6. If you answered "yes" to Q5, is there a person associated with the IRWM currently in a position that functions similar to that of a watershed coordinator?
- Yes
- No
- Not sure

Watershed Coordinator Grant

* 7. The following components have been identified as aspects of watershed coordination. Please indicate your level of agreement or disagreement about the significance of each component in contributing toward positive outcomes in the watershed in which you were involved. Please mark N/A (not applicable) if the component does not apply to the grant-related watershed work.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	N/A
Sharing information among stakeholders						
Establishing a forum to address watershed issues						
Educating the public on watershed issues						
Including diverse stakeholders and interested parties						
Building relationships among stakeholders						
Developing trust among stakeholders						
Involving the public in project design plans						
Involving the public in volunteer events						
Involving the public in monitoring programs						
Developing or maintaining a project- focused website						
Developing or maintaining newsletters and/or maps						
Developing or maintaining a database for watershed projects						
Implementing adaptive management						
practices associated with project activities						
Giving a voice to stakeholders' concerns in the watershed						
Providing third-party facilitation to address contentious issues						
Facilitating the development of collective goals						
Leveraging funding for implementing projects in the watershed						
Securing resources to develop projects in the watershed						
Initiating new projects						
Helping the group develop consensus decisions						
Ability to minimize conflicts among stakeholders						

* 8. Please list and rank the three most significant components of watershed coordination as identified in Q7 in order of importance (1=highest rank).
1
2
3

* 9. The watershed coordinator grant enabled or helped accomplish the following outcomes. Please indicate your level of agreement or disagreement with the following items. Please mark N/A (not applicable) if the component does not apply to the grant-related watershed work.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	N/A
Funding for projects						
Stronger relationships and trust						
Improved communication among stakeholders						
Project implementation (new projects on the ground)						
Identification of collective goals						
Establishment of a forum for a stakeholder- based group						
More informed public concerning watershed issues						
Engagement of local schools and youth						
Completion of watershed assessment						
Completion of watershed management plan						
Measurable environmental outcomes						
Positive impacts to the local economy						
Restoration of native habitat						
Increased biodiversity						
Water quality improvement						
Increased participation in watershed-based research						
Establishment or maintenance of a data collection/monitoring program						
Allocation of project maintenance responsibilities						
Establishment or maintenance of a volunteer program						
Development of new partnerships						
Funding to continue the watershed coordinator position						
Improved coordination among stakeholders						
Improved ability to respond to regulatory requirements						
Other (please specify)						

* 10. Please indicate your level of agreement or disagreement with each item. The following are important characteristics of an effective watershed coordinator:

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	N/A
Communicates clearly						
Is organized						
Is accountable						
Promotes grant recipient's agenda						
Is trustworthy Is dedicated						
Promotes watershed group/collaborative agenda						
Is enthusiastic Celebrates progress						
Makes objective decisions						
Makes fair decisions						
Demonstrates self- confidence						
Demonstrates confidence in stakeholder abilities						
Encourages diverse stakeholder participation						
Is able to articulate a collective vision						
Is committed						
Promotes own agenda						
Is well-connected with resources and people						
Ability to keep stakeholders updated						
Develops collaborative agendas						
Is familiar with the community						
Minimizes conflict among stakeholders						
Other (please specify)						

* 11. Please list and rank the three most important characteristics of a watershed coordinator as identified in Q10 in order of importance (1=highest rank).
1
2
3

Demographic Information

12. What was your primary occupation during the grant period?

13. What is your gender?

- Female
- Male
- Other

14. What is the length of time you have been involved in activities or have worked in the watershed in which the grant was received?

- Over 15 years
- 10 to 15 years
- 5 to 9 years
- 2 to 4 years
- Less than two years Other (please specify)

15. What was the type of your residential location during the watershed grant work?

- Urban
- Rural
- Mixed (neither urban nor rural)
- Other (please specify)

16. Please provide any remaining comments below.

Appendix I-E. Watershed Coordinator Grant Survey Instrument II

Over the past two years we've conducted 30 case studies of watershed coordinator grants around the state. While we have developed a sense of the benefits and challenges associated with watershed coordination, we still have questions regarding watershed coordinator retention. Your help in answering the following questions is greatly appreciated.

If you do not feel like you are the appropriate person, please forward this email to the person(s) who is most familiar with the watershed coordinator grant(s) received by [grant recipient and grant year(s)].

1. Did the [grant recipient] have a watershed coordinator prior to receiving a DOC watershed coordinator grant?

2. During the DOC grant term(s), was the watershed coordinator position hosted in-house or subcontracted?

3. Did the watershed coordinator position continue after the grant ended?

If YES→

- How long did the position continue?
- Did the role or job duties change? Please explain.
- Did the geographical scope/watershed change? Please explain.
- Was/is it part-time or full-time? Paid or volunteer?
- How was/is the position funded without the DOC grant?
- Was/is the position hosted in-house or subcontracted?

