

A COMPARATIVE ANALYSIS OF STATE-LEVEL WATERSHED MANAGEMENT
FRAMEWORKS IN THE PACIFIC NORTHWEST

by

ADAM MICHAEL ERICKSON

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Student: Adam Michael Erickson

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This thesis has been accepted and approved in partial fulfillment of the requirements for the Master of Community and Regional Planning degree in the Department of Planning, Public Policy and Management by:

Dr. Michael Hibbard	Chairperson
Dr. Richard Margerum	Member
Dr. Max Nielsen-Pincus	Member

and

Kimberly Andrews Espy	Vice President for Research & Innovation/Dean of the Graduate School
-----------------------	--

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded September 2011

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THESIS ABSTRACT

Adam Michael Erickson

Master of Community and Regional Planning

Department of Planning, Public Policy and Management

September 2011

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Approved: _____
Dr. Michael Hibbard

Over the past two decades, contemporary state-level watershed management burgeoned in the Pacific Northwest. This research offers a comparative analysis of contemporary state-level watershed management frameworks in the Pacific Northwest. The four case study areas consist of Idaho, Oregon, Washington, and Northern California. This study begins with a historical analysis of the greater watershed movement in natural resource management. Next, document analysis and key informant interviews are utilized to detail the watershed management framework of each state. Finally, this study explores a comparative analysis of each state framework. Results indicate that while the case study areas share many characteristics endemic to the bioregion, the watershed management framework of each state differs substantially. Key informant interviews indicate that these differences often reflect the unique sociopolitical climate of each state. Results additionally indicate the vital importance of stable state-derived funding for the establishment and resilience of watershed management organizations.

CURRICULUM VITAE

NAME OF AUTHOR: Adam Michael Erickson

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
University of Puget Sound, Tacoma, Washington
Colorado State University, Fort Collins

DEGREES AWARDED:

Master of Community and Regional Planning, 2011, University of Oregon
Bachelor of Arts, International Political Economy, 2004, University of Puget
Sound

AREAS OF SPECIAL INTEREST:

Natural Resource Management
Watershed Management
Salmon Recovery Planning
Common Pool Resource Management
Political Economy
Social-Ecological Systems

PROFESSIONAL EXPERIENCE:

Volunteer, The Nature Conservancy, 2007-2009
Helped restore Washington's South Puget Sound region prairies.

Planning Intern, City of Eugene, 2010
Conducted GIS spatial analysis and video production for Envision Eugene.

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TABLE OF CONTENTS

Chapter	Page
I. PROBLEM STATEMENT	1
Introduction	1
Background and Significance.....	2
Research Question.....	6
Methods.....	6
Importance.....	9
Scope	11
Outline.....	12
II. LITERATURE REVIEW	13
Introduction.....	13
Brief History of Watershed Management in the Western United States.....	15
EPA’s Watershed Protection Approach	22
Pacific Northwest State-Level Watershed Management.....	28
III. METHODOLOGY	33
Research Methods Overview	33
Sampling.....	34
Case Selection	34
Case Boundaries.....	35
Case Frame.....	36
Data	37
Data Collection.....	37

Chapter	Page
Document Analysis	37
Interviews	38
Data Analysis	41
Document Analysis	42
State Institutions and Mechanisms	42
Interviews	43
Interviewee Background	43
Watershed Management Goals.....	43
Long-Term Financial Prospects	44
Management Framework Strengths and Weaknesses	44
Study Limitations	45
Case Study Research	45
Watershed Complexity	46
Purposive Sampling.....	46
IV. FINDINGS	48
State-Level Watershed Management Frameworks	48
California.....	48
Idaho	62
Oregon.....	71
Washington.....	85
Key Informant Interviews	100
California.....	100

Chapter	Page
Interviewee Background	100
Watershed Management Goals.....	100
Relationship of the State Goals to WMO Goals	101
Measuring Watershed Management Progress	102
Watershed Management Progress Indicator or Metric Source.....	102
State and WMO Long-Term Financial Prospects	103
State Watershed Management Framework Strengths	105
State Watershed Management Framework Weaknesses	106
Idaho	108
Interviewee Background	108
Watershed Management Goals.....	108
Relationship of the State Goals to WMO Goals	109
Measuring Watershed Management Progress	111
Watershed Management Progress Indicator or Metric Source.....	111
State and WMO Long-Term Financial Prospects	111
State Watershed Management Framework Strengths	113
State Watershed Management Framework Weaknesses	113
Oregon.....	115
Interviewee Background	115
Watershed Management Goals.....	115
Relationship of the State Goals to WMO Goals	116
Measuring Watershed Management Progress	119

Chapter	Page
Watershed Management Progress Indicator or Metric Source.....	120
State and WMO Long-Term Financial Prospects	121
State Watershed Management Framework Strengths	123
State Watershed Management Framework Weaknesses	124
Washington.....	127
Interviewee Background	127
Watershed Management Goals.....	128
Relationship of the State Goals to WMO Goals	131
Measuring Watershed Management Progress	132
Watershed Management Progress Indicator or Metric Source.....	133
State and WMO Long-Term Financial Prospects	133
State Watershed Management Framework Strengths	135
State Watershed Management Framework Weaknesses	135
V. ANALYSIS, CONCLUSIONS, AND RECOMMENDATIONS	137
Analysis.....	137
Three Types of Watershed Management	138
Watershed Management Priorities	141
Agency Coordination	143
Coordination Mechanism	143
Clearly Defined Agency Roles and Programmatic Support.....	144
Presence of a Framework Lead	145
Diversity of Signatory Agency/Department Roles.....	146

Chapter	Page
Centralization/Decentralization.....	147
Agency Communication.....	147
Funding – Amount, Diversity, and Stability	148
Watershed Investment Geographic Scale.....	152
Local-Level Partnerships.....	154
Technical Assistance or Staff and Information-Sharing Support.....	154
Research, Experimentation, and Pilot Project Support	155
Conclusions and Recommendations.....	157
Unique State Social-Ecological Contexts	157
Importance of Funding	160
The Importance of a Focused, Coordinated State Framework to WMOs.....	163
Opportunities for Future Research	167
 APPENDIX: WATERSHED AGENCIES AND PROGRAMS BY STATE.....	 173
REFERENCES CITED	223

LIST OF FIGURES

Figure	Page
1. The Watershed Management Units	17
2. EPA’s Watershed Protection Approach	26
3. Interview Guide.....	39
4. CALFED Solution Area Regions.....	54
5. Oregon Plan Functions and the Six Teams	80
6. Watershed Activities in Washington.....	88
7. Salmon Recovery Regions	96
8. Stream Miles Treated per \$1 Million of Funds	168
9. Riparian Acres Treated per \$1 Million of Funds	169
10. Upland Habitat Treated per \$1 Million of Funds	169
11. In-Stream Water Flow Returned per \$1 Million of Funds	170
12. Miles of Road Treated per \$1 Million of Funds.....	170
13. Land Acquisition Acres per \$1 Million of Funds	171

LIST OF TABLES

Table	Page
1. Watershed Management Unit Scale	17
2. Key Informants Contacted and Interviewed.....	36
3. A Typology of California WMOs	50
4. Watershed Management Frameworks	140
5. Comparative Analysis of Watershed Management Core Focal Issues	141
6. Estimated FY2011 State and PCSRF Funding Support	151
7. Estimated Comparison of Funding Amount, Diversity, and Stability	152
8. Estimated FY2011 State Expenditure-to-Population Ratios	160
9. PCSRF and State Funding 2000-2008	16

CHAPTER I

PROBLEM STATEMENT

Introduction

Throughout the past two decades, a number of scientists, researchers, government agencies and non-governmental organizations (NGOs) have increasingly supported natural resource management at a hydrologically defined watershed scale, generally known as watershed management (Bentrop, 2001; Bidwell & Ryan, 2006; William Blomquist & Schlager, 1999; Genskow & Born, 2009; Hibbard & Lurie, 2008; Huitema et al., 2009; Imperial & Hennessey, 2000; Johnson, Ravnborg, Westermann, & Probst, 2002; Karen, 2005; Koontz & Thomas, 2006; William D. Leach & Pelkey, 2001; W. D. Leach, Pelkey, & Sabatier, 2002; M. Lubell, 2004; Mark Lubell, Schneider, Scholz, & Mete, 2002; Margerum, 2008; Michaels, 2001; Moore & Koontz, 2003; Sabatier et al., 2005; Said et al., 2006; Schlager & Heikkila, 2007; Weber, 2000). In effect, watershed management is a form of natural resource management that combines topography with the water cycle at a spatially explicit scale to better co-manage the unique ecosystems and local activities contained within the confines of each unique watershed. Watershed management typically links local ecosystems and interests through managing riparian processes vital to sustainability via a collaborative, inclusive, stakeholder-driven organizational format grounded in long-term and genuine praxis-based interactions. Pacific Northwest watershed management frequently aims to balance interrelated, oft-competing processes such as riparian biodiversity (i.e., endemic species recovery and

invasive species removal), agricultural/municipal water diversions, forest resource extraction, hydroelectric dam electricity generation, flood risk management, industrial steam processes, and sourcing drinking water.

Currently, there is a gap in policy understanding regarding the structure and function of state-level watershed management frameworks in the U.S. (W. Blomquist, Heikkila, & Schlager, 2004; National Research Council: Committee on Assessment of Water Resources Research, 2004; Vaux, 2005); this gap is important from a management perspective since, in the words of Louis Brandeis, states are able to act as innovative ‘policy laboratories’ that can implement creative problem solving solutions on a localized scale with potentially wide scale implications (Volden, 2006). A comparative analysis of the watershed management policy structures currently employed across Pacific Northwest states can potentially convey broad-ranging implications for informing effective state-level watershed management frameworks across bioregions of all types.

This study aims to describe and analyze the state-level formal institutional structures and mechanisms (i.e., agencies and programs) currently engaged in activities related to watershed management across the Pacific Northwest bioregion. Both document analysis and the experiential perspectives of key informants inform this research. Specifically, this analysis focuses on the state-level institutional frameworks for watershed management in Washington, Oregon, Idaho and Northern California.

Background and Significance

As Western United States populations, urbanization and resource extraction–based economic activity expanded over the past 150 years, the seemingly infinite

resources of the United States began to appear noticeably finite (W. A. Williams, 1955). This research will focus on the Pacific Northwest as a place where the widespread shrinking of resources due to human impacts presents considerable biologic, economic and cultural issues (Brander, 2007; Dietrich, 1992; McConnell, 1995). Fur trappers, such as those employed by the Hudson Bay Company, were among the first non-indigenous people to settle in the Pacific Northwest. Accordingly, the first large-scale anthropogenic damage to anadromous fish (migratory fish species that are born in fresh water, spend most of their lives in the sea, and return to fresh water to spawn) habitat in the Pacific Northwest was the trapping of beavers nearly to extinction in the 19th century (Taylor, 1999). The second such large-scale anthropogenic damage to anadromous fish habitat occurred through a complex, cumulative array of logging, agriculture, damming, and industrial pollution in Pacific Northwest watersheds; anthropogenic damages caused by overfishing, though sizeable, are ranked third by existing research behind these two broader changes in landscape that constrained watershed processes (ibid).

The interrelated nature of expanding 20th century human populations and finite resources is noted throughout historical texts (Merchant, 1994). An early proponent of hydropolitical jurisdictional boundaries, John Wesley Powell famously proposed that state boundaries be defined by watersheds to reduce conflict related to the allocation of finite, essential resources in his “Report on the Lands in the Arid Regions of the United States” (Ewert, 2002). Nearly a century later, Peter Borg of the Planet Drum Foundation and the San Francisco Diggers movement was an active force in promoting and popularizing the idea of bioregionalism in the 1970s, resurrecting a concept with a relatively deep history (Glasser, 2005).

Over the past century, natural resource management policy underwent substantial reform in the U.S. National-scale natural resource policies largely shifted away from a Gifford Pinchot/U.S. Forest Service conservationist approach focused on the sustained yield of resources to a John Muir/Olaus Murie/Benton MacKaye preservationist approach focused on the designation of protected areas (i.e., National Parks) that separated even the indigenous from the landscape under the guise of protecting natural resources (Meyer, 1997). The formation of the Environmental Protection Agency (EPA), in addition to passage of the Clean Water and Endangered Species Acts (CWA and ESA, respectively) were instrumental in helping to foster a legally and scientifically technocratic preservationist policy approach to natural resource management in the United States (Policansky, 1998). Specifically, Northern Spotted Owl (*Strix occidentalis caurina*) and Pacific Salmon/Trout (*Oncorhynchus* spp.) protections under the ESA fostered new federal mandates in Pacific Northwest watersheds. The importance of state involvement in meeting the extinction-prevention goals of the ESA is detailed in emergent research (Arha & Thompson, 2011).

A question of the ‘right’ balance of control exists between federal government, state government, industry and local residents (Ascher, 2001). Whether to use financial incentives or traditional command-and-control regulations to achieve specific desired environmental outcomes remains unclear, particularly across heterogeneous states (Harrington, Morgenstern, & Sterner, 2004). In recent years, the Enlibra doctrine emerged from the Western Governor’s Association as a state-supported landowner-centric response to what was perceived as growing levels of regulation. The Oregon Plan for Salmon Recovery and Watershed Restoration is often regarded a primary exemplar of

the Enlibra doctrine for its bottom-up landowner-centric approach (Malone, 2000). Concurrently, Community-Based Natural Resource Management (CBNRM) has grown in popularity and implementation frequency (Tsing, Brosius, & Zerner, 1999). Pacific Northwest watershed management efforts, based in a CBNRM approach balancing federal incentives and regulations, are relatively recent. As a practical application of recent Western U.S. governance trends such as CBNRM, New Federalism (federal devolution of power to states) and the Enlibra doctrine, the composition and effects of state-level watershed management frameworks carry implications for natural resource management at large. Watershed management is the latest decentralized, inclusive, collaborative, and regional approach to natural resource management. In essence, Pacific Northwest watershed management represents the bioregion's first major coordinated community-based effort to address over a century of modified stream flows, degraded water quality, and declining salmon populations.

Significant information gaps currently remain related to state-level watershed management frameworks across Pacific Northwest states. Specifically, the formal institutional frameworks, mechanisms, outputs, and outcomes of Pacific Northwest state-level watershed management efforts remain largely unanalyzed in a comparative context. The region's state-level watershed management frameworks underwent considerable development over the past decade, contributing a substantial amount of financial and human resources to their development. A comparative analysis of the region's state-level watershed management frameworks is vital to determining the impact and resilience of the region's watershed management efforts. Not only is a comparative analysis important to deciphering states' return on investment regarding watershed outputs and outcomes,

but also in determining the resiliency of state-level frameworks under the current national-level recessionary forces. Understanding which elements of frameworks and mechanisms lend to successful outcomes may increase each State's likelihood of success in attaining major regional natural resource goals by improving water quality and/or recovering salmonid species. Under the auspices of watershed management, States can potentially achieve these goals without instituting increasing levels of regulation costly to government and private entities, strengthening the region's economy as well as environmental quality. Currently faced with a prolonged national-scale recession, such cost-effective natural resource management strategies are potentially vital to long-term success.

Research Question

The central question this study addresses is: What are the state-level institutional frameworks for managing watersheds in the Pacific Northwest and how do they compare?

This study addresses current research gaps via three ways: 1) detailing formal state-level policy frameworks related to watershed management in the Pacific Northwest, 2) assessing key informant perceptions of policy frameworks and formal institutional dynamics, and 3) offering a comparative analysis of the state-level frameworks.

Methods

The structure of the methodology is informed by previous studies of the past three decades indicating desired future directions for institutional research specific to water

resource management (Ingram, Mann, Weatherford, & Cortner, 1984). One key study recommends a combination of document collection, field interviewing, and data analysis to identify the key features of water management organizations (W. Blomquist, et al., 2004). The methodology of the research is thus three-fold, consisting of document analysis, semi-structured interviews and a comparative analysis. The selection of a regional comparative analysis and the specific case study states was informed through this body of research, which suggests limiting the amount of variables in order to probe differences in institutions (ibid). The definition of the Pacific Northwest region is informed by U.S. Fish and Wildlife Service Evolutionarily Significant Units of Chinook salmon, as well as contiguous PCSRF states and previous research (Omernik & Bailey, 1997; Sommarstrom, 1999b).

First, a review of documents and data was conducted. Information was sourced through search engines, government websites, watershed management organization (WMO) websites, environmental group websites, scholarly works and other written sources. WMOs were selected based upon the level of activity, available data, and statewide relevance derived from informal interviews and advising. Relevant information was sourced through online searches as well as informal interviews, as was done by previous researchers studying similar institutions on a comparative basis (Holst, 1999).

Second, semi-structured interviews were conducted with key informants, selected via purposive sampling. The list of key informants was informed through document review, research committee advising and informal dialogues with experienced watershed management professionals. Interviewees were chosen based upon their perceived levels of experience and/or knowledge for given regions and organization types. The pool of

organizations from which watershed management key informants were selected includes state agencies, federal agencies, WMOs, Special Districts and pertinent non-WMO non-profit organizations active within the region. In total, n = 39 individuals were contacted and n = 18 individuals were interviewed, yielding a response rate of 46%. Out of the n = 18 interviewees, 33% represented state agencies, 22% represented WMOs, and 11% represented federal agencies, with Special District and non-WMO NPO representation comprising an even 17% each. Key informants were asked questions (n = 11) regarding interviewee background, state watershed management goals, state consistency with WMO goals, state goal indicators and metrics, state and WMO long-term financial prospects and, state framework strengths and weaknesses.

The scope of the research is limited to the Pacific Northwest, an area of the United States defined herein as the biogeographic and sociopolitical sum of Washington, Oregon, Idaho and Northern California. The research begins with a historical analysis informed by similar studies providing a “historic, legal and political context” for Pacific Northwest watershed management (Arha, Salwasser, & Achterman, 2003 p.8). Data was analyzed via methods that aim to offer specific and conclusive analysis, as recommended by previous research (William Blomquist & Schlager, 1999). The research focuses on state-level policy frameworks in order to create a bioregional basis for comparison focusing on a single jurisdictional level. The frameworks of the states were documented and compared, along with the specific programs and funding streams for watershed management activities, informed by previous methods (S. M. Born & Genskow, 1999; Gorder, 2001).

The results of the research were synthesized into a comparative analysis of the state-level watershed management frameworks. The state-level mechanisms and related institutional dynamics were analyzed in order to document the level, persistence and type of state-level watershed management efforts. The analysis concludes with a cross-state comparison that explores the watershed management framework of each state, in search of overlying themes and/or divergences in mechanisms and their related contexts. This analysis of Pacific Northwest watershed management governance fills a current gap in policy understanding, acting as a baseline for future studies detailing the region's state-level watershed management outputs and outcomes in order to further estimate each state's effectiveness and return on investment of funding activities.

Importance

Existing research notes, "...nongovernmental governance arrangements and inter-organizational arrangements are ripe to be explored in the watershed context right now in the U.S." (W. Blomquist, et al., 2004 p.933). Societal reliance upon functioning watershed processes, grounded in clean water and a diversity of food sources that includes both fish and agriculture, is well noted across multiple disciplines of study. Such disciplines include human ecology (Johnston, 1995), agricultural science (Weinberg & Kling, 1996), fluvial geomorphology (Gillilan, Boyd, Hoitsma, & Kauffman, 2005), climatology (Brosofske, Chen, Naiman, & Franklin, 1997), anthropology (Derman & Ferguson, 1995), cultural geography (M. Williams, 2005). However, the effectiveness of state-level watershed management efforts remains largely unknown. The composition and type of state-level watershed management frameworks may carry broad implications for

effectiveness in achieving socially and ecologically desirable outputs and enduring, adaptive institutions across jurisdictional and geographic scales.

Given the recent popularity of democratic, regional, collaborative management approaches to social-ecological interactions at the watershed scale, the frameworks of formal government institutions are of significant importance. State-level institutions, in particular, may be well poised to translate the needs of national regulations such as the CWA and ESA while incentivizing and engaging regional stakeholders (Farr, 2004). The ability and importance of states acting as ‘laboratories of democracy’ is well noted in the current literature; Louis Brandeis and others have noted the particular role of states as test beds for policy as well as enablers of regional heterogeneity, stabilizing the federalist system by offering a level of adaptive governance (Tarr, 2001).

The role and effect of state-level watershed management institutions in the Pacific Northwest remain largely unknown, as studies tend to focus on the regional success of WMOs rather than the state-level institutions that may enable such regional, oft-grassroots successes (Huntington & Sommarstrom, 2000; W. D. Leach, et al., 2002). While research efforts such as the Four Corners Initiative have touched up the subject at the national level (S. M. Born & Genskow, 1999), a regional Pacific Northwest understanding remains elusive. Furthermore, Pacific Northwest states’ watershed management framework returns on investment in terms of funding levels, outputs, and outcomes remain undetailed. A regional state-level comparative analysis of substantial depth may be of key importance not only to the long-term success of state watershed management frameworks, but also WMOs that may depend heavily upon the states’ frameworks. Although the case study states have invested considerable financial and

human capital into the establishment and support of watershed management frameworks, the result of these investments remain unknown. Times of recessionary market forces such as today additionally offer a unique insight into the resilience of each state framework, carrying with it potentially large implications for the survivability of a host of WMOs that may rely upon state-level support.

Scope

The scope of this work is limited to an analysis of state-level institutions in watershed management. These state-level watershed institutions will be discussed in terms of three kinds of scope: spatial, temporal and institutional. The spatial scope, as previously noted, is limited to the Pacific Northwest bioregion, for the purpose of this study consisting of Washington, Oregon, Idaho and Northern California. The temporal scope is inclusive, but will primarily focus on the past two decades of watershed-scale natural resource management in order to provide a contextual understanding of current watershed management frameworks. Finally, the institutional scope is limited to state activities that correspond with watershed management activities, as defined by the case study states.

State formal institutions (i.e., agencies) are researched based upon two scope-related criteria: 1) what the structure, role, and mechanisms of the formal state institutions are, 2) how these factors relate to other entities involved in watershed management. The scope of key informants for inclusion in this study is related to formal institutional relevance in regard to watershed management activities, estimated by state-level watershed management roles and major WMO involvement. The study additionally

aims to incorporate key informant perceptions from local, regional, state and federal scales.

Outline

Chapter I of this paper is dedicated to the problem statement. The chapter begins with an introduction to the research, followed by the background, research question, significance, scope, and finally, this outline. Chapter II is concerned with the literature review, beginning with an introduction and moving into the historical context of watershed management in the Pacific Northwest. The chapter ends with an analysis of existing literature related to study area state-level watershed management frameworks and related comparative analyses. Chapter III presents a description of the methodology, moving from background research to document analysis, semi-structured informal interviews, and the comparative analysis. Chapter IV details the findings of the study, from the State of California to the State of Washington, beginning with a brief history of each state's recent watershed management efforts. The findings section for each state next details the current state-level watershed manage framework, followed by a brief diagram and/or overview for each framework. Finally, Chapter V contains the analysis, conclusions, and recommendations of the study. The state-level frameworks are compared and analyzed in relation to a number of generalized framework criteria. The study ends with conclusions and recommendations based upon the findings and comparative analysis.

CHAPTER II

LITERATURE REVIEW

Introduction

While watershed management activities have increased significantly in the past two decades, studies related to the growing number of state-level watershed management frameworks are still few in number. Only a limited amount of scholarly research regarding comparative state-level watershed management frameworks is currently available. As state-level watershed management is fairly new to many regions, even established policy frameworks continue to adjust in structure and function. The agenda for institutional research in watershed management is increasingly focused on the relationship of formal structures to water management outcomes (W. Blomquist, et al., 2004). This agenda, clearly delineated by the National Research Council in 2001, highlights the importance of studying watershed management institutions in a comparative context (National Research Council, 2001).

The US EPA Watershed Academy web document “Statewide Watershed Management” (United States Environmental Protection Agency, Unknown), as well as a recent Public Policy Institute of California study (Hanak et al., 2011), highlight the key role of state-level policy frameworks in achieving desired watershed management outputs and outcomes. Once state-level watershed management frameworks are clearly understood, the relationship of these frameworks to ground-level outputs and outcomes can be explored in a comparative context to determine framework effectiveness. This

research represents the first step in this two-step process toward delineating regional state-level watershed management framework effectiveness and outcomes. Additionally, this research is intended to serve as the foundation for future work investigating why states of the Pacific Northwest have markedly different outputs per investment under the Pacific Coastal Salmon Recovery Fund's Salmon Habitat Protection and Restoration Funding category (National Oceanic and Atmospheric Administration, 2011a).

Studies related to watershed management and collaborative governance frameworks are part of a growing body of work that seeks to understand the fundamental dynamics of human-environment interactions (Moran & Ostrom, 2005; Mumford, 1968) and social-ecological systems (Folke, Hahn, Olsson, & Norberg, 2005). In the words of Nobel Prize Laureate Elinor Ostrom, “empirically validated theories of human organization will be essential ingredients of a policy science that can inform decisions about the likely consequences of a multitude of ways of organizing human activities.” Furthermore, “neither the state nor the market is uniformly successful in enabling individuals to sustain long-term, productive use of natural resource systems... In field settings, public and private institutions frequently are intermeshed and depend on one another, rather than existing in isolated worlds” (Ostrom, 1990 p.24).

Non-governmental organizations (NGOs) such as WMOs can help align public and private formal institutions with local ecological knowledge through stakeholder praxis. Ostrom details the importance of institutional structures in that, “whether or not any equilibria are possible and whether or not an equilibrium would be an improvement for the individuals involved will depend on the particular structures of the institutions”

(Ostrom, 1990 pp.22-3). This research is specifically concerned with such frameworks or ‘formal structures’ of institutions (Selznick, 1996).

This chapter presents the current literature surrounding the historical context of state-level watershed management in the Pacific Northwest. First, the sociopolitical context of the Western watersheds movement is explored. Next, the history of EPA’s Watershed Protection Approach is analyzed, as a vital early impetus and model for state-level watershed management frameworks.

Brief History of Watershed Management in the Western United States

Substantial transitions in natural resource management policy, like water quality degradation, are often the result of cumulative effects that do not point to a single clear source. Researchers note that an array of factors led to the historical rise of the “Western watersheds movement,” consisting of a rapid proliferation of grassroots WMOs and the connected rise in state-level watershed management frameworks (Berkes, Colding, & Folke, 2000; Connick & Innes, 2003; Cronon, 1993; Innes & Booher, 2010; Olsson & Folke, 2001; Ostrom, 1990; Yu et al., 2010).

Over a century ago, John Wesley Powell defined watersheds as “that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community” (United States Environmental Protection Agency, 2009). In practical terms, “A watershed can be defined as the land area that contributes runoff to a particular point along a waterway. A typical watershed can cover tens to hundreds of square miles and several jurisdictions” (Center for Watershed Protection,

1998 p.135). Pacific Northwest watersheds are linked to nutrient and water budgets through complex mechanisms. For example, anadromous salmonids transport marine-derived nutrients substantially inland to upland vegetation through fish predation and spawn site scavenging, mirroring Powell's "inextricably linked" notion from over a century ago (Naiman, Bilby, Schindler, & Helfield, 2002; United States Environmental Protection Agency, 2009). However, the basic idea of a watershed is traditionally understood in simple terms of the water cycle – the course water, from evaporation to precipitation and accumulation, and back to evaporation. Watersheds have been a focus of national research for about a century, fueled by the work of forest hydrologists and geomorphologists such as Luna Leopold, son of famous conservationist Aldo Leopold.

While "there are many different watershed management units... Watershed and sub-watershed units are most practical for local plans" (Center for Watershed Protection, 1998). WMOs typically operate at these two units, or scales. Typically, river basins are the largest watershed management units, followed by sub-basin units, watershed units, sub-watershed units, and catchments (Center for Watershed Protection, 1998; Clements, Creager, & Brewer, 1996). The multiplicity of watershed management units, depicted in Figure 1 and Table 1, can be confusing and imprecise. WMOs often operate in scales as large as basins or as small as sub-watersheds.

Figure 1. The Watershed Management Units (Center for Watershed Protection, 1998)

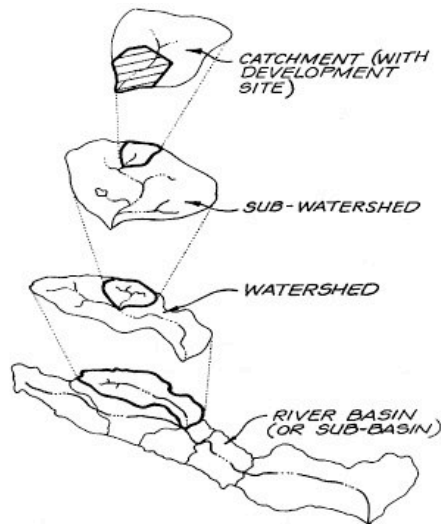


Table 1. Watershed Management Unit Scale (ibid)

Watershed Management Unit	Typical Area (square miles)
Catchment	0.05 to 0.50
Subwatershed	1 to 10
Watershed	10 to 100
Subbasin	100 to 1,000
Basin	1,000 to 10,000

Watershed management is herein defined as community-based natural resource management at a hydrologically defined watershed scale. The characteristic values and practices of WMOs are significantly detailed in existing literature; WMOs tend to be grassroots, collaborative, inclusive, stakeholder-driven, voluntary, grant-funded non-profit organizations that undertake a variety of actions related to watershed assessment,

restoration, protection, monitoring, education, and outreach (Bentrup, 2001; Bidwell, 2003; William Blomquist & Schlager, 1999; Brady, 1996; B. T. Clark, Burkardt, & King, 2005; L. R. Clark, 2001; Davenport, Phillips, Kirschner, & Kirschner, 1996; Imperial & Hennessey, 2000; Douglas S. Kenney, 1997; D. S. Kenney, 1999; Douglas S. Kenney, McAllister, Caile, & Peckham, 2000; William D. Leach & Pelkey, 2001; M. Lubell, 2004; Mark Lubell, et al., 2002; Michaels, 2001; National Policy Consensus Center, 2003; Northcote & Hartman, 2004; Sabatier, et al., 2005; Sommarstrom, 1999a; State of Washington, 2003; Stednick, 2008; United States Environmental Protection Agency, 1991, Unknown).

Watershed management is in many ways a resurgent rather than revolutionary approach in the field of natural resource management. Douglas Kenney offers a concise history of the Western watersheds movement in his journal article “Historical and Sociopolitical Context of the Western Watersheds Movement.” Kenney details the way in which regional efforts to manage water resources have stimulated “social and political organization” since the “ancient ‘fluvial’ societies of Mesopotamia, Egypt and China” (D. S. Kenney, 1999 p.495). Following the initial vision of John Wesley Powell, Kenney notes three main eras in watershed-scale integrated natural resource management in US history: the Progressive Conservation Era, the Great Depression Era, and the Coordinated Resource Management (CRM) Era that grew out of the 1960s with its Water Resources Planning Act of 1965.

Kenney notes that the Progressive Conservation Era (1890-1920) stressed a regional approach, elucidated by President Theodore Roosevelt’s 1908 statement to the Inland Waterways Commission echoing the basic premise of watershed management,

“Every river system, from its headwaters in the forest to its mouth on the coast, is a single unit and should be treated as such” (D. S. Kenney, 1999 p.496). Kenney further describes how the Great Depression Era (1929-1942) strategy for watershed-scale integrated natural resource management planted the “institutional seed” and template for modern watershed initiatives, contrasting with the top-down approach of the Era’s federal Tennessee Valley Authority (ibid). The later CRM Era (1960s) was marked by the growth of “localized efforts in improved land/water management;” a legacy that followed the integrated natural resource management strategies of the Great Depression Era (ibid). The CRM Era “helped provide the procedural model embraced in the modern watershed movement” (ibid, p.497).

According to Kenney and others, the 1960s and 1970s saw a rise in popular support for the environmental movement, shifting resource management toward top-down federal governance strategies “buttressed by litigation” (Douglas S. Kenney, et al., 2000 p.10). Kenney notes how the environmental movement resulted in a regulatory “gridlock,” in which top-down structures and litigation barriers prevented decision-making capacity (ibid); this top-down, technocratic and litigation-heavy structure of governance negatively impacted many levels of decision-making, leading to calls to reinvent government. Kenney notes that the two movements, in turn, fed into the rise of the community/collaborative model, promoted by the regulation-focused EPA through its Watershed Protection Approach (ibid).

The Pacific Northwest, in particular, received the highest level of state support for watershed initiatives. The experiments in state-level watershed management in Washington and California were highly influenced by Oregon’s framework, while Idaho

adopted EPA's Watershed Protection Approach to water quality management (Douglas S. Kenney, et al., 2000). The rise of the 'Western watershed movement' was additionally fueled by the Western Governors' Association's call for locally based solutions to natural resource and environmental challenges, eventually culminating in the Enlibra doctrine, "an approach to environmental management emphasizing balance and stewardship" (ibid p.12).

The U.S. Soil Conservation Service (now the Natural Resource Conservation Service, or NRCS), "established in 1935 in response to Depression-era 'Dust Bowl' conditions, has been an aggressive proponent of federal-state-local partnerships at regional scales" (Douglas S. Kenney, 1997 p.5). Kenney highlights the importance of NRCS's Small Watershed Program and its development of the CRM framework beginning in the 1950s in conducting watershed management through local conservation districts (ibid). Additionally, the Northwest Power Planning Council of 1980 acted as a role model for the expansion of New Federalism, which consists of 'federal devolution' of powers to the States (Gregg, Rice, Kenney, & Mutz, 1998; Douglas S. Kenney, et al., 2000).

Sabatier, Focht et al. (2005) utilize a similar approach in characterizing distinct eras in the history of watershed management: the Manifest Destiny Era (pre-1890), the Progressive Era (1890-1924), The Federal/New Deal Era (1925-1964), the Environmental Era (1965-1986) and the Watershed Collaboration Era (1987-Present). In the Manifest Destiny Era, "water was used almost exclusively to fuel economic development" (Sabatier, et al., 2005 p.26). Similar to previous studies, the Progressive Era is characterized by the Jeffersonian ideals of John Wesley Powell, Gifford Pinchot,

Theodore Roosevelt and others who proclaimed the necessity of watershed-scale natural resource management. The Progressive Era was characterized by a mistrust of market-based approaches to water management, the rise of autonomous bureaucratic experts, and a multiple-use approach focused primarily on water supply, flood control and navigation (ibid).

The subsequent Federal Era “represented a continuation and refinement of approaches developed during the Progressive Era...” (Sabatier, et al., 2005 p.31). The Environmental Era brought new ideas that included “(1) an increased priority to environmental values, (2) a growing distrust of bureaucratic experts in federal agencies, and (3) a distrust of state and local governments as too susceptible to influence by economic interest groups” (ibid p.37). The Environmental Era led to a host of new federal statutes: “the most important for watershed management, at least in the West, has been the Endangered Species Act” (ibid p.42). The listing of aquatic species, such as Pacific salmon/trout and pelagic fish in California’s Bay-Delta System, created “massive potential disruptions throughout entire river basins” (ibid).

Sabatier, Focht et al. (2005) characterizes The Watershed Collaboration Era as a reaction to the “excesses” of the Environmental Era that included the “federalization of authority, tight constraints on agency discretion, reliance on litigation as a major strategy, fostering environmental interests at the expense of property rights, and a general confrontational cloud over water management” (Sabatier, et al., 2005 p.43). The new era of watershed collaboration stemmed from many factors, including “a growing sense that much of environmental policy, particularly regarding the ESA, was neither democratically legitimate nor effective at solving environmental problems” (ibid pp.43-

4). The researchers note that, “the most novel feature of the Collaborative Era is the involvement of multiple stakeholders representing diverse interests who treat each other more or less as equals” (ibid p.50). The Watershed Collaborative Era places primary importance on linking scientific knowledge with local time-and-place knowledge, or praxis (ibid).

Collaborative, integrated watershed-scale ecosystem management began to take hold across the country in the “watershed decade” of the 1990s (Stednick, 2008 p.293). The Pacific Northwest, in particular, was a focal point of rapidly emerging ecosystem management approaches. The combination of federal protections for Pacific salmonids (*Oncorhynchus spp.*) and northern spotted owl (*Strix occidentalis caurina*) through the Endangered Species Act and the Northwest Forest Plan led to a paradigm shift in natural resource management from managing for traditional socioeconomic needs to managing for the needs of healthy functioning ecosystems (Cortner & Moote, 1999), with the subsequent rise of local restoration-based economies combining elements of both approaches (Hibbard & Bonner, 2002; MacDonald, 2010; Nielsen-Pincus, MacDonald, & Moseley, 2009; Nielsen-Pincus & Moseley, 2010). A prime example of a federal agency shifting in role from a top-down, technocratic enforcer to flexible facilitator and policy informer is the EPA through its voluntary Watershed Protection Approach.

EPA’s Watershed Protection Approach

The US EPA embraces a policy-centric, rather than cultural, history in describing the situation that fostered the Watershed Protection Approach (WPA). The Federal Water Pollution Control Act Amendments of 1972, better known as the Clean Water Act

(CWA), with its National Pollutant Discharge Elimination System (NPDES) permitting program, is noted as the first impetus for a watershed approach (United States Environmental Protection Agency, 1995). “Under Section 303(e) of the CWA, states prepared basin plans for controlling their point source problems... after the initial plans were completed, most states maintained only a limited basin planning function while focusing on individual point source problems” (ibid p.10). Additional research indicates that while the Water Quality Act amendments of 1965 based management efforts on the hydrologic function of entire river systems, the 1972 amendments to the Act retroactively replaced this approach with technology-based standards that better fit a federal command-and-control management approach (Viessman & Welty, 1985).

The EPA states that the second impetus for a watershed approach came via the 1974 Safe Drinking Water Act (SDWA), which “drew together several important programs protecting public health that now need to be considered within a comprehensive Watershed Protection Approach” (United States Environmental Protection Agency, 1995 p.11) The later 1986 amendments to the SDWA imposed “significant costs on state and local drinking water monitoring programs” (ibid). Under the SDWA, the Source Water Protection, Wellhead Protection and Sole Source Aquifer Programs were also based on an increasingly watershed-scale approach.

The 1987 amendments to the CWA (the most current amendments to date) required states to develop non-point source (NPS) pollution control programs specifying Best Management Practices (BMPs) and placed additional requirements on the states, straining “state budgets and [making] multi-agency programs such as [NPS] management more difficult to coordinate effectively. Moreover, the states’ progress in eliminating

point-source pollution has revealed that [NPS] pollution and habitat degradation account for most of the nation's remaining water quality problems" (United States Environmental Protection Agency, 1995 p.11). According to Ortolano (1997), this situation led the EPA's Office of Policy, Planning and Evaluation to suggest in 1992 that the agency "move toward a watershed protection approach: one that tailors NPS pollution control strategies to fit conditions in particular watersheds and gives state and local governments flexibility" (Ortolano, 1997 pp.256-7).

The Watershed Protection Approach contains four stated major features: 1) priority problem targeting, 2) stakeholder involvement, 3) integrated solutions, and 4) measuring success. An EPA document states that "the WPA is not a new program that competes with or replaces existing water quality programs; rather, it is a framework within which ongoing programs can be integrated effectively" (United States Environmental Protection Agency, 1995 p.12). Additionally, "one purpose of the WPA is to integrate the many individual programs that have evolved to implement the goals of the CWA and the SDWA" (ibid). Furthermore, CWA Section 303(d) and the Total Maximum Daily Load (TMDL) process together "provide one key legislative and technical underpinning for the WPA..." (ibid p.13). In effect, "each state may make more or less use of each of these CWA and SDWA programs, tailoring them to create its unique watershed approach." (ibid). The EPA produced the initial framework document for watershed protection in 1991, which states:

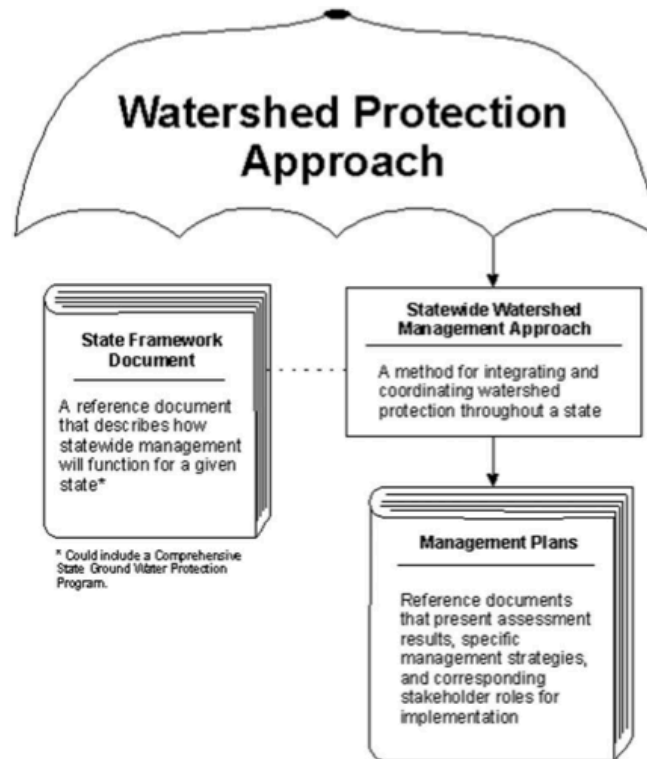
The Watershed Protection Approach is built on three main principles. First, the target watersheds should be those where pollution poses the greatest risk to

human health, ecological resources, desirable uses of the water, or a combination of these. Second, all parties with a stake in the specific local situation should participate in the analysis of problems and the creation of solutions. Third, the action undertaken should draw on the full range of methods and tools available, integrating them into a coordinated, multi-organization attack on the problems... This framework is derived from the experience gained over the last few years in many States and in collaborative activities, such as the National Estuary Program and the Clean Lakes Program (United States Environmental Protection Agency, 1991 p.1).

Concerning the structure of watershed protection program frameworks, noted in Figure 2, the document states that basins and selected major aquifers are the often the primary management unit of the State frameworks, compelling managers to view water resource management in a systems approach, as was previously practiced. Additionally,

Circumstances vary widely, of course, and there is no simple prescription for a program structure that will meet every organization's needs. The following three components are important to all frameworks, however: (1) well defined goals and objectives for the ongoing program, (2) a set of criteria for selecting high priority watersheds, and (3) a flexible process for planning and implementing the watershed protection measures (United States Environmental Protection Agency, 1991 p.5).

Figure 2. EPA's Watershed Protection Approach (United States Environmental Protection Agency, 1995)



Between 1991 and 1995, EPA amended the Watershed Protection Approach. After the 1991 document was released, EPA provided support to states to help build on the many existing watershed-based programs and watershed projects. According to sources outside EPA, before the 1987 CWA amendments, EPA was effective in regulating point source pollution but left NPS pollution almost entirely unaddressed (Brady, 1996; Freeman, 2000); this regulatory discrepancy occurred even though states were required to prepare statewide NPS pollution control programs through Section 208 of the CWA and the growing importance of regulating NPS pollution was well documented (Moreau, 1994). While regulating point source pollution was an effective water quality strategy in the rapid industrialization of the nation's waterways, the strategy

did little to address the deleterious effects of expanding urbanization and agricultural intensity linked to population growth and development (ibid).

The Watershed Protection Approach was in many ways an extension of Section 319 of the CWA. Section 319 was created during the 1987 CWA amendments and incentivizes states to develop non-point source controls on a watershed basis. Section 319, a grant-based program, has drawn criticism for lacking local land use decision-making authority as well as sufficient funding. The states have been assigned the “major responsibility for the design and implementation of programs for the control of [NPS] pollution. EPA has a supervisory role with responsibilities for approving state programs to implement the CWA” (O’Laughlin, 1996 p.12).

EPA’s Watershed Protection Approach is an incremental policy framework from a federal agency lacking in funding priority and local land use authority. Research found, “whether mandated by new CWA provisions or not, increasing emphasis will be placed on pollution prevention and watershed management” (Jaworski, 1994; O’Laughlin, 1996 p.12). The Watershed Protection Approach is a piecemeal, pragmatic approach to fostering state-level watershed management. States such as Idaho continue to manage watersheds almost entirely through the EPA’s suggested framework (O’Laughlin, 1996).

While each State maintains a unique focus, each State has either adopted the Watershed Protection Approach, or as with Oregon, is currently in the process of implementing a ‘Watershed Approach’ to water quality management. In every State, pollution control agencies/departments implement the Watershed Protection Approach, reflecting its core purpose of improving water quality. According to interview findings, EPA’s Watershed Protection Approach offered a vital early model for the States to

implement watershed management. States frequently expanded the Watershed Protection Approach into WMO grant-based comprehensive watershed management and salmon recovery planning during the latter half of the 1990s, while the State of Idaho continues to maintain a singular watershed management framework highly analogous to EPA's model Watershed Protection Approach.

Pacific Northwest State-Level Watershed Management

The importance of watersheds as a hydrologically based scale of natural resource management is strongly linked to two historically abundant Pacific Northwest resources: salmonids and timber. Various salmonid recovery planning efforts and forest Practice Acts (FPAs) connected to the CWA and ESA, note the importance of natural resource management at the watershed scale in order to meet the dual federal mandates. State FPAs began with the Alsea Watershed Study of Western Oregon and were enacted to ward off impending federal NPS mandates (Hairston-Strang, Adams, & Ice, 2008). The interlinked nature of agriculture (i.e., forestry) and salmonid processes in the Pacific Northwest is in many ways at the heart of regional watershed-scale natural resource management, due in large part to the dual mandates of the CWA and ESA. Hence, watersheds are frequently considered an appropriate scale for natural resource management in the Pacific Northwest.

Both forestry and fisheries are of key socioeconomic importance in the Pacific Northwest. Due to the high intensity of activity, forestry remains a key contributor to watershed degradation through a variety of complex watershed-scale interactions (Northcote & Hartman, 2004; Schmidt et al., 2001), in addition to the capacity for global-

scale carbon sequestration (Xiao et al., 2011). The ecosystem management strategy of protection/preservation vis-à-vis the ESA was followed by watershed-based salmonid recovery plans across the Pacific Northwest states. These plans include the Oregon Plan for Salmon and Watersheds and Oregon Coast Coho Conservation Plan, Washington's Forests & Fish Law and bottom-up watershed-based salmon recovery plans referred to as 'the Washington Way' (State of Washington: Recreation and Conservation Office, 2010), former Idaho Governor Blatt's Bull Trout Conservation Plan, and the Recovery Strategy for California Coho Salmon. These strategies, in many ways, were a response to the experiences learned from the spotted owl controversy that led to the Northwest Forest Plan. Accordingly, each plan reflects concerns that federal listing under the ESA rarely leads to recovery and absent state leadership will result in less favorable federal regulation (Arha, et al., 2003).

Such concerns lent to a federally driven incentive for states to proactively address watershed health. State-level watershed management in the Pacific Northwest is often viewed as an "alternative to federal regulations under the [ESA], as an attempt to address both ESA and CWA requirements, and as a state-led conservation strategy for restoring salmonid populations" (Arha, et al., 2003 p.9). While other types of agriculture and urban runoff issues are also present in the Pacific Northwest, the nexus between forestry and fisheries is regionally poignant in terms of regulatory, judicial, and long-term economic support for state-level watershed management.

Another distinct key regional economic driver, besides timber, is the region's hydropower dams. The Corps of Engineers along with the Bureau of Reclamation built 31 dams in the Pacific Northwest, all part of the Federal Columbia River Power System

(FCRPS). Although heterogeneous in impact (Levin & Tolimieri, 2001), The FCRPS dams are widely believed to have substantially contributed to an array of factors leading to the large-scale decline of endemic anadromous fish during the 20th century (Ruckelshaus, Levin, Johnson, & Kareiva, 2002). Due to these concerns, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act in 1980. The Act authorized the states of Idaho, Montana, Oregon, and Washington to form the Northwest Power and Conservation Council (NWPPCC), with two governor-appointed representatives from each state. The Act was not only concerned with anadromous fish, but also energy efficiency measures to pave the way for future growth while maintaining a low-cost supply of energy. NWPPCC's work culminated in multiple iterations of the Northwest Power Plan (Northwest Power and Conservation Council, 2010).

A significant function of the Council, directed by the Act, is the Columbia River Basin Fish and Wildlife Program. The Program houses a Fish Passage Center information clearinghouse and has designated 44,000 miles of Pacific Northwest streams as protected areas (Northwest Power and Conservation Council, 2010). Another core aspect of the Program is its locally created sub-basin plan chapters. The sub-basin plans “identify priority restoration and protection strategies for habitat and fish and wildlife populations” on the U.S.-side of the Columbia River system (Northwest Power and Conservation Council, 2006). The sub-basin planning process “was one of the largest locally led watershed planning efforts of its kind in the United States, an effort that resulted in separate plans for 58 tributary watershed or mainstem segments of the Columbia River” (ibid). Sub-basin plans were a collaborative effort between states, tribes, local planning groups, fish recovery boards, Canadian authorities, and federal government, funded by

the Bonneville Power Administration (BPA) and, incorporated ESA and CWA concerns. The sub-basin plans guide the future funding efforts of the NWPCC, “which directs more than \$140 million per year of Bonneville [Power Administration] electricity revenues to protect, mitigate, and enhance fish and wildlife affected by hydropower dams” (ibid). In addition, years of litigation from the tribes related to treaty rights and the ESA pressured the federal government into an MOA known as the Columbia Basin Fish Accords, which offered \$900 million in restoration funds to the tribes in exchange for a 10-year litigation cessation and additionally helped implement NOAA Fisheries Service’s Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp) (Federal Caucus, 2011).

NOAA Fisheries Service additionally manages a program called the Pacific Coastal Salmon Recovery Fund (PCSRF) that offers substantial Congressionally appropriated funds to States and tribes for Pacific salmonid recovery projects, primarily related to habitat restoration. U.S. District Court Judge James Redden of Portland, Oregon recently denied NOAA Fisheries Service’s BiOp related to imperiled Columbia-Snake River salmonids and the FCRPS for the third time. In the words of the court, “Coupled with the significant uncertainty surrounding the reliability of NOAA Fisheries’ habitat methodologies, the evidence that habitat actions are falling behind schedule, and that benefits are not accruing as promised, NOAA Fisheries’ approach to these issues is neither cautious nor rational” (Staff, 2011). Antithetically, NOAA Fisheries scientists recently published work suggesting that intensive restoration can be an effective recovery approach (Roni, Pess, Beechie, & Morley, 2010). It remains unknown what effect this decision will have on the current widespread practice of hydro-mitigation through habitat

restoration, largely funded through BPA and NOAA's PCSRF with agency partnerships and State cost sharing. The PCSRF, in particular, offers vital ongoing support for state-level watershed management frameworks across the Pacific Northwest.

CHAPTER III

METHODOLOGY

The purpose of this study is to expand the transparency, ease of access, and depth of knowledge related to state-level watershed management in the Pacific Northwest for academic researchers, fellow students, and most of all, natural resource management professionals working in the field of watershed management. The research question the study addresses is: What are the state-level institutional frameworks for managing watersheds in the Pacific Northwest and how do they compare?

This chapter details the methodology used to address the research question. In essence, this research addresses the question by analyzing document analysis and key informant interview data pertaining to state-level watershed management in California, Idaho, Oregon, and Washington. This chapter starts with an overview of the research methods utilized, noting previous studies that informed the approach embraced herein. The sampling methods are explained, including the selection, boundaries and frame of the case study. Next, data collection, processing, and analysis are discussed. Finally, the limitations of the study's research methods are disclosed.

Research Methods Overview

The methodology of this study is informed by a previous National Research Council (NRC) report titled "Envisioning the Agenda for Water Resources Research in the Twenty-First Century," stating that "efforts should be made to invest relatively more

in institutional research than has been the case in the past” (National Research Council, 2001 p.33). The research methods are additionally informed by an article assessing the above NRC report (W. Blomquist, et al., 2004). Accordingly, this research aims to address the need to “conduct comparative studies of water laws and institutions...” (ibid, p.925). The research focuses on the “inter-organizational and/or intergovernmental arrangements” of state-level watershed management (ibid). Written government materials and key informant perceptions were gathered in order to detail and analyze the state-level watershed management frameworks of the Pacific Northwest. The research approach is based on “a combination of document collection, field interviewing, and data analysis... to identify the key features of... water management organizations...” (ibid). State-level watershed management frameworks are detailed and assessed based on document analysis and key informant interviews related to the structure of formal institutions.

Sampling

This section details the sampling methods for the case study region, including corresponding states, government agencies/departments, WMOs, non-WMO non-profit organizations, and individuals selected for interview.

Case Selection

The case selection sampling methods are based on the concept of bioregionalism (Ewert, 2002; Snyder, 1993). The spatial scale of this study is confined to the Pacific Northwest region of the United States. The geographic definition of the Pacific Northwest is herein composed of Washington, Oregon, Idaho, and Northern California.

Since the study is concerned with state-level policy frameworks and due to statewide interest in Northern California's watershed resources (i.e., the State Water Project, Central Valley Project, and Bay-Delta System), the entire state of California is effectively included in the research. However, only WMOs from Northern California were selected for interview in order to probe bioregional perspectives.

The regional definition utilized is informed by ESA-listed Chinook salmon Evolutionarily Significant Units in California, Idaho, Oregon, and Washington under the U.S. Fish and Wildlife Service (National Oceanic and Atmospheric Administration, 2005), as well as PCSRF contiguous states, and previous studies related to watershed management (Omernik & Bailey, 1997; Sommarstrom, 1999a). In order to further isolate non-regional variables, states chosen for study "are similar in physical and economic conditions but differ on institutional variables of interest..." in order to "probe the origins and effects of institutions in additional useful ways" (W. Blomquist, et al., 2004 p.929).

Case Boundaries

This research is designed to focus on state-level watershed management frameworks. The research is designed to gather framework and key informant perspective data from multiple jurisdictions involved at the watershed level that are most likely to have specific in-depth knowledge of the state-level watershed management frameworks. As such, samples for this study consist of: state agencies/departments; WMOs; federal agencies; special districts; other related non-profits (NPOs). Only the most relevant, experienced, and active participating organizational entities and persons were contacted for input, based on document analysis and key information data.

Purposive sampling was employed in order to select key informants with specific desired backgrounds. As such, the pool of key informants is relatively small and is not meant to elucidate differences in perspective within or across jurisdictions, economic sectors, and organizations. Key informants (n = 39) were contacted from each of the above types of organizations based on relevance, state-level watershed management policy knowledge and regional activity level. Key informants had a 46% response rate, yielding 18 interviewees. The most informed, experienced, knowledgeable, and historically active key informants were sought, as indicated via document analysis and key informant interviews. As shown in Table 2, key informants were interviewed from Washington (n = 5), Oregon (n = 5), Idaho (n = 2), and California (n = 4). Interviewees represented WMOs (n = 4), other non-profit organizations (n = 3), state agencies (n = 6), federal agencies (n = 2), and special districts (n = 3).

Table 2. Key Informants Contacted and Interviewed

Summary	Contacted	Interviewed
California (CA)	9	4
Idaho (ID)	8	2
Oregon (OR)	8	5
Washington (WA)	8	5
United States (US)	6	2
Other NPO	6	3
Special District	4	3
State Agency	9	6
WMO	14	4
Federal	6	2
Total	39	18

Case Frame

The objective of this study is to detail and analyze state-level watershed management frameworks in the Pacific Northwest. The findings from this research,

generated through document analysis and key informant interviews, are intended to inform: future state-level watershed management policy approaches; natural resource management research related to structures of governance; research relating watershed management policy frameworks to WMO financial stability; research linking state-level watershed management frameworks to ground-level restoration outputs; research on the effects of federal environmental grant-based incentives and legal mandates; research on social-ecological systems at a bioregional landscape scale with overlapping jurisdictional layers; and research relating public policy, human population dynamics, and economic stability to bioregional environmental outcomes.

Data

The primary data utilized in this study is state-level watershed management policies in the Pacific Northwest. This data is a specific type of formal institutional structure in the field of natural resource management and includes regulatory policies (the police power), funding streams, information sharing, educational outreach, technical assistance, and various other types of watershed management support. The formal institution structure data of the states is documented and analyzed, informed by existing research (W. Blomquist, et al., 2004).

Data Collection

Document Analysis

Document analysis was conducted in order to research government agencies and departments involved in watershed management, along with any related policies and

programs. Data was sourced through primary sources, such as government agency websites, reports, plans, legislation, MOUs, Executive Orders, Best Management/Funding Practices, presentations, proceedings, legislation, and other forms of documentation. In addition, federal, WMO and related NPO websites were researched in order to identify agencies, departments, policies, and persons for further analysis.

Interviews

Additional data consists of information gathered through key informant interviews. Semi-structured interviews were conducted with key informants from a variety of jurisdictional and non-jurisdictional levels. Due to the highly specialized nature of the study subject and breadth of geographic scope, purposive sampling was used to select a small number of key informants for interview. Such key informant values are regarded as imperative in guiding policy decisions (Stephen M. Born & Genskow, 2000; Gorder, 2001; Holst, 1999; United States Environmental Protection Agency, 2002). Figure 3 represents an outline of the interview questions. The list of interview questions was used to guide the overall direction of each key informant interview.