If NO→

- Were any of the watershed coordinator duties picked up by others?
- Following the departure of the watershed coordinator, have efforts been affected or slowed?

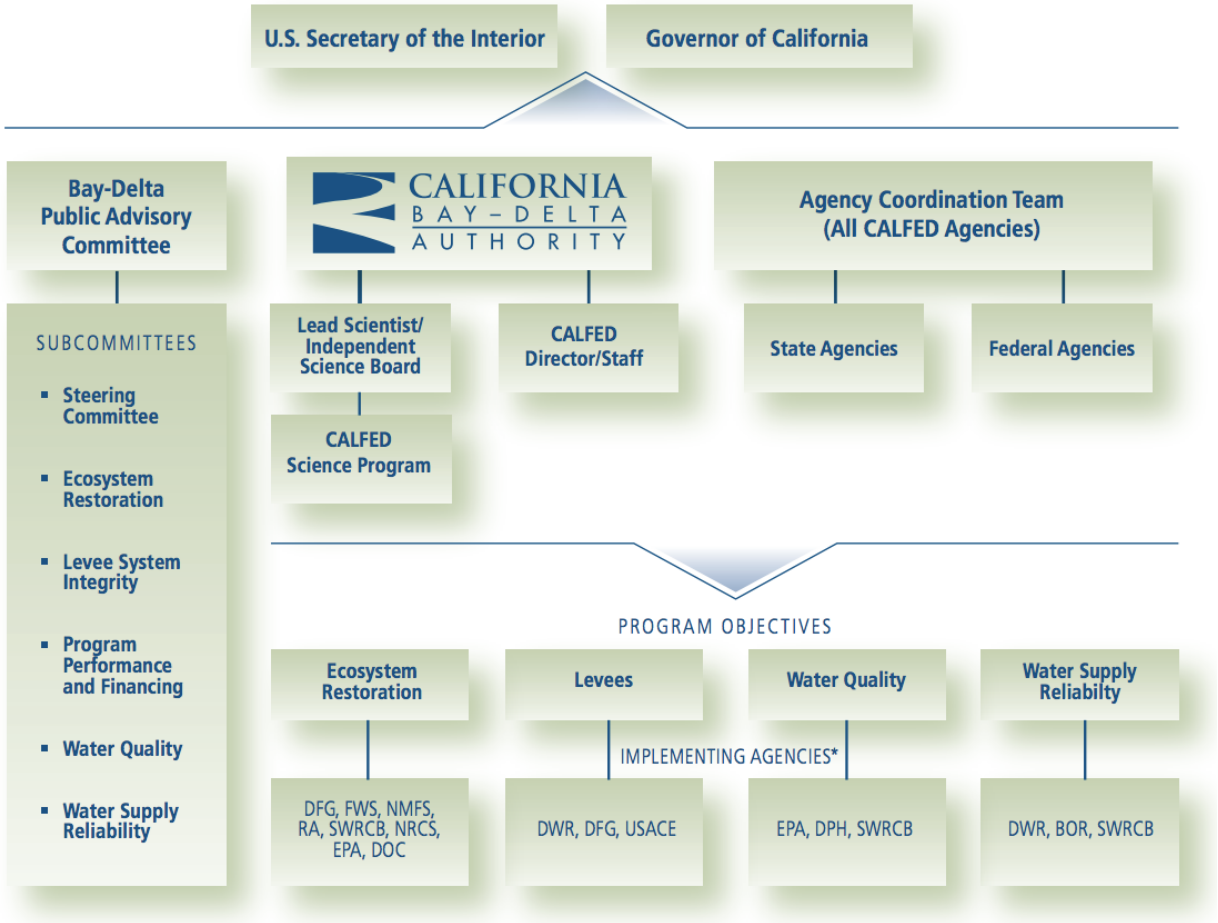
4. What is/are the most important outcome(s) the watershed coordinator helped to accomplish?

Please answer these questions by responding to this email, or calling Kaily Bourg or Lauren Miller at Sierra Institute's office: 530-284-1022. If you have questions about the survey or our research, please don't hesitate to contact us.