Figure 3. Interview Guide: Topics of Semi-Structured Interview Questions

<p><u>Interviewee Background</u></p> <ul style="list-style-type: none">• The role of the key informant and the role of their organization in respect to watershed management <p><u>Watershed Management Goals</u></p> <ul style="list-style-type: none">• The State’s watershed management goals, WMO goals, State-WMO interactions, and metrics used to gauge progress, locally and statewide <p><u>Long-Term Financial Prospects</u></p> <ul style="list-style-type: none">• The long-term financial prospects for both the State and the WMOs <p><u>Management Framework Strengths and Weaknesses</u></p> <ul style="list-style-type: none">• Strengths and weaknesses of the State watershed management framework• Additional items of relevance to watershed management in the state
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The general format of the interviews followed the suggested guidelines of the “Management Interview Guide” (Bloom, Krabbenhoft, & Lamba, 2006). After crafting an Excel spreadsheet and Outlook contact list of potential key informants, interviewees were contacted via e-mail with an invitation to participate in the study. The invitation offered a timeframe of potential interview dates and included two attachments: the survey questions and an outline of the study. Once an interview time was decided, the interview date and time were noted with a Personal Digital Assistant device synched to a calendar application on the researcher’s personal computer.

Each interview was conducted over the phone and was recorded in MP3 audio format with a digital recording device, made possible via an earpiece microphone

accessory. Additional notes were typed into a Word document to record key points or direct quotations for ease of access during the write-up. Interviewees were contacted as close to the start time as possible, utilizing a clock synchronized via internet time; interviews were often contacted a minute or two before the start time to adjust for errors. The estimated interview time was stated at 45 minutes in duration, although interview lengths varied substantially from person to person; some interviews were under 20 minutes while others last well over an hour. An effort was often made to maximize the duration of the interviews, although some ended abruptly due to a lack of specific information or experience. Often, interviewees most heavily active in state-level watershed management were the most passionate and continued to speak until no longer possible. However, this may be attributable to increased amount of experience and related knowledge of state-level watershed management in practice. On the other hand, some interviewees were unable to contribute information specific to state-level watershed management frameworks.

Interviews typically started with informal ‘equal-to-equal’ conversation with the intent of getting a feel for the communication style of the interviewee while helping them to feel more comfortable speaking while being recorded (Bloom, et al., 2006). While conversational prodding was used to move some interviews along, many flowed naturally and were periodically adjusted on-track with subsequent questions from the interview guide. At the close of the interview, interviewees were asked if they had any additional statements or questions. The most informative interviewees were given an opportunity to review a draft version of the research to check for consistency.

Data Analysis

Two types of data were processed for the purposes of this research: document analysis and key informant interviews. The state-level watershed management framework themes listed below were used to process study data. The features, derived from previous research (S. M. Born & Genskow, 1999), were substantially modified to reflect results from the study findings.

Pacific Northwest state-level watershed management framework features:

1. Three types of watershed management
2. Watershed management priorities
3. Agency coordination
 - a. Coordination mechanism
 - b. Clearly defined agency roles and programmatic support
 - c. Presence of a lead agency
 - d. Diversity of different signatory agencies/department roles
4. Centralization/Decentralization
5. Agency communication
6. Funding: Amount, diversity, and stability
7. Geographic scale of programs and activities
8. Local-Level Partnerships
9. Technical assistance or staff and information-sharing support
10. Research, experimentation, and pilot project support

Document Analysis

Documents were processed for the above attributes and any other information relevant to watershed management effectiveness, as informed by the research processes of document analysis and key informant interviews.

State Institutions and Mechanisms

To accurately delineate the state-level policy frameworks, the primary focus of the research was to document the watershed management institutions and mechanisms for each of the four case study states. Documents were analyzed via the Internet for historical and current policy frameworks, describing the development of current watershed management policies in order to better understand their contextual underpinnings.

Document analysis was used to locate cabinet-level agencies, departments, divisions, commissions, meetings, and agreements, as well as regulations, policies, plans, funding streams, technical support, public outreach, and information hubs, as well as incrementally uncovered mechanisms related to state-level watershed management.

However, these metrics are not considered panaceas for success. The method of processing data was intentionally semi-structured in order to let the preliminary findings shape the direction of the research toward a more accurate analysis. The research incorporates features such as state watershed management program financial stability, which was frequently correlated with the funding source. The funding sources for state agencies, departments, and programs charged with watershed management were of vital importance to state-level watershed management efforts; without stable funding sources,

many state programs ceased to exist or were severely downsized under recessionary pressures.

Interviews

The interviews were an opportunity to learn more about the specific state frameworks, how they relate to ground level WMOs, and interviewee perspectives related to state goals, metrics, progress, and additional program strengths and weaknesses.

Interviewee Background

Interviewees were asked about their backgrounds in order to accomplish a number of goals: start the conversation with a non-contentious easy question to establish communication and comfort; learn about the perspective of the interviewee based on their professional experience; acquire indications of specific relevant knowledge; and learn their communication style at the start of the interview in order to better facilitate the conversation during any stalls or lapses that may occur.

Watershed Management Goals

Interviewees were asked about state-level watershed management goals in relation to WMO goals; this was done in order to decipher the intention of the state management frameworks and uncover whether or not the stated goals are shared at the watershed level. Additionally, interviewees were asked about metrics related to progress in attaining watershed management goals; this was done in order to research whether goals, metrics, and definitions of progress overlap between the state and watershed

scales. The ultimate purpose of this set of questions was to discern whether or not the state framework goals are effectively communicated, reflected, and theoretically attainable at the watershed scale.

Long-Term Financial Prospects

Interviewees were asked about the long-term financial prospects of both the state agencies and the WMOs. In addition, interviewees representing other organization types reflected upon their corresponding organization's long-term financial prospects. This set of questions was asked in order to research interviewee perceptions of state and WMO financial stability. In addition, this set of questions was discussed in order to research any possible link between WMO and state financial stability. This set of questions additionally overlaps with the last two data processing types listed above under document analysis related to state financial stability and its implications for WMOs that may depend on such state programs.

Management Framework Strengths and Weaknesses

Finally, interviewees were asked to offer their perceptions of any strengths or weaknesses of the current state-level watershed management frameworks in each of the four states. This question was asked in order to gauge key informant perspectives on framework effectiveness in each of the four states and to probe for any differences of opinion related to organization affiliation or background. This set of questions additionally gave interviewees the opportunity to proffer suggested framework modifications and/or elucidate fundamental issues affecting state-level watershed

management in each of the four states. In closing, interviewees were given the opportunity to include any additional feedback in order to ensure that a full description of state-level watershed management was covered, including important phenomena affecting watershed management.

Study Limitations

This section notes some of the potential limitations of this study related to case study research, watershed complexity, and purposive sampling.

Case Study Research

The first limitation of this study is one shared with case study research in general: findings from the case studies may or may not be applicable across spatial, temporal, and organizational scales. The Pacific Northwest was selected to offer a bioregional context for the study, with the intention of creating as many control variables as possible. However, even within the Pacific Northwest there exist vast socioeconomic and ecological disparities both interstate and intrastate. California, in particular, is a vast state with an incredible amount of ecological and socioeconomic variability. While only Northern California is typically considered part of the Pacific Northwest, state-level watershed management frameworks typically apply statewide. Additionally, Northern California's water resources are used on a statewide basis through massive federal and state water projects, complicating bioregional analysis. Variability is present by a number of metrics within states of the bioregion. However, such complex variation is anticipated to be typical, rather than exceptional. While case studies may not offer panaceas, key

insights can be attained from spatially, temporally, and organizationally explicit natural resource management research.

Watershed Complexity

Another potential limitation of the research is the many definitions of watersheds and watershed management. While a consensus exists among most researchers regarding the fundamental attributes of the watershed movement, such definitions may take distinctive meanings across organizational cultures. Forestry agencies may view watershed management in terms of forest practices to decrease sedimentation and turbidity; agriculturalists may view it in terms of water supply, diversions, and water rights; urban municipalities may view it in terms of quality for safe drinking water; wildlife agencies may view it in terms of fisheries management; tribal governments may view it in terms of long-standing treaty rights; civil engineering agencies may view it in terms of environmental impact mitigation; ranchers may view it in terms of grazing practices; and local activists may view it in terms of civic involvement. Hence, watershed management means many things to many people. This research largely embraces the commonly used academic definition of watershed management as inclusive, collaborative, integrated, and adaptive natural resource management at a hydrologically defined scale.

Purposive Sampling

Finally, the reliance upon a limited number of key informants for state-level watershed management framework perspectives is a potential limitation of the study. As

there are few practitioners at the higher echelons of state-level government with specific watershed management experience and knowledge, this limitation is unavoidable. Such limitations are common to purposive sampling, in which specific types of individuals are sought for a purpose. Due to the novelty of programs and relatively few staff dedicated to watershed management at state agencies, the sampling pool was extremely limited in number. Since many interviewees affiliated with federal agencies, special districts, NPOs, and even some WMOs, were largely unfamiliar with state-level watershed management goals, state agency interviewees were frequently relied upon. This reliance was necessary due to the limited pool of subjects with appropriate knowledge and is important to note in terms of its potential for bias.

CHAPTER IV

FINDINGS

State-Level Watershed Management Frameworks

This section contains the findings of the study, informed by document analysis and key informant interviews. The findings are listed in alphabetic order by state, from California to Washington. Each state section begins with a history of the state's watershed management framework or approach, followed by a description of the current framework. For reference, the Appendix contains a comprehensive listing of state-level watershed management-related programs by responsible agencies/departments/divisions for each case study state.

California

Watershed management in California is deeply tied to water development in a mostly arid to semi-arid state with over 37 million inhabitants. California undoubtedly would not have emerged as the eighth largest economy in the world without its massive water projects that damaged or eliminated rich ecosystems (Erie & Brackman, 2006; Hundley, 2001; Reisner, 1986), including Mexico's massive Colorado River Delta (Leopold & Schwartz, 1987) and California's rich Central Valley wetlands (Garone, 2011). The State's recent push into watershed management stems from its historical context of massive water development infrastructure projects. A 'state of extremes' with as many as 19 distinct ecological sub-regions across the state (United States Department

of Agriculture, 2011), California is ‘hydropolitically’ split into two basic regions, Northern and Southern California; the two major regions represent the state’s largest freshwater producing and consuming regions, respectively. California’s bifurcated system of water delivery is centered on the hotly contested waters of the San Francisco Bay/Sacramento-San Joaquin River Delta (Bay-Delta System), situated within and around the State’s capitol in Sacramento.

California is historically “diverse in its approach and experience with cooperative, community-based watershed organizations, which in California can be called CRMPs, CRMs, WAGs, CAGs, Partnerships, Conservancies, or Councils, among other names” (Sommarstrom, 1999b p.4). The history of these groups “began as early as the 1960s when a few Coordinated Resource Management Planning groups in rural areas were begun under the auspices of the Soil Conservation Service (now Natural Resource Conservation Service) or the Bureau of Land Management” (ibid). California’s watershed management “has really been developing only since the mid-1980's, when two of the oldest continuing groups were created to work on mixed-ownership lands in the upper watershed above reservoirs (Upper Stony Creek Project and the East Branch North Fork Feather River CRM)” (ibid). Figure 3 offers a satirical depiction of the varying cooperative resource groups active in California, many of which have a substantial role in watershed management within various regions throughout the state.

Table 3. A Typology of California WMOs (S. M. Born & Genskow, 1999)

NAME THAT COOPERATIVE RESOURCE GROUP! (MIX & MATCH WITHIN AND BETWEEN THE COLUMNS)			
Location	Descriptor	Adjective	Type
XXXXXXXX	Watershed	Advisory	Group
XXXXX	Bioregional	CRMP	Task Force
XXXXXX	Restoration	Management	Council
XXXXXXXX	Biodiversity	Planning	Project
XXXX	Ecosystem	Cooperative	Committee
XXXXXX	Habitat	Conservation	Forum
XXXXX	Multiple Species	Working	Trust
XXXX	Landscape	Consensus	Alliance
XXXXXX	River	Economic	Association
XXXX	Resource	Coordinated	Partnership
	Creek	Communities	Coalition
	Fish, Farms & Forests	Sustainable	Friends
	Mountains		Team
	Estuary		Program
	Riparian		Federation
	Natural		Conservancy

Provided by Sari Sommarstrom

Research notes, “the highest official policy for local watershed efforts to date” in 1999 was an Executive Order from Governor Pete Wilson related to the proposed ESA listing of coho salmon (*Oncorhynchus kisutch*) in coastal watersheds (Huntington & Sommarstrom, 2000 p.28). The Order declared State support for community-based watershed efforts “as required to preclude federal intervention in the management of California’s anadromous fish species” (ibid); this impetus mirrors Oregon’s Executive Order expanding the Oregon Coastal Salmon Recovery Initiative (OSCRI) into the Oregon Plan during the same year, in response to the judiciary ruling against ESA fulfillment. The California Order created the Watershed Protection and Restoration Council, which provided a list of principles based on inclusion and collaboration – a role that transitioned to the Watershed Working Group of the California Biodiversity Council in 1999 (ibid).

A 2002 report to the legislature required by the heavily amended Assembly Bill 2117 lists the existing state-level watershed management efforts across State agencies at the time (State of California, 2002). The State Water Resources Control Board is noted for having four such efforts: the Watershed Management Initiative, Nonpoint Source Program, NPDES and TMDL requirements, and the Proposition 13 Water Bond. Under the California Resources Agency, there are five departments with watershed management efforts: Department of Water Resources, Department of Parks and Recreation, Department of Fish and Game, Department of Conservation, and California Department of Forestry and Fire Protection. There also existed three key interagency programs in 2002: the California Biodiversity Council's Watershed Group, the CALFED Watershed Group and the North Coast Watershed Assessment Program. Finally, the report lists some key recent legislation and bond measures, which include Assembly Bill 2117 (Wayne Bill) and the attached Assembly Bill 1948 (Watershed Funding Study), Propositions 12 and 13 (funding for watershed restoration), and Proposition 40 (ibid).

California is in the process of fully implementing a Statewide Watershed Program under the Department of Conservation; implementation continues to be constrained by the State budget crisis and legislative setbacks (California 2011). The Statewide Watershed Program was formerly the CALFED Watershed Program before being moved by the Secretary of the Natural Resources Agency in 2007 to the Department of Conservation for statewide adoption, as it previously only applied to the CALFED Solution Area due to restrictions written into Propositions (California 2010). The Delta Stewardship Council is scheduled to replace CALFED this year (Buchanan, 2010) and is unlikely to house a watershed management program that applies outside the Bay-Delta

System. A 2008 report summarizes the Statewide Watershed Program's present status as "functioning to maintain management of the remaining CALFED Watershed Program obligations, as well as managing the Watershed Coordinator Program at [the Department of Conservation]. These duties will continue as the new description of a statewide approach is fully developed and implemented" (State of California, 2008b).

In 2009, Assembly Bill 1520 (Statewide Watershed Program) was introduced and died the same year. The State of California's current budget crisis is likely hindering the advancement of newly proposed legislation requiring additional investment. In 2008, the State released cease orders on watershed restoration activities receiving funding through General Obligation bonds, including some activities already completed (Arroyo Seco Foundation, 2008). In 2011, the State cut billions of dollars more in its budgeted program funds (Goldmacher & McGreevy, 2011).

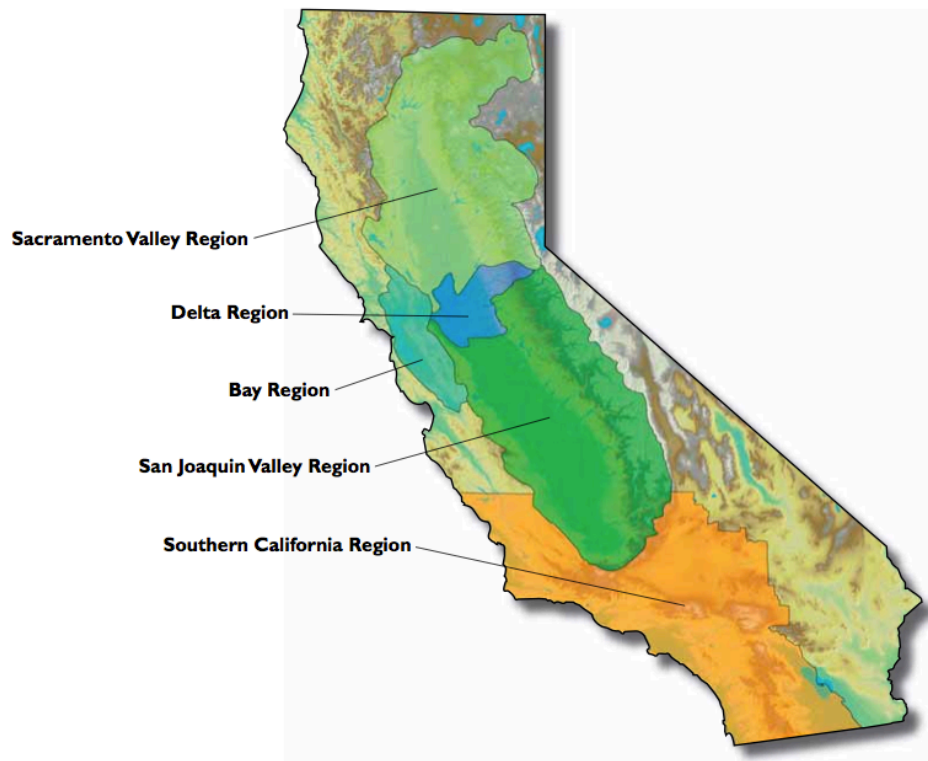
Despite expending substantial resources over the past decade to establish a State watershed management framework, the State of California does not have a formal framework for watershed management. A host of executive orders, MOUs, councils, forums, legislation, bond acts, and plans were created to bolster state-level watershed management, culminating in a high level of State activity around 2004 with the updated "Framework for Protecting California's Watersheds" MOU signed between Resources Agency and Cal/EPA, and its connected California Agency Watershed Strategic Plan: 18-Month Action Plan. However, the effort only reached partial completion. Attempts to strengthen State watershed management have waned under the State's recent economic pressures, exacerbated by costly State bond initiatives.

Called Propositions, California's bond initiatives typically involve large sums of money available during short timeframes to fund capital projects (a situation that often gives priority to large infrastructure projects over small restoration projects), incurring substantial interest expense (debt service) paid through the State General Fund (i.e., Proposition 13 of 2000 contained an estimated principal of \$1.97 billion with an interest expense of \$1.4 billion). Bond interest rates typically increase as the State's credit rating diminishes, making it more difficult to issue bonds and fund capital projects. California has the lowest credit rating of all 50 states (Public Policy Institute of California, 2010), making the issuance of new bonds to fund watershed management grants financially and politically challenging. California's watershed management programs are funded almost exclusively by a host of bond initiatives, including Propositions 1E, 13 (2000 Water Bond), 40, 50, and 84 in recent years. Additionally, legislation that would have bolstered statewide watershed management 'died' in recent years (Assembly Bill 1520 and Senate Bill 301 of 2009).

Although the State has yet to realize the full implementation of its statewide watershed management framework, it has undertaken numerous piecemeal efforts to develop framework elements. The State's watershed management efforts remain concentrated around a program that grew out of the Bay-Delta System, the controversial hub of California's water resources. The Bay-Delta System connects the state's northern temperate forests to its southern deserts via the State Water Project and federal Central Valley Project, forming the basis of the CALFED Solution Area program boundary – areas that feed water into, divert, or use water from the Bay-Delta System. Watershed management in California largely revolves around freshwater flowing into and out of the

Bay-Delta System. CALFED Watershed Program grants only apply to the Solution Area, shown in Figure 4, due to the explicit geographic scope of funding written into Proposition 50, which funds the program.

Figure 4. CALFED Solution Area Regions (CALFED Bay-Delta Program, 2001 p.4)



California’s state-level watershed management responsibilities are split between two “super agencies” (cabinet-level agencies): The Natural Resources Agency (Resources Agency) and California EPA (Cal/EPA). These two agencies are separated based upon their roles. Resources Agency is tasked with natural resource management and Cal/EPA is tasked with pollution control. Multiple state agencies have water resource responsibilities in California. Cal/EPA departments include the State Water Resources

Control Board and its nine Regional Water Quality Control Boards (collectively known as the State Water Boards) that manage water rights and water quality; Resource Agency departments include the Department of Water Resources that manages the State Water Project, and the Department of Conservation that manages the Statewide Watershed Program within the Division of Land Resource Protection.

The State of California's watershed management approach is located within the Resources Agency with Department of Conservation's Statewide Watershed Program; a program that expanded from the Solution Area-only CALFED Watershed Program in 2007. The key mechanisms of Department of Conservation's Statewide Watershed Program are two grant programs: the Watershed Coordinator Grant Program and the CALFED Watershed Program Grants, funded by Propositions 84 and 50, respectively. However, the CALFED Watershed Program grants only apply to the CALFED Solution Area and are not truly statewide as per Proposition 50; these grants are not currently available.

The Watershed Coordinator Grant Program is the only current State mechanism solely focused on funding WMOs and is available statewide due to the scope of Proposition 84. Watershed Coordinator Grants are available to non-profits, Special Districts, and local governments with watershed-related goals for a three-year work period. The grants require a sizeable minimum match of 25% of the requested funding, with each proposal limited to the cost of a single full-time watershed coordinator while requiring quarterly and annual reports. Department of Conservation maintains an online database of potential grant applicants in its Cooperation Database and utilizes State Water

Resource Control Board's Financial Assistance Application Submittal Tool (FAAST) to facilitate grant application and review.

Department of Conservation additionally houses Resource Agency's 24-member State Watershed Advisory Committee, responsible for advising on the development of the State Watershed Program, as well as the California Watershed Portal, an information clearinghouse based on EPA's Surf My Watershed website. Finally, Department of Conservation maintains a Resource Conservation District Assistance Program, providing limited funding (watershed coordinator grants) and technical support. In effect, the State's central watershed program offers only minimal support to the staffing costs of WMOs and has declined in its ability to fund capital projects, funded by state bonds.

Under heavy financial constraints, Department of Conservation current relies on the noted ability of watershed coordinators to leverage funding in order to drive watershed management efforts. While the Watershed Coordinator Grant Program requires a minimal 25% match, an internal report notes that grant recipients in aggregate provided an effective match of 614% from outside sources during 2004-2007 (State of California, 2008a), or about \$6.14 for every dollar awarded during the four-year period, comparable to the estimated \$5.09 leveraged by watershed councils in Oregon for each dollar provided through council support grants (Hibbard & Lurie, 2005).

Also within Resources Agency are a number of watershed-related mechanisms through Department of Water Resources, Department of Fish and Game, Department of Food and Agriculture, California State Parks, and Department of Forestry and Fire Protection (CAL FIRE). These programs include Department of Fish and Game's Coho Recovery Strategy, based on watershed recovery units, and the associated Watershed

Assessment and Enhancement Plans. Department of Fish and Game also administers the Fisheries Restoration Grant Program, which allocates Pacific Coastal Salmon Recovery Fund (PCSRF) money, as well as funding from the Salmon and Steelhead Trout Restoration Account (appropriated \$8 million annually from State Lands Commission tidelands oil and gas leases in accord with Senate Bill 1125 of 2006). Steelhead Fishing Report and Restoration Card revenues provide additional funding to Department of Fish and Game's Fisheries Restoration Grant Program; the Steelhead Subcommittee of the California Advisory Committee on Salmon and Steelhead Trout submits restoration proposals and funding recommendations to Department of Fish and Game.

Department of Forestry and Fire Protection's watershed-related mechanisms include California Forest Improvement Program grants, additional forestry/landowner assistance funding programs, Anadromous Salmonid Protection Rules, and numerous technical resources, including partnering with the University of California at Davis to create the two-volume California Watershed Assessment Manual. California State Parks engages in watershed management activities through the General Fund-supported Habitat Conservation Fund Program, as well as a handful of acquisition programs and management approaches, including the Watershed Management program area.

Department of Water Resources maintains a large role in State water resource management. Department of Water Resources manages the State Water Project, authors the California Water Plan (including a Watershed Management chapter), and is a former administrator of Proposition 50 CALFED Watershed Program funds. Interviews indicate that Department of Water Resources retained Watershed Program staff that is largely inactive in terms of their former watershed management role. Department of Water

Resources manages the new Integrated Regional Water Management (IRWM) Program alongside State Water Resources Control Board with its IRWM Grant Program. The IRWM Program relies upon massive state bonds and manages resources at a regional hydrologic basin or ‘hydropolitical’ water resource source-to-diversion-to-use geographic scale (exhibited by the CALFED Solution Area), occasionally matching Regional Water Quality Control Board basins utilized to develop TMDLs.

The IRWM Program is an umbrella approach that involves integrated resource management across jurisdictional and watershed scales, offering a host of grants related to planning, implementation and flood management. IRWM planning is connected to watershed management through its use of the Ahwahnee Water Principles for Resource-Efficient Land Use, which promotes watershed protection as a way of preserving local government water supplies. IRWM planning also embraces watershed management as an officially supported Resource Management Strategy. IRWM is often considered a promising approach to California’s water resource management, increasing inter-jurisdictional, multi-scalar efficiencies and acting as an effective way to incorporate watershed management functions into California’s largely hydropolitical management framework. Department of Water Resources additionally houses FloodSAFE California, which offers a number of grant programs that improve flood management through non-structural watershed improvements (i.e., restoration). Department of Water Resources offers technical resources such as the Water Data Library and has largely ceased its former CALFED Watershed Program role, which transferred to State Water Resource Control Board in 2009. Finally, Department of Forestry and Fire Protection has a Weed

Management Area Program that creates local collaborations to address invasive and noxious weed issues within watersheds.

Within Cal/EPA cabinet-level pollution control agency, the State Water Boards contain a significant number of mechanisms related to watershed management, representing the only watershed-related Cal/EPA department. While climate change programs are in development through the Air Resources Board (Assembly Bill 32), the new programs are focused on reducing greenhouse gases rather than on funding climate adaptation projects. Watershed-related funding for climate change is currently offered through IRWM Planning Grants, funded by Proposition 84. Department of Water Resources is additionally in the process of co-developing the State's "Climate Change Handbook for Regional Water Management," which notes IRWM's key watershed management and climate change roles. While Department of Water Resources is charged with managing California's State Water Project, paid for by the State Water Contractors (27 public agencies that purchase water through the State Water Project), the State Water Boards are charged with managing water quality and water rights, rather than water supply. State Water Boards' core watershed-related program is its Watershed Management Initiative (WMI) strategy for integrating and managing resources.

The Watershed Management Initiative started in partnership with EPA in 1996 and represents a framework for adopting EPA's Watershed Protection Approach in order to better address non-point source pollution. The WMI Integrated Plan consists of the State Water Resources Control Board Strategic Plan and nine Regional Water Quality Control Boards WMI Chapters, with one chapter for each basin. The WMI Chapters divide the regions into Watershed Management Areas. These Watershed Management

Areas are placed into one of four categories according to the California Unified Watershed Assessment of the Clean Water Action Plan (1998). To support the WMI, State Water Resources Control Board provides ongoing funding for one WMI Coordinator (often called Watershed Coordinators, confusingly) at each of the ten Water Boards. The WMI Coordinators are the Water Boards' representatives on the WMI Workgroup and maintain the WMI Chapters. The Regional Water Quality Control Board WMI Chapters are loosely related to the Regional Water Quality Control Board Basin Plans, which serve as a framework to implement state and federal water quality control laws and regulations, such as the establishment and implementation of beneficial uses required by the Porter-Cologne Act, and TMDLs related to CWA Sections 303(d) and 305(b).

In addition to the WMI, State Water Resources Control Board maintains the Surface Water Ambient Monitoring Program (SWAMP), created to fulfill a State mandate to unify all of the State Water Boards' water quality monitoring programs. Within Surface Water Ambient Monitoring Program is the Clean Water Team, a Citizen Monitoring component created to support watershed stewardship through citizen involvement in the TMDL process, increasing monitoring coverage at marginal cost during the State budget crisis. The Surface Water Ambient Monitoring Program maintains a Quality Assurance Program Plan and Quality Assurance Management Plans, and additionally serves the newly formed California Water Quality Monitoring Council and associated Monitoring Collaboration Network. The Surface Water Ambient Monitoring Program fulfills its support role in a variety of ways, including hosting the My Water Quality portals, assisting the Healthy Streams Partnership and

Bioaccumulation Oversight Group portals, offering technical assistance, providing data management through California Environmental Data Exchange Network, and providing funding support for monitoring efforts. Finally, State Water Resources Control Board provides a Section 319(h) Grant Program, an IRWM Grant Program, and Agricultural/Dairy Water Quality Grant Programs, as well as the aforementioned FAAST program.

In summary, while the 2004 MOU and the corresponding Action Plan outline some of the agencies and activities involved, the programs that compose the framework are not disclosed. As the MOU and Strategic Plan are now approximately seven years old, they are also outdated. Indicated by document analysis and interviews, the core of the State's current watershed management approach is the Statewide Watershed Program housed within Department of Conservation. Additional watershed management efforts include State Water Resources Control Board's Watershed Management Initiative, and Department of Fish and Game's watershed-based Fisheries Restoration Grant Program.

In effect, the Statewide Watershed Program supports comprehensive WMO-based watershed management, whereas the Watershed Management Initiative represents a water quality-focused adoption of EPA's Watershed Protection Approach, and the Fisheries Restoration Grant Program represents the State's core watershed-based salmon recovery effort. In addition, findings indicate that IRWM is often considered a practical solution to many of the state's hydrological water resource challenges, incorporating watershed management and climate change into basin-scale water resource management.

Emblematic of natural resource management in California, the State's watershed

management programs are split between agencies competing for the same pot of substantial, intermittent Proposition funds.

Idaho

Watershed management in Idaho in many ways represents a departure from the state's history of water resource management protectionism; Idaho's first State Water Plan from half a century ago was designed to 'put the water to work' to ward off pressure from Southern California water development interests (Grant, 1978). As acknowledged in Idaho Code and parallel to other states, "the CWA gives the state, not the EPA, the authority to design and enforce non-point source control programs" (O'Laughlin 1996). Through the TMDL ruling, if the State of Idaho failed to update the EPA's TMDLs for 303(d) list water quality-limited waters, the State could have lost "more than \$1 million in federal grants made to Idaho each year for CWA non-point source programs... [with] the possibility of court injunctions halting federal land and resource management activities until such time as TMDLs are completed" (ibid). As with many states at the time, Idaho and the EPA had a strong incentive to create a comprehensive statewide non-point source program containing a comprehensive list of CWA Section 303(d) list TMDLs.

Although grassroots watershed councils such as the Henry's Fork Watershed Council, Pack River Watershed Council and the Lower Boise Watershed Council exist in Idaho, Idaho's state-level watershed management strategy is historically focused on water quality and represents an adoption of the EPA's Watershed Protection Approach to water quality management (O'Laughlin, 1996). Key legislation in 1988 (Idaho Code 42-

1734A), a year after the 1987 CWA amendments, provided for the development of a comprehensive State Water Plan and created state-protected rivers. Basin or water body plans are considered components of Idaho's State Water Plan (ibid).

In 1989, the Idaho Department of Environmental Quality developed its initial non-point source pollution program. Six years later, in 1995, Idaho undertook an official audit of the 1989 program and found, among other things, that one of the six key challenges was the “change from the historical focus at the landscape level into the watershed or drainage basin level...” (State of Idaho, 1999 p.5). As a result, “in 1995, the Idaho legislature adopted a law (Water Quality Law §39-3601) to provide direction for local watershed planning and management. Under the new law, community-based advisory committees recommend to Department of Environmental Quality and other resource agencies how to properly manage the state's watersheds” (ibid). Through this law, Idaho's state-level watershed management framework was formally enacted. Noting the new framework to address water quality in 1999,

Basin Advisory Groups (BAGs) have been established in each of the six river basins around the state... Their responsibility is to make recommendations to DEQ on water quality issues, including monitoring, revisions to beneficial use status, prioritization of impaired water, review development and implementation of TMDL processes, and solicitation of public input. The 18 Watershed Advisory Groups (WAGs) recognized to date are developing watershed management plans necessary to protect and restore Idaho's water quality... [WAGs] advise DEQ on the development and implementation of those actions needed to effectively

control pollution sources within a watershed, so that within a reasonable period of time designated beneficial uses are fully supported... [Soil and Conservation Districts (SCDs)] are members of WAGs and have been instrumental in [the] formation of WAGs if none currently exists... Statewide priorities are provided by the designated agencies to the BAGs and WAGs. Soil Conservation Districts are direct recipients of §319 funding, as well as other federal and state funding for NPS prevention and control, and therefore act as one of the primary implementation entities for TMDL activities. The WAG and the lead agency forward completed watershed (TMDL) plans to the BAG for review and comment. The final plan is sent to DEQ for adoption as part of the state's water quality management plan... (State of Idaho, 1999 pp.6-7).

Water Quality Law §39-3601 also further defined the roles of the State agencies by assigning designated agencies for those activities within the State that are major contributors of non-point source loadings to waterbodies. These are: 'the Department of Lands for timber harvest activities, for oil and gas exploration and development and for mining activities; the Soil Conservation Commission for agriculture and grazing; the Department of Transportation for public road construction; Department of Agriculture for aquaculture, and the Department of Health and Welfare Division of Environmental Quality (now DEQ) for all other activities (State of Idaho, 1999 p.7).

In short, “the BAG concept improves upon the former biannual basin-area meetings by meeting more frequently, and each BAG established its own operating procedures...” (O’Laughlin, 1996 p.62). “BAGs are part of a decentralized approach to watershed management programs, which Idaho policy has recognized since 1988 may be more effective than centrally planned programs” (Idaho 1999 p.73). “The BAG is considered to be the basin-wide coordinator... The duties of the BAG include setting priorities, coordination of WAGs within the basin, and recommending WAG members” (ibid p.74).

While BAG participation is statutorily defined, WAG participation is not. WAGs provide “a forum to allow local interests to come together, foster communication and coordination between resource management agencies, and explore and recommend specific actions needed to manage the watershed; such recommendations will be incorporated into a watershed management plan and implemented through various federal, state and local efforts” (O’Laughlin, 1996 p.75). “Perhaps the most important function of WAGs will be the recommendation of specific actions to control sources of pollution. Because representatives of local interest groups are involved with WAGs, these recommendations probably would have more influence on local land-use activities than would controls recommended by regulatory agencies acting alone” (ibid p.76). A perceived negative aspect of the law is that Senate Bill 1284 “affirms in statute that agricultural BMPs will be voluntary, and provides a potential escape for cleaning up old mines” (ibid p.78).

In addition to the BAGs and WAGs are Technical Advisory Groups (TAGs), which assist BAGs and WAGs with technical support to achieve desired TMDLs.

According to the State of Idaho, “the designation of specific agencies gives the State the ability to target projects and programs toward specific activities” (State of Idaho, 1999 p.7). The Idaho state agencies frequently overlap with existing federal agencies, helping to ensure state-federal program consistency. The Bull Trout Conservation Plan of Governor Philip E. Batt plays a key role in Idaho watershed management, as “the development of [WAGs] provides a way to identify and solve factors limiting bull trout populations” (State of Idaho, 1996 p.ii). The Plan states:

The Governor’s Bull Trout Conservation Plan utilizes the BAG and WAG framework to provide for local development of watershed specific plans to maintain and/or increase bull trout populations. State and federal agencies will provide technical assistance to BAGs and WAGs, and will make recommendations for protection of the bull trout. This will allow locally developed plans to meet the needs of both the bull trout and the community. While the state will not mandate how local communities protect the species, it will insist on meeting the goal of protecting and maintaining the species (State of Idaho, 1996 p.2).

The Bull Trout Conservation Plan focuses on key watersheds to promote the health of the species. This “locally developed site-specific” approach to ecosystem management is characteristically Idahoan in spirit (Puckett, 2008), in which there is essentially no state involvement except for potential technical assistance through TAGs and the insistence that goals be met through local plans. The ESA listing of bull trout is

cited as an impetus for the voluntary formation of grassroots Idaho watershed councils, such as the Pack River Watershed Council (Council, Committee et al. 2006).

Idaho Department of Lands (IDL) local working committees based around Stream Segments of Concern (SSOC) and the Forest Practices Act (FPA) were the “forerunners of WAGs. The assigned duties of WAGs, however, are much broader than the highly technical and regulatory mission of the earlier local working committees” (O’Laughlin, 1996 p.75). Currently, Department of Lands participates as a formal member in some WAGs of interest. Department of Lands also “attend[s] meetings and provide[s] input” to non-membership WAGs as an interested party rather than member, depending on the ownership of the drainage, since “the large landowners are generally the most affected by the TMDL” (e-mail correspondence from Idaho Department of Lands representative, March 28, 2011).

Idaho’s WAG framework, similar to Tennessee Valley Authority’s River Action Team framework of 1992 (O’Laughlin, 1996), places a priority on the parties most affected by TMDLs, which are often private landowners. State-supported Soil and Water Conservation Districts are often directly involved in WAGs while grassroots 501(c)3 watershed councils may act as the WAG for a few select watersheds, depending on the interests involved. BAGs and WAGs, formed by law four years after key 1991 Forest Practice Act amendments, follow a similar framework as the State Agriculture Water Quality Program, designed to protect watershed health by bringing the most affected local interests to the table (O’Laughlin, 1996; Sommarstrom, 1999a).

While Idaho does have a state-level watershed management framework, it differs significantly in definition from the other case study states. Idaho is the only state in the

study that offers no specific support mechanisms for WMOs. While Northern California tends to view watershed management primarily in terms of water quantity, Idaho views watershed management comparatively in terms of water quality. Idaho's unofficial state-level watershed management framework is centered on its NPS Management Program within DEQ, modeled after EPA's Watershed Protection Approach and implemented under pressure from the TMDL Lawsuits. DEQ-appointed BAGs and WAGs, and non-appointed TAGs are the defining mechanisms for managing TMDLs and prioritizing funding objectives at the local level. The primary financial mechanism employed by the State to support watershed management is the CWA Section 319(h) Grant Program, administering funds provided by EPA.

DEQ and its regional offices identify affected or interested parties within watersheds and seek to incorporate them into a WAG through appointment by the DEQ Director. As one respondent noted, "The user group that is likely to be most impacted in the watershed is going to have the larger voice at the table." Often, these user groups are comprised of local landowners, seen as an essential component "due to the political climate of the state." Department of Fish and Game, Idaho Department of Lands and Department of Water Resources typically have representatives that sit on the WAGs, which typically range in size from 6 to 20 people (O'Laughlin, 1996).

BAGs are assembled through the same essential process as WAGs. DEQ works with six BAGs across the state. The BAGs provide input on TMDLs, monitoring priorities, designation of beneficial uses, and the Integrated Report. BAGs additionally review and prioritize projects that address NPS pollution. The WAGs, on the other hand, are more focused on the development and implementation of specific TMDLs. WAGs

fundamentally work with DEQ to complete Assessment Unit/Pollutant Combination TMDLs for impaired waterbodies identified in the Integrated Report. According to a State respondent, “The objective [of a WAG] is to get a group, regardless of its name or title, with interested and affected parties working toward mutual goals for that watershed.”

WAGs provide recommendations to DEQ to develop and address TMDLs within the watershed in 5-year intervals. In developing a TMDL for incorporation into the biennial Integrated Report (CWA Sections 303(d) and 305(b)), WAGs, BAGs, and DEQ collaborate on sub-basin assessments. DEQ establishes TMDLs with WAG, BAG and occasionally TAG input, eventually submitted to EPA for approval. Once the TMDL is approved, TMDL Implementation Plans, driven by WAGs and “designated agencies,” are put into action. DEQ and WAGs monitor the progress of the plan implementation. Both the BAGs and WAGs fundamentally serve an advisory role to the State. In addition to the WAG/BAG framework designed to meet the requirements of the CWA through developing and implementing water quality plans (TMDLs), DEQ conducts use attainability analysis (UAA) and a Beneficial Use Reconnaissance Program (BURP) that assesses whether beneficial uses are being met through Water Body Assessment Guidance (WBAG) methods.

While DEQ manages water quality, Department of Water Resources (DWR) manages water quantity and maintains a Stream Channel Protection Program, as well as financial and technical resources. The Department of Water Resources’ Water Resource Board engages in Comprehensive State Water Planning, which includes the State Water Plan, Comprehensive Basin Planning, MIKE BASIN Modeling software, Minimum

Stream Flows, State Protected Rivers, and the Idaho Water Transaction Program, as the Qualified Local Entity of the Columbia Basin Water Transaction Program – a program funded by Bonneville Power Administration and National Fish and Wildlife Foundation with the Northwest Power Planning Council. Water Resources Board additionally maintains a Financial Program that funds water quality and quantity improvement projects, among other things. Last, Water Resource Board operates the Water Supply Bank, a water exchange market.

Additional agencies with watershed-related mechanisms include Department of Agriculture, Idaho Department of Lands, Department of Fish and Game, Soil and Water Conservation Council, and Office of Species Conservation. While culvert removal/replacement is typically done through Section 319 Grants, Department of Lands additionally undertakes actions to assess the passage status of culverts. Department of Lands additionally manages for Cumulative Watershed Effects through its Forest Practices Act. Both Department of Lands and Department of Fish and Game frequently sit on WAGs. Soil and Water Conservation Commission offers additional staff resources to support watershed management. Department of Fish and Game manages a number of federally funded programs as well as the State-funded Habitat Improvement Program, while Office of Species Conservation maintains anadromous fish management plans, including the Bull Trout Conservation Plan, and is the entity charged with administering PCSRF funds for fish habitat restoration projects. Office of Species Conservation is additionally engaged in Sub-basin Planning through the Northwest Power Planning Council, with Bonneville Power Administration providing mitigation funds for

restoration projects. Last, Department of Agriculture and Soil and Water Conservation Commission offer a host of programs to address agricultural NPS pollution.

Non-profit 501(c)3 watershed groups, such as the Henry's Fork Watershed Council and Lower Boise Watershed Council are involved in WAGs for their particular watershed, but fundamentally differ in terms of role and support. The State of Idaho offers limited support for WMOs (i.e., watershed councils) and relatively few WMOs exist in Idaho. The State offers no specific ongoing operational or capital support for WMOs. Nearly all watershed-related funds offered by the State are from the administration of federal and hydro-mitigation funding programs, such as the CWA, ESA, Safe Drinking Water Act, and Bonneville Power Administration mitigation funds. Out of all four of the case study states, Idaho offers the least WMO support. Idaho's watershed approach is based on local watershed-scale advisory groups to address water quality issues and differs substantially from fully inclusive, active, integrated and coordinated watershed-scale natural resource management. Idaho's BAG/WAG framework offers a uniquely minimalistic and refined approach, blending EPA's Watershed Protection Approach with the landowner-centric values of Idaho.

Oregon

Existing research (Bidwell, 2003; L. R. Clark, 2001; Hibbard & Bonner, 2002; Mason, 1994; Robbins, 2004; Walth, 1994) details the unique sociopolitical spirit of Oregon, with its history of populism and legislative experimentation (i.e., land-use laws, Forest Practices Act, beach protection laws, recycling program, and the 'Oregon System' of Initiative, Referendum and Recall) often collectively referred to as the 'Oregon

approach.’ State-level watershed planning in Oregon started with the passage of Senate Bill 23, creating the Governor’s Watershed Enhancement Board (GWEB), which encouraged the formation of local watershed councils (Bidwell, 2003; Hibbard & Lurie, 2008; Sommarstrom, 1999a). According to the Oregon Association of Conservation Districts,

GWEB's mission was twofold: to provide outreach and assistance to private landowners to restore watershed health locally, and to enable the state's natural resource agencies to work together across bureaucratic and geographic boundaries to achieve better watershed management. To implement this mission, from 1987 to 1995, GWEB funded landowner workshops on land use practices, developed education materials to teach watershed processes to landowners and in local schools, and provided grant funding of \$500,000 to \$1 million per biennium for watershed restoration demonstration projects (Oregon Association of Conservation Districts, Unknown).

After the formation of GWEB, many watershed management challenges remained, including the need to integrate local landowner and agency efforts. The State recognized that watershed management responsibility would have to shift away from a top-down approach in order to voluntarily integrate local landowners. To this end, “the State held a series of statewide water resources planning forums to discuss policy options, and a general consensus emerged that became the ‘1992 Watershed Management Strategy for Oregon’” (Sommarstrom, 1999a p.7).

In 1993, the Oregon Legislature passed House Bill 2215 and a companion bill, Senate Bill 81, codifying the 1992 strategy. The Oregon Watershed Health Program, a \$10M pilot project, created state-sponsored watershed councils in the Grande Ronde Basin and South Coast of Oregon from 1993 to 1995 (Sommarstrom, 1999a); this effort was separate from GWEB and was administered by the Water Resources Department. House Bill 2215 “adopted the watershed council program and promoted the concepts that: local governments should form voluntary local watershed councils; the councils would be cooperative partnerships of individual, local, state, and federal interests” (ibid p.7). Initial state watershed management efforts, such as the Strategic Watershed Management Group, involved a high degree of state oversight of local councils. The local councils responded by resisting the top-down governance framework in favor of council autonomy and authority (ibid).

In 1995, House Bill 3441 passed, recognizing watershed councils while emphasizing the voluntary, diverse and local nature of councils, requiring no state approval for formation (Sommarstrom, 1999a). “Under HB 3441, GWEB became responsible for providing support to locally established watershed councils engaged in a consensus-based approach to watershed improvement” (Oregon Association of Conservation Districts, Unknown). Between 1996 and 1999, the number of watershed councils nearly doubled to 92. Roughly half as many (45 in total) SWCDs, private landowners, and public landowners were involved in implementing on-the-ground salmonid restoration projects by 1999 (ibid).

The Oregon Coastal Salmon Recovery Initiative (OCSRI) began in 1995, passed in 1997 (via SB 924, HB 3700, HB 5042 and HB 5044) and is regarded as a direct

response to the threat of salmonid ESA listings and additional TMDL lawsuits (Arha, et al., 2003; Bidwell, 2003; L. R. Clark, 2001; Oregon Association of Conservation Districts, Unknown; United States Environmental Protection Agency, 2002). The OCSRI “focused on recovery of costal coho salmon and improvement of water quality statewide” (Arha, et al., 2003 p.9). The Legislature funded the OCSRI strategy in 1997 by investing in agency staff to plan for water quality and salmonid restoration (ibid). The 1997 OCSRI plan contained a chapter devoted to watershed councils; they were the decision-making and local inclusion focal point for habitat protection and restoration through the OCSRI. Additionally, a Steelhead Supplement was added to the OCSRI in 1997. Thus, the OCSRI consisted of two documents: one for salmon and one for steelhead (Arha, et al., 2003; Sommarstrom, 1999a).

In April of 1997, NOAA’s National Marine Fisheries Service, commonly known as NOAA Fisheries Service, entered into a Memorandum of Agreement (MOA) with the Office of Governor John Kitzhaber and chose to accept the OCSRI as adequate for species recovery. In 1998, a federal court ruled in *Oregon Natural Resources Council v. Daley (1998)* that the NMFS lacked the authority to choose not to list coho salmon as “threatened” under the ESA, “solely on the promise of an unproven state conservation plan,” referring to the OCSRI (L. R. Clark, 2001 p.215). A key reason for the ruling was that the MOA was “speculative” and not based on “current enforceable measures” (EO 99-01). NOAA Fisheries subsequently listed Oregon Coast coho salmon as “threatened” under the ESA in October of 1998.

In 1998, Ballot Measure 66 passed, amending the Oregon Constitution to utilize 15 percent of lottery revenues “to be spent equally on acquisition and maintenance of

state parks and to support restoration of native salmonids and watersheds,” requiring that the funds be administered by a single state agency (Oregon Association of Conservation Districts, Unknown). In 1999, the passage of House Bill 3225 created the Oregon Watershed Enhancement Board (OWEB) “as a new state agency to administer the watershed restoration and protection funds made available by Ballot Measure 66,” further refining the Oregon Plan (ibid). OWEB, a cabinet-level state agency, was charged with expanding GWEB’s previous local restoration support and was given coordination and prioritization responsibilities to guide strategic investment. House Bill 3225 clarified the State’s role in supporting collaborative partnerships while encouraging watershed councils and SWCDs to work together wherever possible (Sommarstrom, 1999a).

In 1999, the Governor renamed and expanded the OCSRI into the Oregon Plan for Salmon Recovery and Watershed Restoration through Executive Order (EO 99-01), today known as the Oregon Plan for Salmon and Watersheds, or simply, the ‘Oregon Plan’ (Sommarstrom, 1999a). The Order was Governor Kitzhaber’s response to the 1998 federal ruling disallowing the State’s MOA with NOAA Fisheries. Through the Order, the State reaffirmed its “intent to play the leading role in protecting and restoring Oregon Coast coho and other salmonids through the implementation of the Oregon Plan” (EO 99-01). The Oregon Plan expanded the state’s efforts to watersheds and fisheries statewide; this change combined both elements of the OCSRI into one document while expanding the overall scope. The Order required the establishment of biologic and habitat goals while clearly providing support to watershed councils and Soil and Water Conservation Districts to develop, prioritize and undertake restoration activities (Sommarstrom, 1999a).

The adoption of the Oregon Plan “emphasized the role of local citizens as resource stewards” and “provided a significant increase in funding for locally based restoration efforts” (Oregon Association of Conservation Districts, Unknown). The Order expanded the program to include every salmonid-bearing stream in the state. The Oregon Plan, unlike the OCSRI, aimed to meet the dual goals of salmonid recovery and water quality improvement through the ESA and CWA’s TMDL requirements, respectively. HB 3225 established OWEB’s “responsibility for administering half of the funds generated under Measure 66 for the non-park purposes” (State of Oregon, 2010b). After over two years of implementation of the Oregon Plan, criticism grew, to which OWEB responded by releasing a Strategic Plan that refined the Board’s vision related to the following: 1) effective and accountable investment in watershed health, 2) partnering to achieve watershed health and 3) citizen understanding of watershed health (Bidwell, 2003). The Strategic Plan specifically sought to improve local planning, scientific monitoring, outreach/education and partnering (ibid).

Over the past eight years (2003-2011), the number of watershed councils in Oregon remained steady at just over 90 councils. In the period from 1997 to 2001, the number of watershed councils increased drastically, with approximately 40 new councils formed (Bidwell, 2003). The level of funding support for the Oregon Plan increased dramatically in just over a decade, from \$5.5 million in 1995-1997 to \$32 million in 1999-2001 and \$130.1 million in 2008-2009 (Bidwell, 2003; State of Oregon, 2011c). OWEB is the key agency charged with distributing the funds. From 2008 to 2009, the federal government provided 37% of funding while the state government provided 31%, for a combined total of 68% federal-state Oregon Plan funding. The next two largest

sources of funding were local governments (12%) and private sources (9%) (ibid). In total, “between 1997 and 2009, the total [Oregon Plan] funding for completed and reported restoration projects from state, federal, private, and other sources exceeded \$646.1 million” (Bidwell, 2003; State of Oregon, 2011c).

Measure 76, an initiative constitutional amendment like Measure 66, passed November 2, 2010, indefinitely extending Measure 66’s scheduled funding sunset scheduled for 2012. Measure 76 is fundamentally similar to the previous Measure, providing grants to implement the Oregon Plan, Oregon Conservation Strategy, and Oregon’s native fish conservation and recovery plans. Perhaps the most significant administrative change, two Department of Agriculture grant programs – weed grants and SWCD capacity grants – changed into OWEB grants under Measure 76 (State of Oregon, 2011a).

During 2010, Oregon Department of Environmental Quality began implementing the Oregon Watershed Approach to water quality management, nearly two decades after the release of EPA’s Watershed Protection Approach. The Watershed Approach is still in development and falls under Department of Environmental Quality’s NPS Program Watershed-Based Plans funded by Section 319 Grants. The Watershed Approach is a “coordinating framework for management that focuses public, private, and non-profit sector efforts to address the highest priority problems within watersheds taking into consideration both ground and surface water flow” (Idaho Association of Soil and Water Conservation Districts, 2010). The Watershed Approach is designed to improve stakeholder involvement and interagency cooperation, as well as address limitations of the TMDL process. The Watershed Approach is additionally intended to be a basin-scale

resource assessment process that is more inclusive than the TMDL process. Each year, one basin team from each Department of Environmental Quality region is intended to produce a Basin Plan consisting of a Status Report and Action Plan that are further intended to enable adaptive management of water quality at a watershed scale.

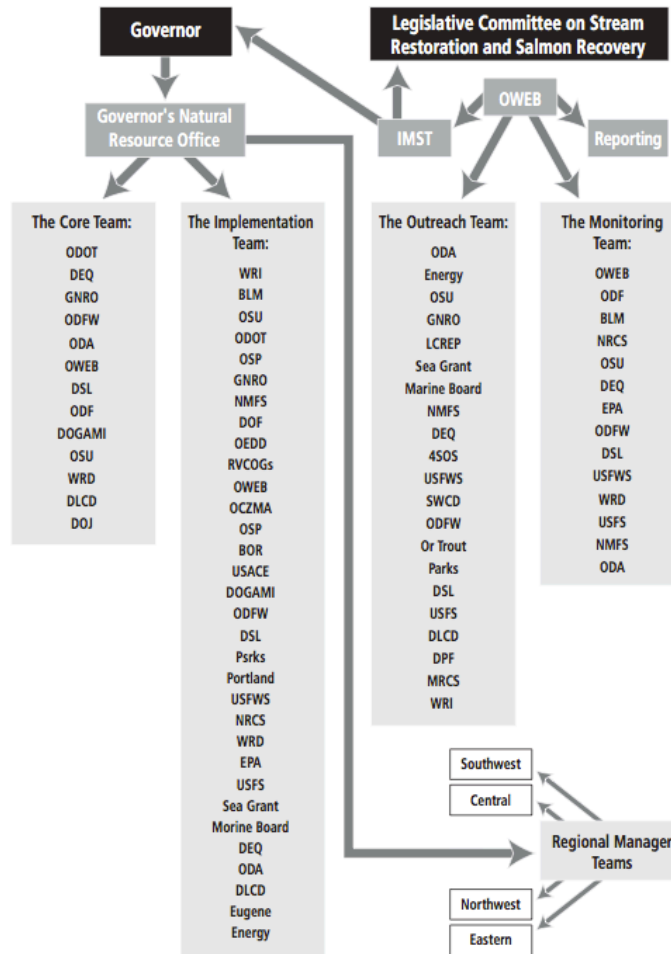
Oregon's watershed management is currently focused on voluntary local WMOs called watershed councils, as defined in statute. The Oregon Plan represents the State's official framework for watershed restoration and salmonid recovery through WMO support. The Oregon Plan is the only explicit State watershed management framework document offered by any of the four case study states, although it too does not list all of the included agency programs. OWEB has lead coordination responsibility for the Oregon Plan and operates related funding and reporting programs. The Oregon Plan is focused on four elements: (1) Agency Actions, (2) Voluntary Restoration, (3) Monitoring, and (4) Science Oversight.

The Oregon Plan relies primarily upon Oregon Lottery funds for implementation, written into the State's constitution via Measure 66 and made ongoing via Measure 76. These funds, as well as federal PCSRF and State salmon license plate funds, are distributed chiefly to watershed councils and SWCDs by OWEB, an agency led by a 17-member citizen board. OWEB functions as the financial arm of the Oregon Plan. OWEB tracks restoration activities through the Oregon Watershed Restoration Inventory (OWRI), the self-described largest database of restoration projects in the Western United States. OWEB additionally utilizes data from the Federal Interagency Restoration Database and Department of Fish and Wildlife's Fish Screening and Passage Database in

preparing the Biennial Reports, through which OWEB communicates the implementation status of the Oregon Plan (State of Oregon, 2010a).

The Oregon Plan relies upon six Oregon Plan Teams to achieve its goals related to watershed restoration and salmonid recovery: The Core Team, Implementation Team, Outreach Team, Monitoring Team, Independent Multidisciplinary Science Team, and Regional Implementation Teams (State of Oregon, 2007). The Core Team provides interagency policy coordination and direction to other Oregon Plan Teams; the Outreach Team develops public outreach and educational tools; the Monitoring Team coordinates interagency monitoring and data analysis; the Independent Multidisciplinary Science Team is an impartial scientific review panel hosted by Oregon State University and designed to advise on implementation and development of the Oregon Plan; the Regional Implementation Teams provide forums for agency managers and staff to enhance regional coordination. The composition of these teams is described in Figure 5, (the Legislative Committee on Stream Restoration and Salmon Recovery currently appears to be inactive):

Figure 5. Oregon Plan Functions and the Six Teams (Arha, et al., 2003 p.19)



The current framework is essentially analogous to that depicted in Figure 5, although the Legislative Committee on Stream Restoration and Salmon Recovery appears to be no longer active. The Oregon Plan for Salmon and Watersheds Monitoring Team provides planning, coordination, and monitoring oversight. OWEB’s financial support mechanism for Oregon Plan implementation is its Grant Program, which funds five general categories of project eligible for competitive funding: (1) on-the-ground projects, (2) technical assistance, (3) assessment/monitoring, (4) education/outreach, and (5) watershed council support. The Grant Program contains three grant sub-programs:

Regular Grants, Small Grants, and Watershed Council Support Grants. The Regular Grant Program supports a number of activities, including land acquisition, in-stream water lease and transfer, monitoring, outreach, restoration, and technical assistance. The Small Grants Program offers grants up to \$10,000 on a rapid timeframe to support local decision-making, based on 28 Small Grant Teams that set local funding priorities around the state.