Appendix II. Institutional Analysis Charts

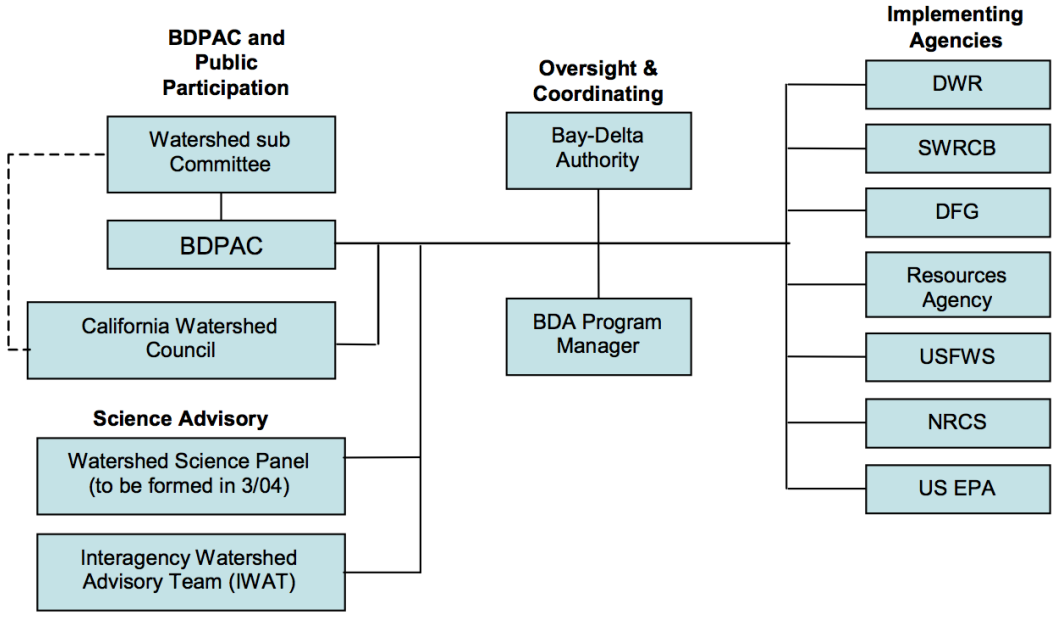
Appendix II-A. CalFed Governance Structure

(Source: CalFed Bay-Delta Archived Website, 2007)



*BOR–U.S. Bureau of Reclamation; DFG–State Department of Fish and Game; DOC–State Department of Conservation; DPH–Department of Public Health; DWR–State Department of Water Resources; EPA–U.S. Environmental Protection Agency; FWS–U.S. Fish and Wildlife Service; NMFS–National Marine Fisheries Service; NRCS–Natural Resources Conservation Service; RA–California Resources Agency; SWRCB–State Water Resources Control Board; USACE–U.S. Army Corps of Engineers

Appendix II-B. Watershed Program Governance Structure
(Source: Watershed Program Plan, 2004)



Appendix II-C. California Hydrologic Regions

SOURCE: California Department of Water Resources.

Appendix II-D. CalFed Watershed Program Principles of Participation

(Source: Watershed Program Plan, 2004)

Principles of participation

The Watershed Program Principles represent an underlying framework for Plan implementation. They state that the Watershed Program seeks partnership projects that:

- ✓ Are community based and
  - Promote community and landowner involvement,
  - Have demonstrable community support
  - Contribute to ongoing watershed management,
  - Foster the development and maintenance of local watershed efforts,
  - Reach out to and encourage participation of local leadership, Reach out to and encourage participation of individuals with diverse interests, and
  - Foster collaboration among multiple interests.
- ✓ Collaborate and are consistent with the CALFED Bay-Delta Program implementation, and that
  - Are consistent with the goals and objectives of CALFED,
  - Promote information exchange with CALFED, and
  - Promote local community involvement in CALFED implementation
- ✓ Address multiple watershed issues, and
  - Address multiple ecosystem issues,
  - Are consistent with related resources protection activities and applicable regulations,
  - Contribute to beneficial environmental results,
  - Improve ecosystem values and watersheds that directly or indirectly affect the Bay-Delta system, and
  - Are consistent with general principles of good watershed management.
- ✓ Are coordinated with and supported at multiple levels to
  - Enhance coordination between CALFED, government agencies, and local community groups.
- ✓ Provide for ongoing implementation and
  - Identify performance measures to achieve goals and objectives,
  - "Leverage" other funding sources and institutional mechanisms, and
  - Possess the flexibility to allow for adaptive management.
- ✓ Include monitoring protocols that
  - Measure success and are consistent with CALFED monitoring protocols as they are developed,
  - Support coordination of local and regional monitoring efforts, and
  - Promote citizen monitoring programs where appropriate.
- ✓ Increase learning and awareness through
  - Promoting conservation education in local watershed, schools, or to the general public,
  - Enhance local skills in watershed management,
  - Promote technology and information transfer between local watershed efforts, and
  - Deliver technical assistance and information to local watershed efforts.