Watershed Council Support Grants are available to individual watershed councils or groups of watershed councils, called umbrella watershed councils. The Watershed Council Support Grants provide funding for Council Coordinators, operating expenses, risk management and accountability assurance expenses, and fiscal management, not to exceed 10% of direct costs. The Council Support Advisory Committee, appointed by the Director of OWEB, reviews support grants. Finally, OWEB offers Research Grants, based on stated Research Priorities. Grant awards are generally based on the ability of a project or council to meet the goals of the Oregon Plan, informed by the OWEB's regional Prioritization Framework. Upon completion of projects, OWEB grantees are required to report the work through the Oregon Watershed Restoration Inventory Reporting Form. OWEB manages the online OWEB Grant Management System, designed to assist in grant reporting and tracking. Finally, OWEB's Project Reports (post-project status reports and monitoring reports) are required from grantees for projects funded.

OWEB manages a host of additional mechanisms, including Key Performance Measures designed to communicate progress to the legislature, as well as an Effectiveness Monitoring Program that contains both Project-Level Effectiveness

Monitoring and Intensively Monitored Watersheds. OWEB also conducts Watershed Assessments to assess watershed conditions, informed by the Oregon Watershed Assessment Manual and funded by Assessment Grants. The Oregon Aquatic Habitat Restoration and Enhancement Guide describes various types of restoration activities, identifying relevant agency programs, regulations, and funding sources for WMOs. OWEB's Guide to Oregon Permits Issued by State and Federal Agencies serves a similar function of clarifying State and federal permitting processes related to watershed management. Multiple other technical assistance documents are provided by OWEB.

A tool that is taking an increasing role in Oregon's watershed management strategy is the OWEB Special Investment Partnerships (SIP). Since watershed restoration outcomes are often viewed as difficult or impossible to achieve by funding small, fragmentary, sporadic projects, OWEB developed Special Investment Partnerships to support targeted long-term, large-scale restoration efforts that address specific localized outcomes. Currently only two Special Investment Partnerships are established, one for the Willamette Basin and another for the Upper Deschutes. The Willamette Basin SIP is conducted in partnership with Meyer Memorial Trust, Bonneville Environmental Foundation, and The Nature Conservancy and includes the Willamette Model Watershed Project, which uses technical resources from the University of Oregon's Institute for a Sustainable Environment. OWEB additionally houses the Fish Passage Project Viewer and Investment Tracker mapping resources. The Upper Deschutes SIP involves a partnership between Deschutes River Conservancy, Deschutes Land Trust, Upper Deschutes Watershed Council, and the Crooked River Watershed Council, implementing a host of restoration projects. Interviews indicate that OWEB intends to place an

increasing emphasis on SIP, utilizing output metrics that are project-specific rather than statewide in scale. OWEB's current official strategy is outlined in its Strategic Plan from January 2010. In addition, interviews indicate that OWEB offers funding support to the Grande Ronde Model Watershed, which is based on an MOU between Eastern Oregon University and Union County.

Department of Fish and Wildlife's Oregon Conservation Strategy, like the Oregon Plan, is a collaborative framework document related to watershed management and anadromous salmonid recovery, incorporating strategies for species, habitats, program coordination, monitoring, outreach/education, technical resources and voluntary restoration tools. The Oregon Conservation Strategy also provides a clearinghouse of conservation information related to current programs and funding sources. Substantial overlaps exist between the Oregon Plan and the Oregon Conservation Strategy's goals and mechanisms, mirroring the overlapping agency roles of OWEB and Department of Fish and Wildlife, respectively. Substantially overlapping both the Oregon Plan and the Oregon Conservation Strategy is the Oregon Coast Coho Conservation Plan. The Oregon Coast Coho Conservation Plan was spearheaded by Department of Fish and Wildlife to assist conservation groups, relating the non-ESA-listed Oregon Coast Coho ESU to Oregon Plan actions, in accordance with Oregon's Native Fish Conservation Policy.

Department of Fish and Wildlife manages a host of related policies and mechanisms through its Fish Division, such as the volunteer-based Salmon and Trout Enhancement Program (STEP) and the related Salmon and Trout Enhancement Program Advisory Committee Mini-Grant Program, utilizing funds from Department of Fish and Wildlife's Fish Restoration and Enhancement Program (R&E), a restoration funding

program supported by a \$4 surcharge on sport fishing licenses in the state. Additional Department of Fish and Wildlife programs include the Fish Passage Program, Fish Screening Program, Natural Resource Information Management Program, Ocean Salmon and Columbia River Program, Water Quality/Quantity Program, and the Western Oregon Stream Restoration Program, as well as Sub-basin Planning in accord with the Northwest Power Planning Council. A key Oregon Plan spatial analysis resource is Oregon Explorer and its Watershed Restoration Tool, hosted by Oregon State University. Both University of Oregon and Oregon State University offer multiple technical and research resources in support of watershed management.

The OWEB Restoration Priorities Limiting Factor Database, Department of Environmental Quality NPS Implementation Grant (Section 319) Program, Department of Land Conservation and Development Statewide Planning Goals, and Water Resources Department water rights transactions and Water Resources Maps also play a role in state-level watershed management. Water Resources Department is additionally in the process of developing an Integrated Water Resource Strategy, similar in spirit to California's IRWM Program, based on integrated natural resource management. Department of State Lands, Department of Forestry, and Department of Transportation additionally offer a number of technical and financial mechanisms that support watershed management. In terms of staff resources, OWEB maintains Regional Grants Review Teams, Department of Agriculture offers restoration support and water quality planners, Department of Environmental Quality and Department of Fish and Wildlife monitor for water quality and habitat. In addition, Department of Fish and Wildlife contributes biologists, Water

Resources Department offers watermasters, Department of Forestry has Local Service Foresters, and Department of Environmental Quality offers regional TMDL staff.

The high level of stable State-provided watershed management funding support is unique to Oregon. Also unique to Oregon is the independent nature of its agencies; each department operates under its own independent board and the Governor does not appoint agency leadership. Interview results indicate that this governance structure requires strong leadership to prevent agency leadership from guarding departmental interests at the cost of interagency cooperation. The latest Oregon Plan Biennial Report lists actions and roles for agencies involved in implementing the Oregon Plan. The following framework is based upon data from the 2009-2011 Biennial Report, which loosely describes the organizational framework of the Oregon Plan (Arha, et al., 2003 p.19). The Oregon Conservation Strategy of February 2006 offers a thorough listing of mechanisms related to salmonid habitat restoration in Appendices II and III.

Washington

Washington's watershed management framework draws from the area's history of regional governance over the past half century. In particular, the Puget Sound Water Quality Authority was highly influential in its approach to water resource management. The Puget Sound Water Quality Authority was established in 1983 and later re-established in 1985 via the Puget Sound Water Quality Authority Act. This regional water quality governing body was focused on reducing non-point source pollution per the CWA and on improving overall water quality in the Puget Sound region. Two crucial elements of the Puget Sound Water Quality Management Plan are that it took a

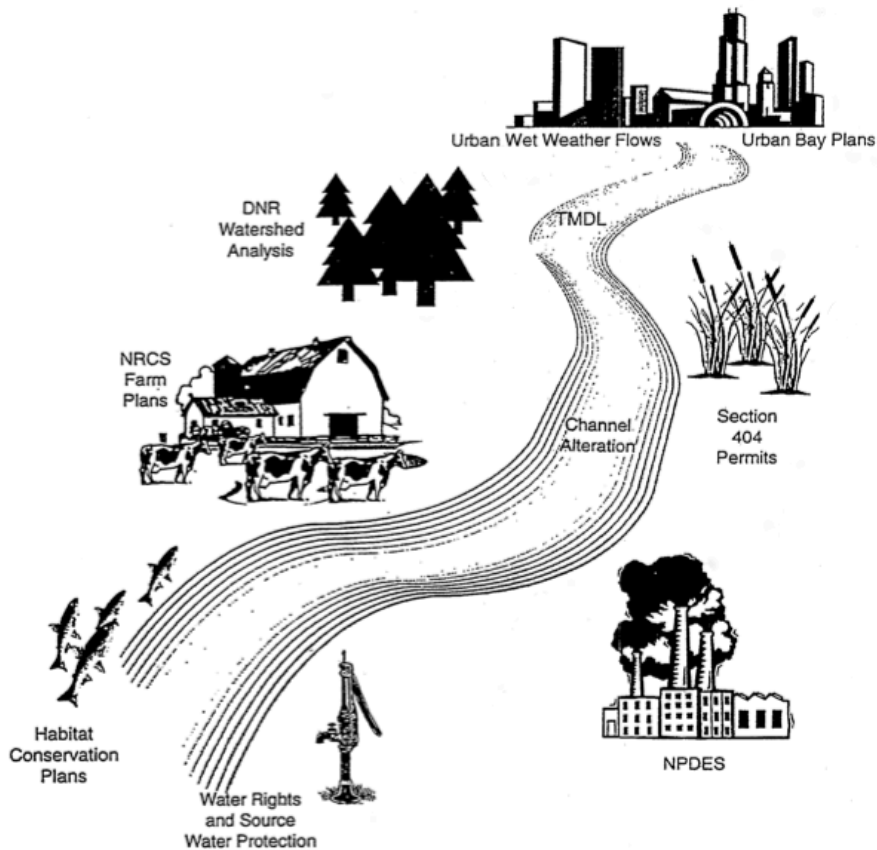
comprehensive, coordinated approach to water quality management and that it emphasized the importance of Puget Sound basin watersheds (ibid). In the 1990s, the State of Washington undertook three key endeavors to foster statewide watershed management: the Watershed Approach to Water Quality Management in 1993, modeled after EPA's 1991 Watershed Protection Approach and, the Watershed Planning and Salmon Recovery Planning Acts of 1998 (Holst, 1999; State of Washington: Department of Ecology, 2008).

The Watershed Approach to Water Quality Management was a key step toward statewide watershed management in Washington, focusing primarily on the rapid authoring of a planning document addressing permit processes found to be inefficient by a legislature-sponsored internal review. In October of 1992, The Water Quality Program workgroup created 32 Water Quality Management Areas (WQMAs), divided more or less equally among the four regional offices across the state. WQMAs arguably represented the state's first delineation of statewide watershed management areas, based on water quality management rather than comprehensive, collaborative watershed management. The Watershed Approach process was based on a recurring five-year interval in which four steps were incrementally completed: scoping, data collection/analysis, technical reporting and implementation. The program incorporated permitting with TMDL monitoring and the stormwater program. In 1993, the work group completed a final draft of the framework document (EPA 1997).

The Water Quality Program has since used the watershed framework to coordinate related water quality activities. Ecology added a Watershed Coordinator position to track the implementation of the watershed framework, as well as promote the

inclusion of related outside programs and agencies. As such, Ecology's Watershed Coordinator position differs significantly from the common role of watershed coordinators at the local WMO level, a confusion shared with multiple States that adopted EPA's Watershed Protection Approach. The Watershed Approach utilized WQMA's and "encompasses most of Ecology's [CWA] planning and implementation activities" (United States Environmental Protection Agency, 1997 p.54). Shortly thereafter, the Governor's office and the Department of Ecology expanded the scope of the five-year WQMA cycle to use as "the basis for integrating and coordinating other watershed initiatives within the state" (ibid). After expanding to include coordination with water right permitting, several agencies embraced the WQMA framework to "begin coordinating efforts in response to [ESA] concerns" (ibid). Many watershed partnerships within the WQMA framework focused on acting as information and communication clearinghouses. The WQMA's were an example of increasingly comprehensive watershed management via focusing on water quality issues and overlapped many watershed activities in the state, depicted by Figure 6.

Figure 6. Watershed Activities in Washington (United States Environmental Protection Agency, 1997 p.2-26)



In 1998, the Washington state legislature passed Engrossed Substitute House Bill (ESHB) 2514, known as the Watershed Planning Act (United States Environmental Protection Agency, 1997). The Watershed Planning Act is “framed around watersheds, or sub-watersheds known as Water Resource Inventory Area (WRIAs)” and is a “voluntary, comprehensive planning process... designed to allow local citizens, governments and tribes to form watershed management Planning Units to develop watershed management plans” (State of Washington, 2003 p.1). The Watershed Planning Act made funding available to Planning Units via four “Phases,” totaling a short-term maximum of \$700,000. Planning Units were given four years from the receipt of Phase Two funds to

complete the watershed plans (State of Washington: Department of Ecology, 2011). The basis implementing the Watershed Planning Act is tied to the Salmon Recovery Planning Act (ESHB 2496) and its Lead Entities through a MOU between a multitude of State departments, titled “Watershed Planning and Salmon Recovery” (State of Washington: Department of Ecology, 2011). The signatory agencies/departments include:

The Department of Agriculture, The Conservation Commission, The Department of Community, Trade, and Economic Development, The Department of Ecology, The Department of Fish and Wildlife, The Department of Health, The Department of Natural Resources, The Department of Transportation, The Interagency Committee for Outdoor Recreation, The Puget Sound Water Quality Action Team, The Salmon Recovery Office within the Governor’s Office, and The State Parks and Recreation Commission (Ecology 2011).

The 2001 Legislative Session yielded significant modifications to watershed planning in Washington with the passage of the Water Resources Management Act (ESHB 1832). The new legislation allowed Planning Units to apply for an additional \$300,000 of funding during Phase Two, on top of the previously available maximum of \$200,000 per unit. The Office of Financial Management conducted a subsequent assessment of the Water Resources Planning Act and found that the State of Washington “had provided \$12.9 million in grants, and \$5.7 million and 47.5 FTEs in technical assistance to watershed planning between July 1998 and June 2001” (State of Washington, 2003 p.2). The Water Resources Planning Act significantly changed “various aspects of water law and water resource management,” reflected in Ecology’s

addendum to the Guide to Watershed Management and Planning in late 2001 (ibid). Also passed in 2001 was the Watershed Health Monitoring & Assessment Act (Substitute Senate Bill 5637), which was aimed at watershed-scale monitoring of critical in-stream flows for salmon recovery. The newly formed interagency committee mandated by SSB 5637 noted that there was no dedicating funding for flow monitoring at the time (State of Washington, 2003).

The 2002 Supplement Budget (Engrossed Substitute Senate Bill 6387) brought significant changes to the funding structure of watershed planning. "...Grant support for watershed planning dropped from \$11.1 million to \$8.2 million and switched the funding source from the State General Fund to the Water Quality Account," only to be reverted back to the General Fund in subsequent years (State of Washington, 2003 p.2). Ecology also received authorization to seek \$900,000 from the Salmon Recovery Funding Board, under the Governor's Salmon Recovery Office, for the purpose of monitoring in-stream flows for salmon recovery in WRIAs with low flows. Effective FY2002, Ecology set out to "provide grants to Planning Units on a cost-reimbursement basis" (ibid). The rate at which funds were disbursed to local jurisdictions slowed considerably thereafter.

The State of Washington's framework for watershed management is effectively a three-pronged strategy based on (1) the EPA's Watershed Protection Approach to water quality management, (2) WMO-based watershed management, and (3) salmon recovery watershed management. Strategies (1) and (2) are split between two separate Department of Ecology programs, and (3) is managed by the Governor's Salmon Recovery Office within Recreation and Conservation Office. While there are a number of efforts to integrate these three related programs, findings indicate that they operate in relative

isolation of one another. Washington's framework for watershed management arguably places the greatest emphasis on salmonid recovery of any of the four case study states, with Ecology's Watershed Planning Program focusing on water quantity for regional growth and salmonid-based minimum stream flows.

The key elements of Ecology's Watershed Approach to Water Quality Management are the designation of 23 WQMAs statewide, the appointment of staff leads for each area, and a five-year, five-step process of scoping, data collection, data analysis, technical reporting, and implementation. Ecology's Watershed Unit manages the Watershed Approach effort. The Watershed Approach is designed to increase water quality protection while using only available resources. The Watershed Approach is further intended to coordinate monitoring, inspections, and permitting on a watershed scale, and to establish local priorities for State planning and funding. WQMAs are scheduled for review on a cyclical five-year basis, rather than prioritization, ensuring statewide coverage. The Watershed Approach is designed to produce fine-scale comprehensive analysis and response actions mainly to NPS pollution concerns, in accord with the EPA Watershed Protection Approach (State of Oregon, 2011b).

Washington's statewide WMO-based watershed management and salmon recovery efforts started in 1998 with the passage of the Watershed Planning Act and Salmon Recovery Planning Act (the Acts). Washington's WMO-based watershed management is managed through a separate but related Watershed Planning Program within Ecology under the Shorelands and Environmental Assistance Program, intended to be carried out in coordination with Governor Salmon Recovery Office's salmon recovery strategy through MOU. Similar to Oregon in scope, overall state-level watershed

management efforts are based on a twelve-agency MOU designed to integrate the Acts, addressing both watershed restoration and salmonid recovery. The MOU, requested by the Joint Natural Resources Cabinet through its Water/Endangered Species Act Work Group, outlines the State's framework for collaborative WMO-driven watershed management and related watershed-scale salmonid recovery planning in limited detail. The purpose of the MOU is to clarify agency roles and responsibilities, increase cooperation, and coordinate implementation of the Acts.

Outlined in the MOU are the foundational elements of Washington's state-level watershed management framework: interagency coordination, local support, technical support, planning assistance, watershed management grants, salmonid recovery project funding, watershed monitoring, and limiting factors identification. The MOU is largely focused on integrating the critical pathways, limiting factors analysis, habitat restoration efforts, and mitigation criteria development elements of Salmon Recovery Planning Act Sections 7, 8, and 16 into Watershed Planning Act implementation efforts (State of Washington, 2008b). Accordingly, Washington's state-level watershed management framework places a high degree of emphasis on salmonid recovery planning and water quantity management, dubbed the bottom-up "Washington Way" to addressing federal ESA listings.

WRIAs, authorized under the Water Resources Act of 1971, are the organizing geographic unit for WMO-based watershed management and serve as the foundation for salmon recovery efforts within each of the state's seven ESA ESU-based Salmon Recovery Regions, corresponding to interjurisdictional Regional Organizations. 62 WRIAs exist in the State of Washington, with roughly half of the WRIAs (n = 36) in the

state active through Ecology's Watershed Planning Program. Both WMOs and watershed-based salmon recovery funding coordination groups, known as Lead Entities, may encompass a single or multiple WRIAs. WRIAs were embraced at a hydrologic scale to simplify integration of existing State natural resource management activities (State of Washington, Unknown). WRIAs differ from both the State's water quality management-focused WQMA as well as commonly used USGS HUC watershed delineations.

Ecology's Watershed Planning Program, the State's WMO-support watershed management program, is essentially outlined in the Watershed Planning Act. As one interviewee noted, "The goal of the planning process was to develop this plan that would guide future water use and land use decisions." The Watershed Planning Program is based on a bottom-up, collaborative approach to water resource management. WMOs within the Watershed Planning Program framework are referred to as Planning Units throughout their duration in the program. The purpose of Planning Units is to develop and implement Watershed Plans, which are local plans adopted at the county level. Watershed Plans are required to address water quantity through a watershed-wide assessment of water supply and use, as well as incorporate strategies to address competing needs of minimum instream flows and future out-of-stream development. Optional Watershed Plan elements include water quality, and habitat. However, only a water quantity element is required by Ecology for Watershed Plans.

Lead Agencies, not to be confused with salmon recovery Lead Entities, act as the lead for each watershed planning area and are responsible to both Planning Units and involved State agencies. Counties, due to their ability to act on a fiduciary basis to

propose, manage, and accept grants, as well as implement projects, typically serve as Lead Agencies. Interviews indicate that counties maintain jurisdiction within WRIAs, which often overlap with multiple counties. Counties can opt out of the process, but the largest city and largest water purveyor in the planning area, whether public or private, must be invited to participate in the process. Tribes are additionally invited to participate in the process where their jurisdictions fall within planning areas. Regardless of the Lead Agency, in order for a Planning Unit's Watershed Plan to be formally adopted as a local document, it must first be passed through the regular planning process by county commissions within the county or counties overlapping the WRIA(s) involved.

The Watershed Planning Program is conducted via four Phases: (1) organization, (2) assessment, (3) planning, and (4) implementation. The Watershed Planning Program's Planning Grant support schedule mirrors the four Phases. Phases 1 through 3 allow WMOs a total timeframe of five years for Watershed Plan development, with Phase 4 allowing another five years for implementation. In total, WMOs are offered ten years of funding support through the Watershed Planning Program. Phase 1 support offers up to \$75,000, Phase 2 offers up to \$200,000 per WRIA, Phase 3 offers up to \$250,000 per WRIA, and Phase 4 offers up to \$150,000 per WRIA, in addition to \$37,500 per each additional WRIA.

Watershed Plan Implementation Grants are split into three types of projects: Operating Project Grants, Capital Projects Grants, and Blended Project Grants. Operating Project Grants are funded through the State General Fund, whereas Capital Project Grants are funded through a Watershed Plan Implementation and Flow Achievement Proviso in the State Capital Budget, funded by the sale of state bonds. Interviews indicate that

Washington's General Fund is hit hardest in the short-term during a recession, with bond sales and interest expense eventually affected as the State credit rating declines.

Ecology's Water Regional Management Teams and Water Advisory Groups make decisions based on funding priorities, with grant requests ranked as High, Medium, or Low priority. After running the ten-year duration of Watershed Planning Program grant support expires, Planning Units may change their name and continue to operate.

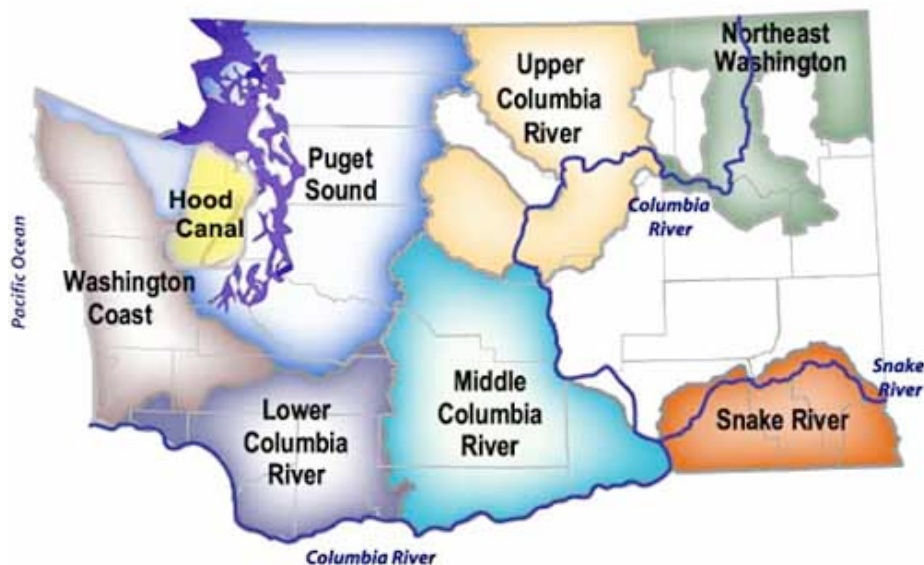
Interviews indicate that some of the first Planning Units are currently running into the funding sunset, losing Planning Grant support and forcing groups to secure outside funding or dissolve. As one interviewee noted, "They could become a non-profit, but there's not any that have."

The third and final State method of watershed management in Washington is directed by the Salmon Recovery Planning Act, which established the Governor's Salmon Recovery Office, administratively housed within Recreation and Conservation Office. Governor's Salmon Recovery Office is responsible for coordinating a statewide salmon recovery strategy and advises the Salmon Recovery Funding Board. The Salmon Recovery Funding Board is the financial arm of the State's framework for salmon recovery, also created by the Salmon Recovery Planning Act, and houses a Technical Review Panel to assess the scientific merits of proposed projects. Washington's approach to salmon recovery, known as the "Washington Way," is based on bottom-up watershed-scale restoration work. Recovery efforts are formed around seven Regional Organizations, based on ESA-mandated ESU-scale Recovery Plans.

Regional Organizations consist of a variety of interested stakeholders of varying jurisdictions and may include many roles; these organizations include the Hood Canal

Coordinating Council, Lower Columbia Fish Recover Board, Upper Columbia Salmon Recovery Board, Yakima Basin Fish and Wildlife Recovery Board, Snake River Salmon Recovery Board, Puget Sound Partnership, Washington Coast Sustainable Salmon Partnership, and the Lead Entity of Pend Oreille County. Regional Organizations are coordinated through the Council of Regions. The related Recovery Plans often include information related to socioeconomic issues, the four H's (habitat, hatcheries, harvest, and hydropower), required implementation resources, ESA compliance, multi-scalar recovery, the plan review process, implementation funding, and the future institutional framework. Implementation of these plans is currently underway; NOAA Fisheries has approved the regional recovery plans for each of the regions, shown in Figure 7. Finally, up until June 2011, the Washington Forum on Monitoring Salmon Recovery and Watershed Health coordinated policy and technical issues related to monitoring salmon recovery and watershed health.

Figure 7. Salmon Recovery Regions (State of Washington, 2011)



Watershed-based Lead Entities operate locally under the ESU-scale Regional Organizations, as defined by the Salmon Recovery Planning Act. Put simply by one respondent, Lead Entities “help the jurisdictions that are applying for grants find funds to implement projects that are part of the Salmon Recovery Plan.” The 27 Lead Entities in the state develop local salmon habitat recovery strategies and recruit organizations to carry out the work implementing strategies. Lead Entities consist of a coordinator or administrative body, a committee of local technical experts, and a committee of local citizens. Lead Entities often consist of NPOs, tribes, and/or local governments, and are primarily funded by Salmon Recovery Funding Board. Lead Entities recruit project applicants (local governments, WMOs, tribes, fisheries enhancement groups, etc.), who use regional recovery plans or Lead Entity strategies to develop projects. The internal Lead Entity committees (Technical Committee and Citizens Committee) then evaluate and prioritize the projects. Finally, Salmon Recovery Funding Board evaluates the projects forwarded from Lead Entities according to eligibility and technical merits before approving projects for funding (Washington 2011). From 1999 to 2007, Salmon Recovery Funding Board provided Lead Entities with over \$248 million, or over \$400 million including matching funds (State of Washington, 2008a).

The online Lead Entity Habitat Work Schedule system is used to report and map projects undertaken by Lead Entities, including proposed, active, and completed work. Overall monitoring efforts are guided by The Washington Comprehensive Monitoring Strategy and Action Plan for Watershed Health and Salmon Recovery. The included types of monitoring consist of status and trends, targeted monitoring, effectiveness monitoring, intensive monitoring, and implementation monitoring. Recreation and

Conservation Office additionally offers a web resource simply titled “Find Grants” with a comprehensive listing of available grants by project type, grantee type, and grant title. The Grants section of Recreation and Conservation Office’s website is the most user friendly, unified, and comprehensive grant resource of any of the four case study states, listing a host of information related to Salmon Recovery Grants, as well as Habitat Conservation and Restoration Grants. Recreation and Conservation Office additionally offers the Project Information System (PRISM) computer program, a Windows-base executable application composed of the Grant Tracking System and the Salmon Recovery Monitoring System. PRISM includes functionality related to project information, detailed reporting, online application submission, project element status, as well as grant and billing backups (State of Washington: Recreation and Conservation Office, 2011).

Findings indicate that there are numerous additional mechanisms related to state-level watershed management in Washington, including Ecology’s Watershed Leads, Ecology’s Water Market (consisting of the Trust Water Rights Program, Water Acquisition Program, and Water Banking Program), and Department of Natural Resources’ Forest Practice Rules, Forest Practices Habitat Conservation Plan, and Forest Practices Watershed Analysis, based on hydrologic/geomorphic Watershed Administrative Units. Additional mechanisms include Department of Health’s Watershed Control Program within the Source Water Protection Program, Department of Fish and Wildlife’s Watershed Stewardship Team, Regional Fishery Enhancement Groups, Salmon Recovery Planning Grant Program, and Regional Recovery Plan Model, as well as a host of programs through Conservation Commission: Limiting Factors Analyses, Columbia River Basin Water Management Program, Conservation Reserve and

Enhancement Program, Coordinated Resource Management, Farm Plan Implementation Grant, Good Governance and Capacity Building Grants, Irrigation Efficiencies Grant Program, and Puget Sound Water Quality Work Plan Grants.

Further mechanisms include Department of Commerce's Growth Management Act technical assistance, Puget Sound Partnership's Puget Sound Acquisition and Restoration program, Department of Natural Resource's Forests and Fish Agreement, Ecology's Shoreline Management Act technical assistance, Department of Fish and Wildlife's Fishery Management and Evaluation Plans, 21st Century Salmon and Steelhead Initiative, Energy Development Technical Assistance, Fish Passage technical assistance, Lands 20/20 Initiative, Interagency Aquatic Habitat Guidelines (hosted by WDFW), Habitat Program, and Puget Sound Nearshore Ecosystem Restoration Project, as well as a number of Department of Fish and Wildlife data products, including SalmonScape, Priority Habitats and Species, and Puget Sound Ambient Monitoring Program. The list of signatories to the 1998 Acts MOU are: Department of Agriculture, Conservation Commission, Ecology, Department of Fish and Wildlife, Department of Health, Department of Commerce, Commissioner of Public Lands, Department of Natural Resources, Department of Transportation, Puget Sound Partnership, Governor's Salmon Recovery Office, Interagency Committee for Outdoor Recreation, State Parks and Recreation Commission, and Puget Sound Water Quality Action Team (renamed to Puget Sound Partnership).

Key Informant Interviews

This section contains the findings of the study, based on key informant interviews. Key informants were selected from a variety of jurisdictions: state, federal, and local government, WMOs, Special Districts (i.e., Soil and Water Conservation Districts), and non-WMO NPOs. Key informants were selected via purposive sampling for their breadth of experience and diversity of interests, informed through the background research and advising processes. The findings are listed in alphabetic order by state, from California to Washington. The sections are grouped by the nature of the questions asked, related to watershed management goals, WMO/State consistency, and long-term financial prospects, as well as framework strengths and weaknesses.

California

Interviewee Background

Key informants (n = 4) had an average professional experience of 25 years.

Watershed Management Goals

Goals related to watershed management reported by key informants across a variety of jurisdictions were heterogeneous. Programs mentioned range from Department of Water Resource's water supply projects, State Water Resources Control Board's Watershed Management Initiative, Department of Conservation's Statewide Watershed Program, and Department of Water Resource's IRWM Program. Often repeated themes include the state's water supply challenges/interests, interagency competition, Propositions, budget cuts, the Bay-Delta System, and the lack of a formal State

framework for watershed management. These themes were repeated across jurisdictions (State, federal, WMO, local, etc.). As one interviewee summarized, “In terms of California priorities, we think in terms of the water. If we don’t have the water, then we don’t have the farming, we don’t have enough water for the urban sector, and we have a lot of arguments over Endangered Species. ‘Watersheds,’ for us, is water.”

Relationship of the State Goals to WMO Goals

In terms of the relationship of goals, respondents representing both the local and federal level were often unaware of the presence or specifics of State goals. Regional Water Quality Control Board Basin Plans were noted as being largely ineffective in terms of usability, due in part to the distant proximity of Regional Water Quality Control Board offices combined with a recent cut in State travel reimbursements. Maintaining local water supply was stated as the key focus of Northern California WMOs, with one interview stating outright, “Our focus is on keeping water in [the county].” Sentiments related to maintaining water supply were oft-stated as a watershed-related goal, reflecting a statewide water scarcity-conflict-driven theme enabled by the Bay-Delta System’s connection to the State Water Project/Central Valley Project and its resultant “hydropolitical” jurisdictional boundaries.

Interviewees representing the State were generally positive about goal integration through Department of Conservation’s Statewide Watershed Program, noting, “I think they’re compatible. We’re all into collaboration and reducing the impacts on the environment.” Department of Conservation’s extensive outreach effort and Statewide Watershed Program Advisory Committee were noted as important to goal integration

through program design. RCDs were additionally noted as having substantial WMO implementation consistency. In terms of State watershed management overlap, “the RCD Assistance Program is not designed to help promote watershed management, but we end up utilizing it that way because RCDs have organized themselves to use a watershed approach in the delivery of their local programs. They get a lot of pushing from NRCS to do the same, so it works out pretty well.” RCDs thus represent an example of practical federal-state-local integration through related but differing goals.

Measuring Watershed Management Progress

Interviews indicate that the State could significantly improve its measuring of watershed management progress through developing improved indicators. As interviewees noted, “We really need to do a better job of that” and “That is definitively a work in progress...” Interviews indicate that the State recently created the Welcome to My Water Quality website to improve communication, based on EPA’s Surf Your Watershed. The State has additionally provided financial assistance to develop indicators and conduct watershed assessments, and is working to use local-level indicators to inform state-level indicators. In terms of water quality, “It’s an important, common, and useful measure for helping to determine the status and condition of a particular watershed.”

Watershed Management Progress Indicator or Metric Source

Interviews indicate that Special Districts’ metrics are often developed in cooperation with project funders. Additionally, “The State hasn’t adopted a comprehensive set of metrics or indicators that we will consistently measure or evaluate

to help inform us on the status of watersheds... We have a difficult time just coming to some conclusions about the status of very specific attributes of our resources here in California.” Interviews also indicate, “There are huge gaps, both in the availability of data or the quality of data and information for water quality. There’s a lot we don’t know, but we recognize that there’s a lot we don’t know, which has been a really significant improvement.”

State and WMO Long-Term Financial Prospects

In terms of the State, interviewees unanimously noted California’s ongoing budget crisis as indicative of the state’s long-term financial prospects, affecting the local, state, and federal levels. One interviewee notes, “I don’t foresee, for the next several years, the State of California being able to generate anything close to the kind of financial support we have been able to spend over the last ten years. I think we’ve seen the best of the times.” Perspectives on California’s financial future were overwhelmingly negative. Interviewees at the state and federal levels focused responses on California’s initiative-driven state bonds, called Propositions. Propositions were noted as fiscally detrimental to the State’s financial well being, even though they fund major natural resource management programs, such as IRWM and the Statewide Watershed Management Program.

An interviewee noted, “Things have become so skewed here in California that most of the General Fund money that could have been spent on natural resource management... is now being committed to pay for the debt service on bonds that we’ve sold in order to accelerate the amount of spending that we make on our natural resources

in California...” Additionally, “Right now, our bond debt service here in California is the third largest General Fund expenditure. We spend more money on bond debt service than we do on the University of California system...” Reflecting the uncertainty of natural resource management in California, “At the State level, they have billions of dollars of debt that they have to figure out. Are they going to make a priority for watersheds given that?” Interviews suggest that initiative-based Propositions make additional watershed management funding possible, but unlikely given the State’s overall budget crisis, fueled in no small part by the widespread sale of state bonds that carry a substantial debt service cost. “That’s why the legislature hasn’t been able to pass a bond measure over the last five years; they start staring at the numbers and they realize, ‘we can’t do this, it would be irresponsible.’”

In terms of the State budget crisis’ effect on WMOs, one interviewee notes, “As the State’s financial fortunes take a turn toward the worst, I think we’ll see the same for watershed management organizations at the local level.” Participation in WMO forums has already dropped in California. “Part of that is that there hasn’t been as much money in the system and the primary source for watershed groups and watershed coordinators is through State of California bond funds...” In short, “Without the funding for the watershed coordinators, a lot of the local watershed groups have no way really to carry on, because they’re basically people who are volunteering extra time to work together as a watershed group. They really needed those coordinators to help keep them going.” The primary noted benefit of watershed coordinators is that “they’re very affective at leveraging.” However, the State was not entirely consistent in distributing awarded funding due to the budget crisis. “They weren’t honoring having new contracts come in.

If you've been awarded a grant and it hasn't started yet, you still don't have it. If you had been awarded one and you were midway through it, they finally gave their permission on most of them to start up again and finish some of their work." Although interviews indicate that the State is making progress in assisting WMOs with securing outside funding, "On the other hand, a lot of organizations – their role and their effectiveness in terms of managing natural resources at the local level – are going to decline or disappear as a result of a lack of State funding or support."

State Watershed Management Framework Strengths

Among the strongest State framework features noted is Department of Conservation's Statewide Watershed Program, including its Watershed Coordinator Grants based on statewide Proposition 84 funding (Proposition 50 funding for the CALFED Watershed Program only applies to the CALFED Solution Area). Additional strengths include improved program coordination, database coordination, the SWAMP Clean Water Team citizen-monitoring program, the increased use of adaptive management, the resilience of local groups in the face of change, and the presence of human and financial capital. Additional strengths include the recognition of the need for reform, the ability of WMOs to address California's many heterogeneous biomes (Multiple Land Resource Areas), and future promise related to the basin-scale IRWM Program and its associated grants (funded by a host of Propositions).

Interview responses related to framework strengths evoked another common statewide theme, in that "The strongest really is not the most positive watershed management feature and that is to continue to move water around the state, and deliver

water from the northern part of the state to the populated southern part of the state; that's the overarching purpose of water management at the state level. Even the folks who are trying to do good things for watersheds in the state are constrained by that framework." Another interviewee similarly noted, "If you're planning your water, you're planning your watershed. You just can't separate the water from the watershed."

State Watershed Management Framework Weaknesses

Responses regarding framework weaknesses consist of water delivery, a lack of funding, inconsistent funding equity, poor interagency coordination, the State's negative political connotations of watershed management, the practical implication of large bond funding, State agency competition, a lack of measurable outputs, competing agency roles (i.e., Department of Forestry and Fire Protection and Department of Fish and Game related to riparian understory), internal competing directives within agencies (i.e., Department of Conservation watershed management and farmland conservation), widespread resource health decline, Bay-Delta System water contention, a lack of systemic incremental learning, excessive bureaucracy, and apathy.

From the perspective of a Northern California WMO interviewee, "The bottom line is that each time you sit down with a Secretary of the Resources Agency to go over it, the 800-pound gorilla is the Bay-Delta and water delivery." Concerns related to the Bay-Delta System and water supply permeate California, including concerns over the influence of water development agencies. Interviews indicate that such agencies serve urban interests often adopt a strategy of "...diversifying supplies and improving the

availability of higher quality water supplies to dilute and to mix and to blend with more readily available local supplies of water that tend to be of a lower quality.”

In terms of the political environment, interviews note, “They didn’t think that the program progress was measured and a lot of people felt like they were having their toes stepped on by the watershed coordinators... in California, some of the politicians look at watersheds as a four-letter word.” At the State agency level, “competition has been a more consistent theme than cooperation. Tension has been a characteristic feeling between various departments.” Additionally, “They literally fight each other in court; sometimes they are fighting directly, sometimes they are fighting through their proxies... That’s the typical pattern and it gets really ugly depending on the Administration...”

In terms of funding through Propositions, interviews show, “Part of the difficulty has been that there’s a lot of money to spend quickly and it’s a lot easier to spend a lot of money on big infrastructure projects; there’s a lot less oversight per dollar, so from a purely practical standpoint, there was an incentive to provide money for big things. The timeframe and the amount of money available created that bias.” And, in terms of the development of Department of Conservation’s Statewide Watershed Program, “We haven’t really found our way into the funding stream yet... We’re only focused on certain aspects of the program that we designed.” Additional concerns exist about the framework’s ability to address a legacy of public works, as “a lot of the grand assumptions we had been making during the natural resource development period here in California... have been proven false.” Finally, interviews indicate, “California is all about fire, flood, and drought. We call it the ‘hydrological’ cycle because the other part of it is apathy.”

Idaho

Interviewee Background

Key informants (n = 3) had an average of 12 years professional experience.

Watershed Management Goals

Interviews indicate that the State of Idaho's watershed management approach is entirely based on the EPA's Watershed Protection Approach related to the TMDL lawsuits. A State interviewee noted, "The objective is to get a group, regardless of its name or title, with interested and affected parties working toward mutual goals for that watershed." Additionally, "The process to do that is driven by Department of Environmental Quality (DEQ) and the regional offices to identify the affected parties or interested parties in the watershed and to put that group together." Accordingly, the State's goals are viewed as a watershed approach to addressing TMDLs. One interviewee summarizes, "Because of the way DEQ has configured its State standards... the standards themselves set it up that all [watershed issues] need to be considered." Another major focus according to interviews is bull trout and cutthroat trout. Interviews indicate that Northern Idaho tends to focus on water quality issues, while the arid agricultural regions of Southern Idaho tend to focus on water quantity. An interviewee stated, "North Idaho and South Idaho are almost two different worlds because we're dealing with completely different scenarios."

Interviews additionally indicate that the federal land in Idaho is managed under the guidance of the less rigorous Interior Columbia Basin Ecosystem Assessment, rather than the Northwest Forest Plan used by the other case study regions. In terms of funding,

Section 319 funds were noted as “the biggest pot of dollars for watershed management,” with Department of Environmental Quality’s Source Water Protection Program and Office of Species Conservation’s aquatic habitat restoration grants providing additional State funding for some activities. One interviewee summarized the Watershed Advisory Group (WAG) and Basin Advisory Group (BAG) process, “It’s just a matter of finding what’s out there, getting it all organized, and getting everyone to work together toward that common goal.”

Relationship of State Goals to WMO Goals

Interview results indicate that the State offers minimal support to WMOs and the State maintains no official State goals related to WMO-driven watershed management. Interviews further indicate Idaho’s watershed management approach is based entirely around the participatory use of BAGs and WAGs as minimalist forms of WMOs to develop and implement CWA-mandated TMDLs through the involvement of local landowners. Interviews remarked that local landowner involvement is seen as an integral component of Idaho’s watershed approach due to the State’s landowner-centric political climate. One interviewee noted, “The user group that is likely to be most impacted in the watershed is going to have the larger voice at the table.” Interviews further indicate that the strongest method for coordination between State and WAG water quality goals is the communication of problems, buttressed by the threat of federal intervention. Interviews indicate that DEQ funds BAGs and WAGs, with additional funding available through CWA Sections 106 and 319 funds as well as BPA mitigation funding. While WAGs focus on water quality issues, interviews note that they are expected to go beyond water

quality measures in order to address larger watershed issues that affect water quality through a watershed approach. Interviews reveal that many WAGs were formed by a push from DEQ and that WAGs around the state are highly heterogeneous.

When one WMO was asked about integration with State goals, they remarked, “I would have a difficult time answering that because the State has a partnership performance agreement they enter with EPA that is their official position regarding the implementation of CWA programs... We’re an advisory group to the State [through the WMO’s WAG role].” In regard to how the State tries to reflect its watershed goals throughout the state, an interviewee commented, “I think that it is primarily water quality.” Interviews indicate that the State largely views the BAG/WAG framework as watershed management, whereas WMOs view the BAG/WAG framework as Department of Environmental Quality’s CWA implementation strategy for non-point source pollution, rather than focusing on comprehensive restoration. However, one WMO interviewee noted, “The general goals of high water quality and working collaborative and collectively to achieve the goals of the water body; we all share that.” Concerning the State’s long-term, iterative, phased review of TMDLs, one interviewee stated, “we’ve essentially codified the EPA guidance... That’s something very unique to Idaho...” A comment on goal coordination summarized, “All of the watershed coalitions kind of have their own sets of goals. It would be really nice if we were more cohesive across the state...”

Measuring Watershed Management Progress

Interviewees indicate that one indicator of watershed management progress used is the ability of WAGs and BAGs to retain members. A few BAGs were noted for having no membership turnover since their inception. Additional responses indicate that a key measure is the attainment status of goals outlined in the State's Strategic Plan. Regarding progress measurement, one interviewee noted, "In general, everyone is there working for improved water quality, but that also includes habitat." It is through this perspective that WAGs and BAGs are often viewed as capable of increasing comprehensive management. Interviews also note that the Beneficial Use Reconnaissance Program is used to monitor BMP implementation results and, "With WAGs, it's kind of hard [to measure progress] because once they get the TMDLs written, they are expected to move on to the next watershed." Finally, relationship building between the State, WAG, and within the WAG is viewed as a qualitative measure of progress.

Watershed Management Progress Indicator or Metric Source

As one interviewee summarized, "The TMDL is the big driver. I don't know that there is any other set of metrics." All interviewees reflected a similar sentiment.

State and WMO Long-Term Financial Prospects

Interviewees in Idaho, like other states, noted the effects of a national-scale recession. As one interviewee noted, "I think we're starting to see some change, just as a result of what is happening on the national landscape and the fact that the budget situation leads to at least start talking about better collaboration and more leveraging with

partners.” Additionally, interviewees noted that EPA Region 10 funding for Idaho, providing the relied upon Section 319 grants, was cut from \$2.1 million to \$1.8 million recently as a result of Congress cutting Section 319 Program funding by \$25 million nationwide. As a result, an interviewee noted, “Timeframes are going to be pushed back or dropped altogether because there’s no money or nobody available to do the work... When we take a hit, it’s passed down the line; everyone takes a hit, including the waters.”

The interviewee additionally noted that the Idaho legislature cut water quality monitoring last year due to budgetary constraints. Indicating effect of state regulatory frameworks, one WMO interviewee commented, “Dischargers... are looking to support [the work] because it’s directly linked to their livelihoods in complying with the federal and state laws protecting water quality.” The same interviewee further noted, “It’s only going to be less money. Fewer jobs, less money, greater hardship, poorer education for our children... We continue to build unsustainable infrastructure whenever we’re investing.”

Additional funding-related interviewee comments indicate, “The bread and butter right now for folks is to go through the 319 dollars because there’s not much help beyond that, even through DEQ and the work that they do at the WAG.” Additionally, “I don’t see there being a huge financial prospect at the state level for watershed work beyond the programs that already exist and those come under pressure constantly and have had cuts in the past.” In terms of NPO WMOs, “At the local level, a lot of the 501(c)3s are due-based organizations, in that people pay into them, and so that’s how they accomplish most of their work, or they’ll go after more federal-based funding.” An interviewee offers

a summary of the current financial situation in that “At the state level, there’s just not a ton of money outside of the 319 program.”

State Watershed Management Frameworks Strengths

Interviews indicate the strongest feature of Idaho’s watershed approach is local buy-in and the completion process. Additionally, the goals are noted for their clarity. An interviewee summarized, “I think it’s really awesome how DEQ steps up, gets into the community, and makes sure that they have voting members on that WAG that represent all these different industries and different special interests out there. The whole process of the WAG is phenomenal and they provide a lot of opportunity to comment and respond to TMDL development.”

State Watershed Management Framework Weaknesses

The primary weakness noted is the lack of resources (human and financial capital) to complete work within the state. In regard to voluntary landowner work, one interviewee commented, “It’s difficult; you’re trying to change cultures.” In addition, the national recession was noted as a core challenge that is provided little buffer by the State’s minimalist framework. Another interviewee noted, “It’s hard to meet your goals sometimes in a constantly changing environment... A lot of the problems you see are the result of unpredictability.” Highlighting a challenge of the State’s relationship to EPA, “The permitted dischargers perceived a very real situation where they would not be allowed to discharge even though it would have little or nor impact to the receiving waterbody’s water quality, simply because EPA and the State were not controlling the

discharge from agricultural sources...” Another issue noted in Idaho regards beneficial uses, as “All of the waterbodies have the exact same use expectation regardless of ecosystem.”

An additional noted framework weakness is its lack of persistence and capacity building with WAGs. As one interviewee noted, “Once they write the TMDL... they’re pressured pretty highly to move on to the next watershed and get the next TMDL written. There’s really not a lot of funding for those people to kind of team-back and keep working on those relationships with the landowners and try to foster those partnerships so that they can actually move forward and do projects.” Another weaknesses noted by an interviewee is the need for “More people on the ground, because the DEQ Watershed Coordinators that write the TMDLs... coordinate to the point where they get the TMDL written and then there needs to be someone on the ground to pick up the pieces and that’s where I think there’s a huge lacking.”

Interviews also revealed reactionary funding patterns that may not be the most efficient use of resources. An interviewee stated, “...pretty much the only time you can get funding to do watershed management is when you’re already impaired... What about the folks that aren’t impaired and just want to maintain that?” In terms of which agencies are involved in watershed management, “It’s not clear in Idaho.” In terms of institutional efficiency during a recession, an interviewee stated, “We’ve got four different agencies here [managing water]. What’s going on? If you’re looking for flaws or things that can be improved on that might be one of them... In tough budget times, why couldn’t we pool our resources?”

Oregon

Interviewee Background

Key informants (n = 5) had an average professional experience of 14 years.

Watershed Management Goals

Oregon Watershed Enhancement Board's (OWEB) mission statement was noted as reflective of the State's watershed management goals, "To protect and restore healthy watersheds and natural habitats that support thriving communities and strong economies." Interviewees noted goals of addressing limited factors for salmonid and watershed health, comprehensive restoration, voluntary collaboration, integrated science, monitoring, regional economic stability, partnerships, organizational development, and resilience. Interviews indicate that the WMO goals are regionally heterogeneous; coastal WMOs focus on salmon habitat and eastern WMOs focus on water quality/quantity.

In terms of the State, an interview noted, "The goals are to try to address those factors that prevent us from meeting water quality standards [and] prevent the people of Oregon from meeting ESA requirements..." One interviewee noted, "[OWEB is] basically a public foundation [that provides] funding for projects that would enhance watershed processes and functions that would improve conditions in watersheds across the state." An interviewee noted that the OWEB Board "adopted regional priorities for most of the state; [they] are based on TMDL Water Quality Management plans, [and] Species Recovery plans. Sub-basin plans have been developed fish and wildlife resources." Noting the role of the Oregon Plan, an interviewee described the following,

The Oregon Plan is really a framework for how the State addresses issues where there are federal mandates, private property interests, and a public interest in that part of the state to address those federal mandates. It's really a roadmap for collaboration to address those issues. It was developed on a series of about three or four principles. One is that there are federal mandates – there are legal mandates – and we need to address those. Two, that Oregon has a regulatory framework that, while it may not be adequate to meet all of those requirements, it is what it is and it protects to the extent that it does... And, it's important that we have that regulatory framework enforced. Third, that we need to invest in restoration activity and we need to have a source of funds for that restoration investment. Fourth, we need a mechanism to engage citizens at the local level to look at what the needs are compared to the federal requirements and figure out how to get from where they are to where they need to be. That's the logic-train behind the Oregon Plan and OWEB is the funding mechanism for the implementation of that logic-train, from the local analysis to meeting the federal requirements on private lands.

Relationship of State Goals to WMO Goals

Interviewees from both the federal and WMO levels indicated that they were unaware of the presence of State goals related to watershed management. Interview results additionally indicate that both the Oregon Plan and the Oregon Conservation Strategy are considered guiding documents regarding the State's watershed management framework. Results indicate that the Oregon Plan consists of broad State goals related to

water quality and salmon habitat, while the Oregon Conservation Strategy identifies priority habitat for wildlife species. OWEB funding, guided through regional grant review teams, is often considered the mechanism by which the State ensures WMO goal consistency. Interview results additionally indicate that OWEB utilizes watershed councils and Soil and Water Conservation Districts to reach different community groups; Soil and Water Conservation Districts often reach agricultural landowners while watershed councils frequently reach industrial timberland owners, small woodland owners, and urban residents. One interviewee noted that through the Oregon Plan and OWEB funding support, the State is “supporting both councils and districts, and in most instances, they’ve figured out how to work together to be able to work with landowners of all types to reach statewide regional conservation goals.”

Interviews indicate that there are mixed perspectives on whether the State’s watershed management goals are coordinated well with WMOs. One WMO interviewee stated, “A lot of people feel that the state’s goals aren’t aligned with the goals for their watershed council.” Interviews indicate that “OWEB doesn’t form or bless those other organizations as part of the State’s framework, but once every two years [they] run a council support grant process where [they] evaluate the capacity and the effectiveness of each watershed council to determine whether they merit funding for the next two years.” OWEB’s assessment criteria was stated as “who is involved in the council, what their accomplishments have been, what they’re proposing to do, how they view their role in the watershed – are they taking a leadership role in the watershed – this kind of criteria.” In terms of awarding regular grants, results indicate OWEB looks to see if projects fit into priorities, if the projects are feasible, if they’re highly cost effective.

In terms of State interagency coordination related to watershed management, viewpoints diverged. State interviewees tended to perceive a high level of coordination, whereas WMOs often cited a lack of internal consistency as a hindrance – reflective of interests they represent. One interviewee stated, “you’ve got goals in every different department and they’re not necessarily consistent. You’ve got [Department of Environmental Quality] saying one thing, [Department of Fish and Wildlife] saying another, and [Water Resources Department] saying a third... They’re not internally consistent.” In terms of the applicability of State goals to WMOs, a WMO interviewee noted, “They’re not our requirements, they’re the State’s, and we’re not subject to regulation... We use them as guideposts, but we make our own decisions.”

Regarding the relationship of the State and WMO goals, an interviewee stated, “The State is not proactive in trying to have their goals reflected in local organizations. It’s just not how it works. Kind of the opposite is true; the local organizations are trying to get the State to implement in their own goals.” OWEB is perceived as using funding to achieve its goals on regional scale. “One [way to coordinate State and WMO goals] is that we developed a Watershed Assessment Manual and have funded watershed assessments around the state so folks are using the same set of lenses to look at degradation of watershed processes. The other is, through our funding, we have regional review processes that look at proposed projects and try to align those with the regional priorities.” However, one WMO interviewee indicated, “Even within the basin, different agencies have different goals... that’s one thing that makes it difficult [to know] what to focus on. There isn’t a comprehensive set of goals that I’m aware of.” Perspectives on State and WMO goal integration were highly heterogeneous.

Measuring Watershed Management Progress

In terms of WMO progress, one interviewee indicated, “Restoration outputs are just part of it. What [they] want to see is that there are restoration outcomes happening because the council exists and because of the work that the council’s doing, but not necessarily that the council itself is doing those restoration projects.” Interviews further indicate that progress toward meeting salmon habitat and waters quality goals is measured by Department of Environmental Quality and Department of Fish and Wildlife, rather than OWEB. The State uses the Oregon Watershed Restoration Inventory (OWRI) to measure outputs as well, according to interviews. Interviews indicate that WMOs contrarily focus on measuring outputs, rather than outcomes. Responses indicate that while there’s a lot of effort around the state to get to outcomes, the difficulty of measuring outcomes is a major constraint. In terms of effectiveness, one interviewee responded, “It is a constant struggle to document what the changes are. We’re trying to address that in a couple of ways. One is, we’re looking across certain types of activities like placement of large wood in streams, fencing streams from channel use, and looking at the effectiveness of those types of activities on an individual project basis. We’re looking at the effectiveness of individual projects.” Additionally, “in some targeted areas, we have a couple of model watersheds where we’re looking at all of the activities in that watershed, we’re looking at looking at changes that have occurred through time.” The interviewee closed,

And, then the third effort that we’ve got is the targeted investment for specific outcomes. We’ve got two places where we’re doing that: one is in the Upper

Deschutes where we're addressing fish passage barriers, habitat conditions, and flow conditions that limit the survival of reintroduced anadromous fish above Pelton-Round Butte Dam. Since they're being reintroduced, we're investing in activities that would ensure their survival and sustainability. The other area that we're really looking at targeted investment is in the Willamette, where we're looking within the floodplain of the Willamette, at channel complexity, habitat, and reconnection of the river to the floodplain.

Watershed Management Progress Indicator or Metric Source

Interviews indicate that, in some parts of the state, Bonneville Environmental Foundation (BEF) played a key role in the development of metric through its Model Watershed Program. An interviewee noted, "They have intellectual capital that is very valuable that they can share." An interviewee responded, "It's been very useful. It's great to have that kind of third party come in; we all didn't have to argue about who's right about the metrics. It was really good." Oregon Watershed Restoration Inventory was noted as a key source of metrics due to mandatory reporting requirements. OWEB was also noted for maintaining a limiting factors database. Additional interviews indicate, "There's not a standard set of metrics across the state; everyone does their own" at the WMO level. Interviews indicate that OWEB has looked to researchers at the University of Oregon and Oregon State University to develop a monitoring methodology "that provides us with tools in looking at what kind of changes we're bringing about versus what kind of changes are happening to the [Willamette] River through other causes."

Interview results further demonstrate that OWEB considers both micro-scale watershed-level metrics and macro-scale statewide metrics. At the micro-level, “Typically, the metrics are specific to the types of activities that we’re trying to get to. For example, in the Upper Deschutes, the metrics are elimination of all barriers... That’s one of the metrics we’re looking at. The other is flow... The metrics are defined related to the objectives of the investment.” At the macro-level, “Broad-scale, the metrics that we’re looking at are trying to achieve water quality standards that are adopted by DEQ and approved by EPA, but we’re not going to meet those everywhere all the time. What we’re trying to do is figure out ways we can target our investments, meet the objectives for those, and then move on.” Interviews indicate that the tool OWEB currently relies upon to direct these targeted investments is its Special Investments Partnership (SIP) program, which incorporates outside funding from major NPO partners and hydro-mitigation funds.