Appendix III. Case Study Library

Individual case study reports are accessible at the following link:
https://sierrainstitute.us/program/doc/

Case Name	Grants
Arroyo Seco Foundation: Arroyo Seco Watershed	2004 - Watershed Coordinator 2005 - Arroyo Seco Watershed Sustainability Campaign 2008 - Watershed Coordinator 2012 - Watershed Coordinator
Battle Creek Watershed Conservancy: Battle Creek Watershed	2003 - Battle Creek Watershed Stewardship 2004 - Watershed Coordinator 2008 - Watershed Coordinator
City of El Cerrito: Baxter Creek Watershed	2003 - Baxter Creek Gateway Restoration Project
City of Vacaville: Lagoon Valley Watershed	2000 - Lagoon Valley Watershed Restoration
Contra Costa Resource Conservation District: Suisun Bay Watershed	2003 - Mt. Diablo Creek Watershed Coordinator Resource Management Planning Program 2004 - Watershed Coordinator
Council for Watershed Health: Los Angeles River and San Gabriel River Watersheds	2000 - Study of Augmenting Groundwater Supplies Through Capture of Urban Runoff 2000 - Los Angeles and San Gabriel Rivers Watershed Council Organizational Development 2004 - Watershed Coordinator 2007 - Sun Valley Neighborhood Retrofit Demonstration 2007 - Ecosystem Values of Watersheds in Southern California 2008 - Watershed Coordinator 2011 - Watershed Coordinator
Earth Resource Foundation: Santa Ana River Watershed	2004 - Watershed Coordinator
El Dorado Resource Conservation District: South Fork American River Watershed	2007 - Watershed Education Summit
Golden Gate National Park Conservancy: Tennessee Hollow Watershed	2008 - Revitalizing and Learning from the Tennessee Hollow
Gualala River Watershed Council: Gualala-Salmon River Watershed	2011 - Watershed Coordinator
North Cal-Neva RCDC: Pit River Watershed	2006 - Pit River Alliance Watershed Management Strategy Development Program (Watershed Management Strategy)
Ojai Valley Land Conservancy: Ventura River Watershed Council	2011 - Watershed Coordinator
Santa Cruz Resource Conservation District: Pajaro River Watershed	2011 - Watershed Coordinator
Resource Conservation District of the Santa Monica Mountains: Santa Monica Bay Watershed	2004 - Watershed Coordinator 2011 - Watershed Coordinator
Sacramento Area Flood Control Agency: American River Watershed	2003 - Lower American River Environmental Enhancement 2004 - Watershed Coordinator
Sacramento River Watershed Program: Sacramento River Watershed	2003 - Sacramento River Watershed Program- Program Support
San Joaquin County Resource Conservation District: Lower Mokelumne River Watershed	2000 - Murphy Creek Restoration Project 2003 - Lower Mokelumne River Stewardship Plan Implementation 2004 - Watershed Coordinator

	2007 - Continuing Education, Outreach, Restoration, and Monitoring in the Lower Mokelumne River 2008 - Watershed Coordinator
Shasta Valley Resource Conservation District: Shasta River, Sacramento River Headwaters, and McCloud River Watersheds	2011 - Watershed Coordinator
Solano County Water Agency: Lower Putah Creek	2000 - Lower Putah Creek Watershed Assessment and Stewardship Implementation Program 2002 - Putah Creek - Yolo Housing Authority Project 2003 - Community-Based Restoration of Lower Putah Creek Watershed 2007 - Lower Putah Creek Winters Area Riparian Restoration Projects 2008 - Lower Putah Creek Watershed Plan Priority Projects
Tehama County Resource Conservation District: Thomes Creek, Antelope Creek, Pine Creek, and Elder Creek Watersheds	2002 - Tehama West Watershed Assessment 2004 - Watershed Coordinator 2005 - Tehama West Watershed Management Program 2006 - Tehama East Watershed Assessment 2008 - Watershed Coordinator 2011 - Watershed Coordinator
The River Project and Los Angeles Department of Water and Power: Tujunga/Pacoima Watershed	2003 - A Watershed Management Plan for Restoration Feasibility of the Tujunga Wash 2008 - The Woodman Avenue Multi-beneficial Stormwater Capture Project
Trinity County Resource Conservation District: Trinity River Watershed	2008 - Watershed Coordinator 2011 - Watershed Coordinator
Truckee River Watershed Council: Truckee River Watershed	2011 - Watershed Coordinator
Tuolumne River Trust: Tuolumne River Watershed	2000 - Tuolumne River Initiative: Developing an Integrated Plan 2003 - Clavey River Watershed Assessment 2006 - Tuolumne River Outdoor Classroom 2007 - Clavey River Ecosystem Project
Upper Putah Creek Stewardship: Upper Putah Creek	2007 - A Comprehensive Assessment of the Upper Putah Creek Watershed