State and WMO Long-Term Financial Prospects

Interviews indicate that the long-term financial outlook is uncharacteristically stable for a State watershed management framework. While deep concerns about the national economy and its impact on Oregon’s economy exists, voters passed Measure 76 through a citizens initiative in 2010, constitutionally guaranteeing state-level funding support for watershed management. Additionally, a number of WMOs are involved in projects with stable long-term outside funding sources, typically stemming from federal partnerships or hydro-mitigation/litigation Bonneville Power Administration/National Fish and Wildlife Foundation funding. Interviews indicate that the Oregon Department of

Agriculture is also actively funds restoration work. Federal funding, outside of special partnerships, is noted for being highly volatile and currently on the decline. As one interviewee noted, “It would be crazy to have an organization that relies upon federal money, because it’s just not going to be reliable. We put [federal money] in the ‘windfall’ category.” The interviewee additionally noted, “I don’t expect that we’ll see any federal money for a while.” In contrast, OWEB expects about \$55 million per biennium for watershed management grants. “For OWEB, Measure 76 just gave them a long-term lease on life with a funding stream... They’re going to be able to do some interesting things, based on that kind of long-term security.”

Interviews also indicate that there is a split in framework prospects between State agencies and WMOs. “For local grant programs, the prospects are good... In terms of state agencies and the state framework for supporting local efforts, things are not looking so rosy.” Further, “The local biologists, watermasters, and other folks on the ground who are integral to helping councils and districts and landowners develop projects may not be there.” In terms of the split’s long-term effect, “It may change what we fund... We’ve been able to focus our dollars on the on-the-ground work. We may need to focus more of those dollars on the upfront design and planning. Folks who would have normally relied on someone from the state or federal agency to help design a project might actually need to hire a contractor to do that.” In terms of OWEB’s capacity to address this change, “We don’t feel like we have the expertise onboard. We’ve relied heavily on those other agencies to bring their expertise and perspectives on whether something is truly a limiting factor and whether the project is going to adequately address that and it’s the right solution.”

For WMOs, interviews indicate that the recession has a “trickle-down” effect. WMOs that rely on water banking note the additional challenge of Water Resource Department’s reliance on the hard-hit General Fund, as “It just gets pounded in these economic times... Our ability to move forward and get flow restoration is definitely hampered by the capacity of the [Water Resources Department]... We’re just going to all limp along.” Interviews note the importance of a diverse portfolio of funding during a recession, with some WMOs receiving funding from private, local, special district, state, federal, and major non-profit sources, which fund different types of work and have a hodgepodge of correlations with the economy at large. One WMO interviewee simply put it, “We’re fortunate to have a diversity of funding.”

State Watershed Management Framework Strengths

OWEB’s continued support provided to watersheds was noted as the strongest feature of watershed management in the state, followed by local stakeholder involvement. Interviews indicate, “OWEB has done a fantastic job making sure that watershed councils have funding” and “The local [support] and the dedicated funding are clearly the two strongest features.” Interviews further indicate that while there are a number of agencies involved in watershed management work in Oregon, “They each have their own agency perspective, but when it comes together there is usually somebody that covers every project [OWEB] has.” One interviewee summarized, “We have a policy framework that is more favorable than basically any other Western state. We also have guiding lights like the Oregon Plan; these are great documents. There’s vision and there’s good goals out

there.” OWEB’s Special Investment Partnerships program is noted as another core strength of the State’s framework. A final interviewee summarized these points,

The things that I am most proud of are 1) the watershed assessment approach that we have adopted that is available for local groups to start to build a sheer understanding of the function of the watershed, 2) the fact that the State has dedicated continued funding for watershed restoration at the local level, which includes funding watershed councils at the local level, and 3) that the State has developed a cooperative effort among State agencies in exploring ways in which we could achieve these common objectives

State Watershed Management Framework Weaknesses

One noted weakness of the framework is that it is difficult to determine the outcome of investments in watershed management, making it difficult to communicate results to the legislature. Additionally, interviewees responded, “There are several different plans. Trying to pick which one you want to use can be confusing.” Some interviewees also noted that the primary challenge is funding, a perspective shared throughout the four states. Interviews in particular noted the desire for more operational funding in rural areas, where municipal funding is not available. As one interviewee noted, “Funding is the thing that limits everything else.” Another common perspective across the states was the decline in funding support for natural resource management agencies in terms of their portion of total state funding. As one interviewee observed, “It’s a change in State priorities.” The interviewee noted that natural resource agencies

went from 5% of the State's budget to 1% over the past two decades. An additional challenge noted by an interviewee in Oregon is perceived to stem from the effectiveness of its State land use laws, is the lack of land and water acquisition non-profits, such as land trusts.

In terms of improvements, interviews show that the State is working to enhance coordination. As one interviewee noted, "The perennial effort is to coordinate state agencies priorities and strategies better. There's an ongoing effort right now to develop an Integrated Water Resource Strategy... How [the Oregon Plan and Oregon Conservation Strategy] get integrated better into priorities for grant evaluation is an ongoing issue." An additional weakness mentioned by one interviewee is the time to get water certificates in-stream, which was noted as taking two years, due to Water Resources Department's lengthy process. The interviewee noted, although the State tried to expedite the process in the past, "In some cases it actually took longer... Water Resources Department has never been able to get a capacity built to handle the new reality." Interviews indicate that some of this bottleneck is due to an increased rate of transfers, which cover "7,000 acres of irrigated land every year." Interviews implied that a big part of this change is due to water banking in the basin and Water Resources Department's constraint regarding capacity "comes down to a cost issue – a head count, really." In regard to OWEB's strategy, an interviewee additionally commented,

[OWEB is] based on a list of projects... Above the line you fund, and below the line, you don't... It's not necessarily according to any strategy; it's just a project. When you do business that way, you reduce everything to a one project-at-time

look. Often times, stringing projects together doesn't give you the answer... Or, you spread your money so thin that you couldn't possibly have a watershed impact...

To address these concerns, the interviewee suggested, "OWEB and others need to focus on all of the elements that need to be put together for a watershed and try to ensure that all of those components are getting delivered and getting funded... The processes and structures aren't setup to actually do that." The interviewee further noted, "There's no place to plug into the vision and the strategies that the Oregon Plan might talk about. The most frustrating thing about the State process is the lack of strategy." The interviewee summarized, "I think they could setup something that would be a vast improvement beyond sprinkling money over the state." Results indicate that OWEB's Strategic Investment Partnerships program is designed to address some of these concerns.

Additional noted concerns are State's pertinence issue and rules of enlargement, attached to prior appropriate water right law. Summarizing these concerns, "there's no easy way for them to reduce the amount of water on their land. If they could, we could actually setup a market... but the in-stream transfer would be considered enlargement." Another problem noted about Oregon is the structure of the State, in which each agency has an independent board and commission, rather than a Director appointed by the Governor. An interviewee described, "[The Directors'] loyalty is with the commission, not with the Governor. So, it takes a strong Governor to have State agencies move in a similar direction." An interviewee noted, as a result, "When strong leadership disappears, the agencies run into their silos. That's a problem." Another problem noted is State-

federal coordination. An interviewee commented, “[The federal agency] response is often going to go back to a regulatory solution to all problems.”

When asked about the existence of state agency competition, an interviewee commented, “They always do... We’re fighting over scraps on the natural resource side.” The interviewee further noted, “[Outside] increasing demands, because of other priorities, have squeezed out natural resources, which have never been a particularly large percentage of the General Fund budget.” Asked where the State is going with watershed management in the future, an interviewee noted, “I see it becoming more systematic and I see that there is greater demand to have targeted investment. The problem is, there are more targets than investments. We’re struggling with how to deal with that...”

Summarizing this challenge, “What [OWEB’s] Board sees is that we’re more accountable for the outcomes when we’re targeting specific geographic areas with specific outcomes. The downside of that it becomes more difficult to reach all parts of the state.” Finally, an interviewee noted that at the WMO level, “It really is clear that you have to have the right mix of people and issues and external support. When you get those together, great things can happen.”

Washington

Interviewee Background

Key informants (n = 5) had an average combined experience of 12 years.

Watershed Management Goals

Summarizing the impetus for state-level watershed management efforts, a State interviewee noted, “Basically, the idea was to get the community involved in determining at the basin level what their plans, preferences, and priorities were for water distribution and water allocation. That was why they came up with a watershed plan...” The interviewee explained, in essence, “The goal of the planning process was to develop this plan that would guide future water use and land use decisions.” Another interviewee indicated that the primary goal of watershed management is related to water quantity, water quality, and fish habitat in the watershed. The interviewee further noted that Planning Units create a Watershed Plan and an implementation plan, which consists of a list of projects. Watershed goals are noted as ensuring that there’s enough water for current uses and 20 years of future growth.

The State interviewee further noted that coordination with salmon recovery planning is done at two levels: Planning Unit and Regional Organization. In sum, an interviewee responded, “The Planning Unit has identified a number of actions and... plans and implements those projects. The higher-level coordination is done on a [Regional Organization] that coordinates region-wide restoration actions of the various Planning Units.” In short, Salmon Recovery Planning Act “[Regional Organizations] coordinate the salmon recovery restoration, but the actual implementation is done through the [Watershed Planning Act] Planning Units.”

Interpretations of watershed management goals came into question in an interview, as even within Ecology (who operate the Watershed Planning Program), there exists an additional Watershed Unit charged with implementing the CWA through

TMDLs. As the State interviewee commented, “We have to be careful of what we’re talking about with watershed management goals...” Interviews indicate that the Salmon Recovery Act plays an additional role in watershed management, run through Recreation and Conservation Office (RCO) and Governor’s Salmon Recovery Office (GSRO), which overlaps with the Watershed Planning Act through an MOU between Recreation and Conservation Office, Department of Ecology, Department of Fish and Wildlife, and Governor’s Salmon Recovery Office). Indicating the pragmatic nature of the MOU, an interviewee commented, “The goals were mutual where they could be.”

Interviews indicate that Ecology’s water banking, once restricted to the Yakima Valley by statute, now operates on a statewide scale. An interviewee noted, “You could previously use trust water, but not an actual water bank.” The interviewee further noted that water banking is “a form of watershed management because then there’s certainty... We know what the future looks like from a quantity level better so that we can continue to do other parts of watershed management. It depends on how you define watershed management.” Ambiguity related to the definition of watershed management was not unique to Washington, but additionally arose in Idaho and California. Oregon was the only state in the study that had a relatively consistent definition of watershed management.

In addition to debate surrounding the meaning of watershed management, interview results indicate that a lot of confusion exists related to the State’s watershed management goals, as well as the presence of Ecology’s Watershed Planning Program and the Watershed Planning Act. Two of the five key informants, both representing Lead Entities involved in salmon recovery planning at a watershed-scale, were unaware of any

state-level watershed management goals. One of these two interviewees flatly stated, “There aren’t watershed councils in the state of Washington; there are things called Lead Entities... but, that’s not watershed management.” Another interviewee commented, “The watershed planning that comes to mind is the salmon recovery planning that’s based on a watershed level. I don’t have any knowledge of how or if that’s related to State watershed planning.”

Although the State made an effort to link watershed and salmon recovery planning through MOU while additionally conducting a recent substantial coordination study, Lead Entities involved in salmon recovery planning appear largely uninformed of the State’s connected watershed management program. The “Washington Way” to salmon recovery stresses its bottom-up watershed-scale approach to addressing the four H’s (habitat, hatcheries, harvest, and hydropower), appearing to have substantial overlap with state-level watershed management. In fact, roughly half of the WRIAs in the state are engaged in both watershed and salmon recovery planning as defined by statute, according to a recent report from Recreation and Conservation Office in response to SHB 2157 regarding coordination of watershed and salmon recovery planning (State of Washington: Recreation and Conservation Office, 2011). An interviewee noted that although the Puget Sound basin has many Lead Entities active in salmon recovery, many of the basin’s watershed Planning Units were dissolved due to tribal concerns related to quantifying water rights dating back to the Treaty of 1855. In addition, local governments of the highly urbanized “sea of people” Puget Sound basin were described as having enough funding and staff to maintain their own resource management programs. This finding related to urbanization providing local support is similar to the highly urbanized

areas of Southern California, home to the active and relatively well-heeled Santa Ana Watershed Project Authority (SAWPA), as well as Southern Idaho with its locally supported Lower Boise Watershed Council.

Relationship of State Goals to WMO Goals

The primary mechanism mentioned that relates State and WMO goals are grants. As one interviewee plainly noted, “[Ecology] decides who does and doesn’t get grants.” The interviewee indicated that the focus is on in-stream flow rules between basins. The interviewee further noted, “Grants help watershed Planning Units develop a watershed plan that has to address water quantity, and they can also address [water] quality, habitat and storage... mainly, [watershed plans] have to have in-stream flows; they have to have this water quantity component.” In terms of developing watershed plans, an interviewee noted, “The planning unit is very much the driver of the content of these watershed plans; that was their responsibility to come up with the plan.” Interviews note that after funding the development of the watershed plans for five years, Ecology’s Watershed Planning Program provides an additional five years of competitive grants for implementation while requiring a 10% match, after which only a limited pot of operational and special project funds exists.

In terms of what makes a project competitive, an interviewee noted, “[Ecology is] really focusing on the areas now where [there is] a heavy demand for water, such as a backlog in water right application permits, known growth issues, and known water supply problems.” In short, the State’s watershed planning priorities are “where the resource demand is high and on the edge” due to population growth and high water demand,

according to the interviewee. Additional interviewees indicate that the State is more broadly focused than WMOs, but shares many goals and are members of Planning Units. Furthermore, results show that Ecology ensures consistency with State goals by participating directly with Planning Units in the development of plans; the State stays engaged.

Measuring Watershed Management Progress

In terms of measuring progress, an interviewee mentioned that there's a regular metric that Ecology reports to the Governor's Office, "...but it's not very robust. It's just the number of watershed plans that have been adopted." Additionally, "If the timeframe was truncated by anything less than it normally takes to do this without a watershed planning process, [Ecology would] measure that a success." The interviewee further responded, "Another way is to look at those cases where we've used our capital budget to build or repair or remove something that provides more water in-stream or opens more habitat." Furthermore, "Parallel to [their] operating grants, [Ecology has] a capital grant program, which has a proviso titled 'Watershed Plan Implementation and Flow Achievement.' By implementing watershed plans, [WMOs] are achieving higher flows than [they] had, which is in most cases a good thing." Interviews indicate that the capital budget (funded by state bonds) provides funding for water efficiency activities, which are simply measured in terms of cubic feet per second of flow (cfs). At the local level, an interviewee noted, "We track the amount of water debited against the reserves. Watershed plans essentially identify the amount of water available for different kinds of growth." The interviewee additionally noted, "We also track accomplishments via a

Habitat Work Schedule, an online database that reflects projects to restore habitat. Those two are the primary ways of tracking progress...”

Watershed Management Progress Indicator or Metric Source

While research indicates that the previously mentioned Habitat Work Schedule uses metrics derived from NOAA Fisheries and the PCSRF data dictionary (State of Washington, 2009), interviewees were unaware of the source of the metrics. As one interviewee responded, “I don’t know who exactly developed those metrics.”

State and WMO Long-Term Financial Prospects

Overall, State long-term financial prospects were noted as “Not very good, but it depends on how we define what watershed management is. At a grant level, where [Ecology is] providing money to local units of government, it’s not looking very good.” As the interviewee noted, “It’s really going to be tough this year because [Ecology’s Watershed Planning Program] funding was cut 52% from the year before, so not only are we working in high priority basins like we were this period, we’re going to have to be in the highest of the high priority basins.” However, the interviewee stated that the funding change was split between the capital and operating budgets, receiving a \$4 million larger capital appropriation this year while having the operating budget cut by \$5.93 million.

The interviewee explained that the State’s credit rating recently declined and that there’s a law mandating capital budgets only comprise a certain percentage of operating budgets, as the operating budget must be used to pay for the interest expense generated by the state bonds that fund the capital budget. In short, “The way that the State structures

the capital budget is dependent on the state's economy, and when the state's economy is not very good, the State's credit isn't as good, or you can't float as many bonds. So, the bond cycle just goes up and down." Interviews note that the General Fund is hard-hit during recessions and Ecology recently reduced staffing levels.

In terms of WMOs, the responses were mixed. Watershed Units (funded by Ecology's Watershed Planning Program) and Lead Entities (funded by the Salmon Recovery Funding Board within Recreation and Conservation Office) reported positive long-term financial prospects when a diversity of funding sources were available. As one such Planning Unit interviewee noted, State funds don't "make up a huge part [of funding], but it's a critical part because it's administrative funding. Many of the funders want to fund actions on the ground and so it's challenging to find administrative funds to keep the planning unit together." Furthermore, "The State provides very critical administrative funding for watershed plan implementation and that may be going away. Certainly, it will be more competitive." Administrative funding was noted as stemming from the State's operational funding (General Fund), which is heavily impacted in recessions.

In terms of the WMOs in general, interviews indicate that prospects are highly heterogeneous between basins. In terms of what the result of declining State funds will be on Planning Units, an interviewee clearly noted, "I don't know what's going to happen to them." However, Ecology's Watershed Planning Program already had a funding sunset of ten years, already generating substantial uncertainty. When asked what happens after the sunset, an interviewee responded, "That's the million dollar question... there's just very little money, so it's very, very competitive." Another interviewee stated, "At the end of

five years, what happens to these watershed groups? That is a very challenging issue... We started to see [the] first group of people having gone through the entire process... how are they going to get money?"

State Watershed Management Frameworks Strengths

The most common framework strength reported was that efforts are locally driven. In terms of affected stakeholders, one interviewee noted, "It's critical for them to be involved... If the landowners don't support it, there's no chance of any actions getting on the ground. That is the single most critical thing of a successful watershed plan." A separate interviewee noted, as a result of local involvement, "the trust between local groups and Ecology to have a discussion about water at a much better level than they've ever been able to have it before... The dialogue on water use and allocation improved. When you do that, you also improve certainty." Interviews further indicated that the planning process produces local buy-in ahead of time from the counties, making it easier for Ecology to administer grants, in turn increasing certainty for developers. Another key strength mentioned is State support. "If [the State] want it to be successful, they need to [continue to] provide support." A final strength mentioned is the State's coordination with local salmon restoration plans developed at the federal level.

State Watershed Management Framework Weaknesses

One of the most frequently mentioned weaknesses of the framework is the aforementioned ten-year funding sunset facing Planning Units. Reflecting an oft-heard sentiment, one interviewee stated, "I'd like to see a longer horizon for funding." Another

interviewee noted, “A weakness is just funding; having they money to do things called for; having the monitoring to determine ‘are those actions doing what we want them to?’ The third potential weakness would be landowner burnout.” In regard to landowners, “even though they support the actions, at some point they just get tired of always providing access to the river, etc. There is turnover too, so that is a challenge. The frequency is everything from a year to ten years.”

An interviewee additionally noted that water right applications cost users \$50, but cost the State \$10,000 to make a decision. As a result, “What [Ecology] tried to do in the legislature this year is to have the water users pay for services.” The interviewee noted that many use this water to generate profits while “not paying anything for the water,” which is effectively subsidized by taxpayers. Along the same lines, the interviewee noted, “We need a better enforcement program for water right abuse.” Further, the interviewee noted, “The biggest thing that’s the most important for us is managing climate change... The hydrographs are changing.” Interviews indicate Ecology is looking at Aquifer Storage and Recovery to alleviate climatic fluctuations, as is practices in parts of California, but the location of such aquifers is currently posing a logistical delivery problem.

CHAPTER V

ANALYSIS, CONCLUSIONS, AND RECOMMENDATIONS

Analysis

This section of the findings discusses ten state-level watershed management framework features in a comparative context:

1. Three types of watershed management
2. Watershed management priorities
3. Agency coordination
 - a. Coordination mechanism
 - b. Clearly defined agency roles and programmatic support
 - c. Presence of a lead agency
 - d. Diversity of different signatory agencies/department roles
4. Centralization/Decentralization
5. Agency communication
6. Funding: Amount, diversity, and stability
7. Geographic scale of programs and activities
8. Local-Level Partnerships
9. Technical assistance or staff and information-sharing support
10. Research, experimentation, and pilot project support

Three Types of Watershed Management

Three generalized definitions of “watershed management” arose during the process of this study: (1) the Watershed Protection Approach (WPA), (2) comprehensive watershed management, and (3) watershed-based salmon recovery. The varying models reflect three fundamentally distinctive frameworks for watershed management, based on differences in structure and priorities. Although predated by GWEB, EPA’s 1991 Watershed Protection Approach to water quality management offered the first clear nationwide model framework for state-level watershed management. Findings indicate that the Watershed Protection Approach not only acted as a model for States to CWA-driven address non-point source pollution, but also grew into the foundation for many comprehensive state-level watershed management frameworks, which in many cases cultivated a practical vehicle through which to implement ESA-driven salmonid recovery efforts.

Comprehensive watershed management is characterized by collaborative, community based, comprehensive, and integrated natural resource management at a watershed scale, fundamentally driven by providing grants to local WMOs. While the Watershed Protection Approach is often a ‘top-down’ approach focused on water quality via TMDLs, comprehensive watershed management is often ‘bottom-up’ and focused on multiple objectives. However, State implementations of the Watershed Protection Approach often built the institutional capacity for comprehensive WMO-driven watershed management, as occurred in California and Washington. In turn, the landowner-backed comprehensive focus of WMOs often built the institutional capacity

for States to implement salmonid recovery efforts, which necessitate the organized voluntary involvement of local private landowners in order to attain recovery goals.

While Washington's Regional Fisheries Enhancement Groups and California's Fisheries Restoration Grant Program both predate state-supported comprehensive watershed management, Oregon and Washington's state-level salmon recovery efforts relied upon an existing or co-developed comprehensive WMO-driven watershed management framework. Examples include Idaho's Bull Trout Conservation Plan, the 'Washington Way' to salmon recovery via the Watershed and Salmon Recovery Planning Acts, the Oregon Coast Salmon Recovery Initiative that grew into the Oregon Plan and Oregon Conservation Strategy, as well as California's Fisheries Restoration Grant Program and Coho Salmon Recovery Strategy. Many of these regional salmonid recovery efforts are fueled in large part by national PCSRF funding.

Watershed-based salmon recovery represents a unique framework for watershed management. Watershed-based salmon recovery often addresses everything from water quantity (minimum instream flows and assimilative capacity), water quality (i.e. loading, temperature, turbidity), fish passage barriers (i.e. culverts), water diversions (i.e., fish screens), etc., which link to a comprehensive set of watershed land uses addressable through WMOs. While some salmon recovery efforts have historically only funneled money to restoration efforts, current efforts in Oregon, Washington, and Idaho fundamentally link comprehensive watershed management to salmonid recovery.

California offers perhaps the only State within which these two efforts are not explicitly linked; WMOs merely have the ability to receive PCSRF-based salmon recovery grants, funneled through Department of Fish and Game. In Idaho, the

WAG/BAG framework and Bull Trout Conservation Plan are explicitly linked, though separate, efforts where salmon recovery planning does not offer a framework for watershed management. In Oregon, salmonid recovery is fundamentally tied to watershed management through a single grant-providing entity, OWEB, which receives and distributes PCSRF funds in support of the Oregon Plan for Salmon and Watersheds. Oregon is thus the only State with a comprehensive WMO-driven watershed management program directly supported by PCSRF funds, requiring a high level of effort integration.

Washington’s salmon recovery framework remains distinct from its comprehensive watershed management framework, but the two are highly interwoven where watershed Planning Units overlap with salmon recovery Lead Entities and Regional Organizations. In the Puget Sound basin, where Planning Units are largely absent, counties and Special Districts essentially fill the role of the Planning Unit, with the salmon recovery framework driving State watershed management activities. An analysis of Washington’s salmon recovery framework – similar in genesis, formal institutions, roles, and activities to comprehensive watershed management – suggests that salmon recovery in Washington offers a distinct state-level watershed management framework focused on salmonid recovery. The various watershed management frameworks are shown in Table 4.

Table 4. Watershed Management Frameworks

	Comprehensive	EPA WPA	Salmon Recovery
California	X	X	
Idaho		X	
Oregon	X	in development	X
Washington	X	X	X

Watershed Management Priorities

The watershed management priorities of the states are largely indicated through funding analysis and are represented in Table 5. In California, as indicated by interviews, the vast majority of watershed management efforts are focused on addressing water quantity and water quality vis-à-vis assimilative capacity. The focus on water quantity stems from a high level of historical growth, both population and economic, in a semi-arid state. Interviews indicate that even in the more remote regions of Northern California, watershed management efforts are largely focused on issues of water quantity that link directly to Central and Southern California through the State Water Project and Central Valley Project. By addressing the contentious issue of water quantity, California WMOs can effectively address issues related to riparian habitat (i.e., salmonid and pelagic organism habitat) and water quality (i.e., TMDLs). Much of this focus is centered on the Bay-Delta System; Northern California WMOs manage flows into the System while agricultural Central Valley and urban Southern California interests contend for access to the System's water resources. The focus on water quantity correlates with differences in priorities in California, as well as differences in management scale, including regions and hydropolitical boundaries.

Table 5. Comparative Analysis of Watershed Management Core Focal Issues

	Water Quantity	Water Quality	Habitat
California	X		
Idaho		X	
Oregon	X	X	X
Washington	X		X

In contrast, Idaho's watershed management is focused almost entirely on water quality, through the use of WAGs and BAGs that advise Department of Environmental Quality and EPA on TMDLs. Though TMDLs carry a direct connection to water quantity, the role of BAGs and WAGs is decidedly oriented toward addressing water quality. While interviews indicate that the state has a distinct north-south divide, with salmonid habitat concerns in the north and water quantity concerns in the arid agricultural and urbanizing south, findings indicate that these issues are secondary and tertiary in priority to the development and implementation of TMDLs (also known as Water Quality Improvement Plans).

Washington's watershed management focus is indicated through its funding priorities, which are directed at a high degree to salmon recovery efforts through the 'Washington Way' to salmon recovery. The State offers a host of programs and funding dedicated to salmon recovery, fueled in large part by federal PCSRF and hydro-mitigation funds, while offering minimal funding support to WMOs, which were substantially impacted by the recession. Within Department of Ecology, the Watershed Planning Program is additionally focused on water quantity to address concerns related to regional growth and minimum stream flows for salmonid recovery. As previously noted, water quantity has a significant overlap with salmon recovery efforts due to its affect on riparian habitat and loading. In terms of watershed management, the State of Washington is focused on its steadily funded salmon recovery efforts.

Oregon's framework and focal issues are indicated by findings and the content of the Oregon Plan. As the Oregon Plan suggests, the State offers a blend of the other three state-level perspectives, focusing on WMO support to implement its state-level watershed

management and salmon recovery efforts by addressing each of the three major priorities: water quantity, water quality, and salmonid recovery. In effect, Oregon's watershed management framework is the most comprehensive in scope of all the case study states and is supported by a high degree of interagency cooperation and support. Oregon is additionally well poised to address these priorities by linking watershed management to salmonid recovery directly through a single core plan and a single, stable, well funded grant support agency, providing explicit support to statute-defined WMOs.

Agency Coordination

Since watershed management activities typically involve multiple agencies, this analysis section compares aspects related to the coordination of watershed management efforts across the four states.

Coordination Mechanism

Oregon utilizes the aforementioned Oregon Plan for Salmon and Watersheds, as well as the Oregon Plan Teams to integrate efforts across agencies and regions. In Washington, the Watershed Planning Act and Salmon Recovery Planning Act are tied together via MOU. Salmon recovery Lead Organizations provide oversight to Planning Units within ESA Evolutionarily Significant Units. In Water Resource Inventory Areas where Planning Units and Lead Entities overlap, efforts frequently are enmeshed. In California, the Statewide Watershed Program Advisory Committee oversees the Statewide Watershed Program, which exists in relative isolation and is still in development, with an interagency coordinating committee noted in the framework

document. Notwithstanding additional funding, California's oversight committees may remain relatively inactive. In Idaho, WAGs are directly connected to DEQ through BAGs, hence committees to facilitate agency relationships may not be necessary.

Clearly Defined Agency Roles and Programmatic Support

A core challenge of conducting this study was locating explicit state-level watershed management framework documents. Only Oregon offers a single, clear, readily available, biannually updated framework document. However, even Oregon's framework does not comprehensively report each State agency's relationship to the Oregon Plan in terms of programmatic, technical, and staff support. However, the Oregon Plan lists each State agency involved, along with their fundamental roles and actions. Washington's watershed planning framework is the next most transparent, stemming from a MOU linking together the Watershed Planning Act with the Salmon Recovery Planning Act. In addition to the roles outlined in the Acts, the MOU outlines how the State intends to integrate its watershed management and watershed-based salmon recovery efforts. The MOU has an estimated date of 1998 (it is not stated), the same year the Acts passed. The purpose of the MOU was to (1) clarify the roles and responsibilities of participating State agencies, (2) foster interagency and interjurisdictional cooperation, and (3) coordinate and simplify implementation of the Acts. However, State agency support remains murky at best and the MOU was written approximately a decade ago.

California's watershed management framework is based on Department of Conservation's Statewide Watershed Program, formerly the CALFED Watershed Program. As the CALFED Watershed Program was coordinated through 2001 MOU, the

Statewide Watershed Program that replaced it is coordinated through a similar MOU dating from 2004 called the “Framework for Protecting California’s Watersheds.” While the CALFED MOU involved multiple State and federal agencies, the Statewide Watershed Program MOU was entered by two cabinet-level State “super agencies,” Cal/EPA and Natural Resources Agency. The MOU offers no clear explanation of State agency roles or support activities, while the California Agency Watershed Strategic Plan: 18-Month Action Plan that it produced offers little more than the agencies involved and a list of work to be done six years ago. The elements of the Action Plan that were successfully completed remains largely unknown. Finally, Idaho’s newly updated Department of Environmental Quality website offers a clear description of the BAG/WAG framework. However, State agency coordination or support is not explicitly detailed. Overall, the lack of information available for every State with the exception of Oregon severely impacted watershed management framework clarity and transparency, likely damaging the State agency coordination, as well as extra-State organization communication.

Presence of a Framework Lead

Although Idaho’s framework superficially appears to have little coordination to lead, Department of Environmental Quality fundamentally acts as the lead since it is charged with developing and implementing TMDLs with the input of BAGs and WAGs. California, in contrast, has a host of State agencies, departments, commissions, boards, authorities and conservancies to coordinate under the MOU and Action Plan. However, it appears that no State agency is leading coordination, as program implementation beyond

the current Statewide Watershed Program has largely fallen through the cracks due to budgetary and legislative setbacks.

Washington's watershed management framework is split between two entities that each act as a lead for their specific roles related to watershed management and salmonid recovery: Department of Ecology and Recreation and Conservation Office, respectively. Washington's Joint Natural Resources Cabinet spearheaded framework coordination in requesting the MOU related to the Acts. Coordination in Oregon is fundamentally led through the Oregon Plan Teams, which are overseen by the Governor's Natural Resource Office and OWEB. While OWEB oversees the Outreach and Monitoring Teams, Governor's Natural Resource Office oversees the Core, Implementation and Regional Teams. In terms of day-to-day operations, OWEB essentially acts as the Oregon Plan lead, acting as an information clearinghouse and grant support distributor for both watershed restoration and linked salmon recovery activities. Of all four case study States, only Oregon offers an agency that essentially coordinates framework efforts on a day-to-day basis.

Diversity of Different Signatory Agency/Department Roles

California's 2004 MOU is split between the Natural Resources Agency and Cal/EPA, who represent the only signatories and include a host of natural resource management and pollution control departments. Even though the Action Plan contained a host of additional State and federal agencies, only Natural Resources Agency and Cal/EPA have entered into a formal framework agreement. Idaho maintains no known coordination mechanism and therefore has no formal framework diversity, though tacit

diversity clearly exists, in addition to other forms of agency support. Signatories to the Oregon Plan include thirteen State agencies almost entirely focused on natural resource management and pollution control, fundamentally similar to California. Finally, Washington's MOU regarding the Acts includes twelve signatories. While the list includes many natural resource management and pollution control agencies, it additionally includes Department of Commerce, Department of Health, and the regionally focused Puget Sound Partnership. In effect, Washington appears to have the greatest diversity of framework signatory agency roles.

Centralization/Decentralization

In effect, every State framework is centralized in its adoption of the Watershed Protection Approach through TMDLs and decentralized in its adoption of comprehensive WMO-supporting watershed management. Idaho's BAG/WAG framework falls under the former category, even though its scope and activities border on comprehensive watershed management. Washington's salmon recovery framework is mixed due to its coordination of local efforts only occurring within explicit portions of the State under Regional Organizations. In terms of agency programmatic centralization, Oregon is exemplary.

Agency Communication

One of the themes that arose in the findings is the sheer lack of communication in many instances between state watershed management efforts and outside entities, even in regard to programs that are enmeshed by MOU. Respondents in Washington and Oregon, where the watershed management frameworks are the strongest and most funded,

frequently noted that they were either unaware of the States' goals related to watershed management, or they were unaware that the states had watershed management programs in general. An additional interviewee at the federal level, who helped design watershed indicators in the Northwest Forest Plan used by the States, mentioned with certainty that no State watershed management frameworks exist; this response was relatively common and indicates that the States need to not only conduct outreach at the local level, but at the watershed-related interjurisdictional level to communicate programs with affected and/or interested parties.

Improvements in communication may potentially increase project capacity and efficiency for WMOs under budgetary constraints, particularly where salmon planning is occurring. Salmon planning and watershed management roles frequently overlap, providing WMOs a potential increase and stabilization in funding during difficult times. Interviewees noted that generating funds through diverse sources is an effective WMO funding strategy, with the largest and most stable funding made available through long-term federal partnerships, strategic investments, hydro-mitigation (salmonid recovery), and municipal partners.

Funding – Amount, Diversity, and Stability

Out of all four case study states, only Oregon appears to provide stable state-level funding directly for watershed management through its Oregon Lottery, PCSRF, and salmon license plate funding sources. However, Oregon was also hit by the recession, both directly through Lottery revenues and indirectly through the loss of partner agencies' capacity to provide technical assistance. Due to a decline in Lottery revenues

for the first time in the agency's history, OWEB effectively ceased funding support for "new applicants" and "solo funding" for the 2011-2013 council support funding cycle. OWEB anticipates making available \$55 million per biennium (\$27.5 million per year) in WMO grant funds in the future, vastly exceeding the essentially zero state funding support provided by Idaho, which relies almost entirely on federal CWA Section 319 funds that recently declined by \$25 million nationwide and have been in decline since 2004. Idaho is on schedule to distribute \$5.6 million in PCSRF salmon recovery funds through the Office of Species Conservation; these funds are not directed specifically at WMOs. In terms of State funding diversity, watershed management in Oregon is marginally more diverse than Idaho. However, Oregon's funding amount and stability offer vastly more support to WMOs than Idaho.

In terms of funding amount, diversity, and stability, California and Washington offer a more complex picture. Both states offer comparatively diverse state-level funding sources with marginal stability. Washington's Ecology Watershed Planning Program is set to provide \$8 million in capital and an estimated \$1.5 million in operating grants for the 2011-2013 biennium, or about \$4.25 million per year. Washington's Salmon Recovery Funding Board distributes an estimated \$18 million per year in State funds, with the bulk of the funds going to restoration projects (36% of all projects from 2000-2008). Finally, Department of Fish and Wildlife's Regional Fisheries Enhancement Group offers about \$2.2 million per year in program funds. In total, Washington's watershed planning and watershed-scale salmon planning receive about \$24.5 million total per year, similar to the amount in Oregon, but from a more diverse array of sources. However, only an estimated \$4.25 million of these funds is available specifically for the

support of WMOs in the form of Planning Units. Additionally, Washington's watershed management funding structure does not appear entirely stable during fluctuations in the economy. Findings indicate Ecology's Watershed Planning Program has been hard-hit by the recent recession.

California's funding for watershed management is available mainly through Department of Conservation's Watershed Coordinator Grant Program, which recently received a sparse \$9.15 million over a three-year period, or about \$3 million per year, funded through Proposition 84. Proposition 50 CALFED Watershed Program grants are not currently available, while related Department of Water Resources IRWM grants, funded through Propositions 1E and 84, are high in amount and sparse in availability. Findings additionally indicate that areas throughout the state with substantially amounts of local wealth tend to receive preference within the IRWM grant process, which was noted for giving priority to organizations with the largest local match funds. California Department of Fish and Game's Fisheries Restoration Grant Program, on the other hand, provides about \$13.5 million per year to improve salmon habitat through watershed improvement projects. Department of State Lands offshore oil and gas lease revenues fund the Fisheries Restoration Grant Program, a funding source that is highly stable compared to California's massive but sporadic Proposition (state bond) funds. Table 6 is based on estimated FY2011 grant support levels for each of the core watershed framework programs within each State related to comprehensive WMO-based watershed management and salmon recovery planning.

Table 6. Estimated FY2011 State and PCSRF Funding Support

State	State & PCSRF Support
California	\$ 20,000,000
Idaho	\$ 6,000,000
Oregon	\$ 30,000,000
Washington	\$ 25,000,000

Data sources: State of California, State of Idaho, State of Oregon, State of Washington,
National Oceanic and Atmospheric Administration

While not the most diverse, Oregon’s watershed management framework has the highest estimated amount of funding from relatively diverse sources and appears to be the most stable. While Washington has diverse, substantial funding in terms of watershed-scale salmon recovery, its support for dedicated WMOs through the Watershed Planning Program is sparse, declining under pressure from the recession. At the surface level, California appears to have a diversity of funding with numerous programs. However, California’s watershed programs tend to be fueled almost entirely through the same few Propositions that offer a large amount of funds in a limited window, creating a high degree of instability and a lack of fundamental diversity. Idaho, on the other hand, offers essentially no state-level funding support for watershed management, instead relying upon federal Section 319 and PCSRF funding not directly intended to support WMOs.

Table 7 is based on estimated state-level watershed management funding sources used explicitly to fund WMOs and WMO activities; this estimate is concerned only with state-level programmatic funding sources and is intended to reflect the stability and capacity of state-level watershed management frameworks, not WMOs. This comparative analysis is offered as findings indicate that many WMOs are dependent upon state-level watershed management frameworks for critical operational funds. Rural WMOs without

strong local funding support and not engaged in outside partnerships (federal or hydro-mitigation) were described as the most dependent on the amount and stability of state-level watershed management framework funding. Hence, the ability of States to consistently offer ample WMO funding is a key determinant of sustainability for both state-level watershed management frameworks and the WMOs that depend on them.

Table 7. Estimated Comparison of Funding Amount, Diversity, and Stability

	Amount	Diversity	Stability
California	High	Low	Low
Idaho	Low	Low	Medium
Oregon	High	Medium	High
Washington	Medium	High	Medium

Watershed Investment Geographic Scale

Findings indicate that States approach watershed management with different investment strategies that vary in terms of scale. Although Idaho offers essentially no financial support for WMOs, it sparsely funds WAGs and BAGs that operate on a statewide scale to develop and implement TMDLs using Section 319 funds. WMOs written into stature, such as the Henry’s Fork Watershed Council, are extremely rare and sporadic in Idaho.

Washington, on the other hand, is highly focused on the Puget Sound region with water quality management and salmon recovery planning, while the same region is largely absent of watershed planning. A reason offered for this lack of watershed planning was given as tribes walking out on the watershed planning process to circumvent having to quantify contentious treaty-based water rights. Department of Ecology’s Watershed Planning Program focus appears to be on addressing the water

supply issues of Eastern Washington for salmon and development, particularly where ESA Evolutionarily Significant Unit-based Regional Organizations overlap; Washington's salmon recovery planning is focused on these same Regional Organization areas and unlike the Watershed Planning Program, is highly active in the heavily populated Puget Sound basin.

While California's funding program for watershed coordinators is statewide through Proposition 84, Proposition 50 CALFED Watershed Program grants still only apply to the Solution Area. Interviews additionally indicate that Southern California receives a disproportionate amount of State funds, due to the sheer number of people and high level of wealth that enables sizeable local match funds. Additionally, the Bay-Delta System receives a high level of support, due to its statewide importance not only to environmental health, but the State's highly coveted economic health. Last, California's IRWM program typically provides funds at the larger basin scale, peppered thinly and sporadically in large sums throughout the State.

Finally, the State of Oregon's watershed management framework is statewide in scale with a watershed council in nearly every watershed throughout the state. The State is also in the process of two Strategic Investment Partnerships where it is working with funders to address a range of issues multiple-watershed- or basin-wide, similar to IRWM in California. Interviewees noted Oregon's Strategic Investment Partnerships and California's IRWM program as each State's most promising future prospects for achieving desired watershed outcomes, a viewpoint supported by recent fisheries-based watershed restoration outcome studies (Roni, et al., 2010).

Local-Level Partnerships

Findings indicate that local-level partnerships are highly heterogeneous across and within states and are essentially only connected to state-level watershed management frameworks through local match, hydro-mitigation, or special project funds. Local government funding support tends to be the greatest where human population levels are the highest while federal support tends to focus on areas with the greatest ecological and cultural significance. Rural non-forested WMOs in non-strategic locations appeared to have the most difficult time connecting with additional partners and funding sources. Non-State WMO partners typically include federal agencies, such as USFS and NRCS, as well as tribes, counties, cities, and special districts. In addition, one WMO reported writing grants for an irrigation district to access previously unattainable watershed funds in exchange for a portion of the awarded funding. Interviews indicate that some of the more aggressive WMO leaders have been successful in attaining a host of outside funds through such creative diversification strategies, while groups with passive outreach strategies tend not to have many funding/technical partners. These aspects were shared across all four case study States.

Technical Assistance or Staff and Information-Sharing Support

In California, technical assistance or staff support is unspecified and appears minimal. Information-sharing support is substantial, particularly through CalFish and the California Environmental Data Exchange Network. However, California offers so many different information-sharing programs related to watershed health and salmonids that the array of offerings is extremely convoluted and uncoordinated. Idaho offers staff technical

assistance by involving affected agencies on both BAGs and WAGs. Idaho's information-sharing support is also minimal, based predominantly on TMDLs and BMPs.

Oregon offers the clearest technical/staff assistance and information-sharing support. Oregon's in-depth technical/staff assistance is clearly outlined within the biennial Oregon Plan reports. Interviews indicate that the recession is hampering Oregon's watershed management framework by reducing the assistance capacity of supporting agencies, even though OWEB remains stable. Oregon's information-sharing support is focused on the Oregon Watershed Restoration Inventory, the self-described largest restoration inventory in the Western United States, in addition to Oregon Explorer, housed at Oregon State University. Oregon's information-sharing support is explicit, detailed and straightforward, making California's support chaotic in comparison. Finally, Washington's technical/staff support is largely unknown, as agency coordination information was not located. Information-sharing support in Washington is focused on Lead Entity Habitat Work Schedules and Department of Fish and Wildlife's SalmonScape.

Research, Experimentation, and Pilot Project Support

While Idaho and California appear to offer relatively little in terms research, experimentation and pilot project support, Oregon is involved in a host of support activities. Not only has Oregon invested substantially in the Grande Ronde Model Watershed, OWEB has a Research Grant program. OWEB also partners with its University System in a number of ways to support State watershed management efforts, through developing indicators, BMPs, and outcome models. Washington, in comparison,

offers relatively little research/experimentation support. Washington's Entiat River and Methow Sub-basin Model Watersheds are in partnership with Bonneville Environmental Foundation (BEF) through its Model Watershed Program, as is the case with Idaho's Clearwater and Teton Model Watersheds, California's Mattole Model Watershed, and Oregon's Coos, Deschutes, and Willamette (involving seven watershed councils) Model Watersheds. Only Oregon's OWEB appears to connect substantial, long-term, dedicated State support to its Model Watershed programs in partnership with BEF, specifically in the Deschutes and Willamette basins through OWEB's Special Investment Partnerships (SIP) program.

Findings indicate that Oregon's long-term basin-wide interagency Special Investment Partnerships are regarded as one of the most promising state-level watershed management efforts in the Pacific Northwest. OWEB's ample, stable long-term funding was noted during interviews for allowing the agency to fund and otherwise support a host of creative, capacity-building activities capable of reaching desired outcomes. Interviews further indicate that a positive correlation exists between OWEB's financial outlook and its ability to support creative projects designed to increase effectiveness. Measure 76's passage was noted for its ability to allow OWEB to offer key support to such creative basin-wide interagency endeavors. California's IRWM program, though similar to Oregon's SIP program in scale, offers little to no capacity building support and is instead focused on sporadically funding integrated water resource management planning and implementation projects throughout the state. Idaho effectively offers no such support while the State of Washington's effort are highly focused on the Puget Sound basin, which offers a host of technical capacity-building support. Washington's closest effort to

Oregon's SIP is its salmon recovery focused Regional Organizations, which link watershed management to salmon recovery in Evolutionarily Significant Units (ESUs) that resemble sub-basins and correspond with multiple Water Resource Inventory Areas (WRIAs).

Conclusions and Recommendations

Unique State Socio-Ecological Contexts

The meaning of watershed management tends to vary across states, as well as between jurisdictions, agencies, and departmental divisions. Approaches to state-level watershed management tend to fluctuate based upon such historically and socio-politically rooted interpretations. In places like California with a long history of intensive development whereby many habitats were extirpated, watershed management represents a relatively low priority for the State. Although water quantity issues are not unique to California, the sheer intensity of water resource use in an arid to semi-arid environment places an exceedingly high level of importance on water quantity. In essence, some might argue that it makes little sense for California to focus on watershed pollutant loading or habitat destruction when these problems are in many ways a product of too little water in-stream. Northern California, with relatively little population and a host of water resources, falls under the state's greater political objective of water resource deliveries from the Bay-Delta System, pushed primarily by agricultural Central Valley and urban Southern California water development interests that fund the State Water Project as the State Water Contractors.

Findings indicate that development interests in California, relying heavily on water resources to generate wealth, take an oft-adversarial position to watershed management and view it as a resource competitor. State-level watershed management in California reflects these larger priorities through its funding, focusing the bulk of its Proposition funds on large infrastructure projects. In addition, the State's budget crisis has hindered efforts over the past decade to fully implement the Statewide Watershed Program. Findings indicate that it is unlikely that California's situation will improve anytime soon even if another Proposition is passed, due to its fundamentally out of balance financial and social-ecological systems.

Idaho has a host of water resources, drastically less population and little development compared to California. The State of Idaho is focused on watershed-scale water quality management to a high degree due to the TMDL lawsuits, with concerns of water quantity in the arid south and salmon recovery in the forested 'panhandle' north. While every state adopted EPA's Watershed Protection Approach to a varying degree in order to address non-point source pollution, Idaho is the only state embracing it as a way of establishing comprehensive watershed management with minimal available State resources. A major likely driver of this approach noted in interviews is the state's libertarian political climate, which places emphasis on a minimalist government role and empowering local landowners. As with California, watershed management in Idaho reflects its larger state context.

While Idaho and California have largely north-south biome divides, Washington and Oregon are split into two relatively shared biomes east-west, with populous forested western biomes and arid agricultural eastern biomes. A focal point of Washington's

western biome is the highly urbanized Puget Sound basin, whose namesake waterbody is in a general state of decline. While watershed management and salmon recovery efforts in western Washington are focused on the Puget Sound, these efforts are focused primarily on mitigating the impacts of the Federal Columbia River Power System in the eastern and southern portions of the state. Washington's relatively ample level of somewhat State funding, along with numerous present Evolutionarily Significant Units with attached federal PCSRF and BPA/NFWF funding, have provided the State with strong support for watershed management through the priority of salmonid recovery. However, the State's focus on water quantity management for both development and salmonids creates a substantial perceived disincentive for the state's many active tribes to participate in the process, particularly in the Puget Sound basin, due to a history of treaty right concerns.

Oregon is unremarkable within the four-state bioregion in terms of the state's overall context related to its economy, level of development, and presence of highly productive ecosystems, which are essentially a blend of the three surrounding case study states. However, Oregon has a distinct climate of political experimentation known as the 'Oregon way' that blends an environmental ethic with local landowner involvement in a way that is unique within the Pacific Northwest. This sociopolitical backdrop and set of values lend well to the priorities and objectives of the State's watershed management. Oregon additionally has the largest estimated per capita State budget of the four states; roughly double that of California and over four times that of Idaho, as shown in Table 8. The State's comparative presence undoubtedly has an impact on its ability to support its policy frameworks. However, such an ability is dependent upon the funding priorities of

a State, which are reflective of not only its challenges, but also its generalized norms and values. As exhibited by California’s highly funded but instable watershed management funding system, most important are the specific sources from which money is allocated.

Table 8. Estimated FY2011 State Expenditure-to-Population Ratios

State	Expenditures (Total)	Population (2010)	<i>Exp:Pop</i> Ratio
California	\$ 136,000,000,000	37,200,000	\$ 3,656
Idaho	\$ 2,400,000,000	1,500,000	\$ 1,600
Oregon	\$ 25,500,000,000	3,800,000	\$ 6,711
Washington	\$ 31,000,000,000	6,700,000	\$ 4,627

Data sources: State of California, State of Idaho, State of Oregon, State of Washington, United States Census Decennial 2010

The Importance of Funding

As existing research notes, “There is a myth that the watershed movement consists of spontaneous, ‘bottom-up,’ local efforts...” (S. M. Born & Genskow, 1999; Getches, 2001 p.183; D. S. Kenney, 1999). Rather, WMO formation and persistence depends heavily upon federal, state and local support. Interviews indicate that state-level funding support for watershed management is acutely crucial to the formation, persistence, and effectiveness of most WMOs. In particular, state-granted operational funding was noted by interviewees as broadly more difficult to acquire than capital funding while equally important in terms of completing projects. While recent recessionary forces impacted every State, the effects were largely heterogeneous. Excluding PCSRF funds, Idaho had its sole Section 319 funds cut, Washington and California watched their programs steadily decline due to a mix of shrinking General Fund and bond funds, and Oregon’s framework was hit primarily in terms of secondary

technical planning assistance from signatory agencies outside OWEB. Much of this outcome is the result of state-level watershed management framework funding amount, stability, diversity, and long-term sustainability.

An example of a departmentally focused State financial strategy, initiative-based State bonds that incur tremendous debt service, lacking direct returns and lawmaker oversight, exhibit obvious financial flaws even in the short term. State agencies often rely upon these funds to boost programmatic efforts and offer some cushion to fluctuating State General Funds more directly connected to the ebbs and flows of the state economy. The trouble is that such agency attempts to stabilize programmatic efforts often comes at the cost of the overall State budget. One interviewee noted that California's bond debt service from Propositions, which support the State's watershed management framework and host of State programs, represents the third largest expense paid by the State General Fund; the State of California pays more in debt service that it does for the expansive and financially strained University of California system. Such funding conflicts are typically reduced to political priorities. In addition to their oft-inefficient nature, state bonds are less insulated from economic shifts than other sources (though more insulated than State General Funds), such as Oregon's use of federal PCSRF and State Lottery funds to support its watershed management framework, also passed through the citizen-based initiative process in Measures 66 and 76.

Based on a foundation of unified watershed and salmon recovery planning, as well as stable State Lottery and PCSRF funding, the Oregon Plan clearly appears to be the financially strongest state-level framework. In contrast, Idaho offers essentially no WMO funding outside of salmon recovery funds absent of any state-level WMO-support

framework. Washington's stable and ample PCSRF funding is somewhat disconnected from the State's Watershed Planning Program, geared specifically toward salmon recovery. And, when Propositions pass in California, a multitude of oft-duplicate watershed-related programs are peppered across a host of agencies in order to divert as much of the short-term programmatic funds as possible; this model for framework funding often leaves both local groups and State agencies stranded, as Proposition funds tend to eventually run as dry as the state's ephemeral streams, unless replaced by a cycle of new Propositions.

Thus, States should seek to model OWEB and the Oregon Plan in their watershed management frameworks by unifying stable, diverse funding sources through a single funding, monitoring and reporting agency. Rather than being a simplistic outcome of populism, Oregon's watershed management framework funding size and source, more than anything, has allowed the state's WMOs to flourish relative to other states. California's semi-populist Proposition funding efforts, for example, have accessed funding large in amount but ephemeral in duration. However, accessing lottery funds in the midst of a State budget crisis is likely not pragmatic, given the contentiousness and realpolitik of funding priorities. Even so, Oregon's use of the initiative system to write stable watershed management funding into its constitution offers a potential method of securing funding during financial crises. California has also shown that it is able to pass massive natural resource management Propositions (initiatives) in the midst of financial crises. However, such short-term Propositions are inherently fleeting.

The Importance of a Focused, Coordinated State Framework to WMOs

The results of this study indicate that the most effective way for a State to ensure longevity for its watershed management framework and corresponding oft-dependent WMOs is to build a focused and efficient comprehensive framework that combines salmonid recovery, water quality/quantity management, and watershed restoration through a single funding, monitoring and reporting clearinghouse, as exhibited in the Oregon Watershed Enhancement Board and the Oregon Plan for Salmon and Watersheds framework document. Vital to the success and longevity of such institutions is the resilience and long-term sustainability of their financial and technical WMO-support mechanisms. During periods of heightened economic constriction, it is important that watershed-planning efforts seek to eliminate duplications of related programs and institutions; particularly those aimed at managed the same set of resources at the same scale. States should combine such duplicate and overlapping efforts into a single coordinating agency and comprehensive framework to increase institutional efficiency and related return on investment.

States should not only eliminate duplicate, overlapping frameworks and programs, they should be fully transparent in their watershed management frameworks. Many States operate watershed management frameworks that are either not fully described or are described across multiple agency websites with disparate update frequency. In modeling the Oregon Plan biennial reports, States should regularly detail on a single document how their framework efforts are funded, which agencies and local entities they involve, what specific programs are part of the framework, how the process

works, what the funding and outputs have been per year, which kind of work is funded, et cetera.

Additionally, States should improve the coordination of monitoring and reporting through a single entity or agency; too often, a host of complicated and murky programs are scattered across the State. In modeling Washington's Recreation and Conservation Office grant resource webpage, States should list all statewide financial resources available to WMOs through a single site. Too often, grant information is also scattered across agencies, even in the presence of a coordinating MOU. In general, States should streamline their watershed management frameworks into a single plan, a single lead agency, and a single web-based source for monitoring, reporting, and WMO-support resources. Designing a watershed management framework in this way can reduce agency competition, operational costs, duplicated efforts, conflicting agency goals, WMO confusion, and agency resistance to change through clear leadership while increasing WMO framework stability, vital voter/legislature support, the number of ground-level outputs, and the likelihood of attaining and communicating framework outcomes.

In addition, States should provide steady long-term operational funding support for WMOs, who often have difficulty accessing such funds and are noted for their exceptional ability to leverage capital funds through a host of sources. At a minimum, States should provide reliable watershed coordinator grant support in order to leverage funds not otherwise currently available during a recession. However, only WMOs that are able to source funding through creative basin-scale partnerships and make the most of available resources are likely to thrive. As with OWEB's Special Investment Partnerships program, States of the Pacific Northwest should not wait for creative partnerships with

large and stable funding sources to bloom on their own, but should instead plant the regional seeds necessary to grow such long-term partnerships. Recent studies suggest that such intensive basin-wide efforts are needed in order for salmon recovery efforts to succeed (Roni, et al., 2010).

It is imperative that States offer scientifically informed, results-driven, creative management frameworks with minimal overhead and explicitly coordinated agency support in order to attract long-term outside partnerships or funding sources. In order to do so, States should support high quality research related to both the ecological and institutional effectiveness of their watershed management frameworks. While Oregon offers what appears to be the most complete model to date, it too must find creative solutions to a host of challenges, including conflicting agency goals, murky future agency program support, absent cross-jurisdiction WMO grant support information, incorporating growth management/climate change, and reaching outcomes to communicate broad investment results to the legislature.

As previously indicated, the sociopolitical and ecological context of every state offers unique challenges. The sheer size and conflicting roles of the State of California's many natural resource management and pollution control departments, for example, makes such changes in governance structure politically challenging at best. In dealing with this political reality, the State could potentially consolidate existing watershed management efforts related to water quality (SWRCB's Watershed Management Initiative), Integrated Regional Water Management (SWRCB and DWR grants), salmonid recovery (DFG Fisheries Restoration Grant Program), and comprehensive watershed health (Conservation's Statewide Watershed Program) under a single roof,

offering a role and function analogous to OWEB. Such a combination of California's watershed management efforts may reduce interagency conflict while instilling a greater degree of financial stability of a joint 'salmon and watersheds' framework via PCSRF funding. Joining such programs may additionally enhance the institutional capacity to support integrated watershed resource management.

Washington's watershed and salmon recovery planning efforts could similarly benefit from such unified formal institutional structuring to enable fully integrated 'salmon and watershed' resource management. Washington could improve institutional and programmatic efficiency by combining Ecology's Watershed Unit and Watershed Planning Program with the Governor's Salmon Recovery Office and Salmon Recovery Funding Board, combining watershed-scale efforts related to water quality, water quantity, and salmon recovery into a single agency with a single concerted framework. Although lacking OWEB's highly stable lottery funding, Washington and California could perhaps benefit to an equally high degree through the integration of existing watershed management efforts. While integration would not eliminate interagency conflict, it would offer an explicit role and structure for state-level watershed management that is currently lacking. The Idaho framework, in contrast, offers a model of a purely minimalist framework for building increasingly comprehensive watershed management into federally mandated water quality requirements through EPA's Watershed Protection Approach.

Results suggest that as population growth continues, States should increase support for water-banking and incorporate it into a watershed management framework in order to increase watershed outcomes related to the three key goals: water quality, water

quantity, and salmon recovery. The incorporation of water banking could additionally benefit from the restructuring of statutes related to the ‘rule of enlargement’ in order to improve efficiency incentives related to the law of prior appropriation, somewhat similar to Oregon Water Resource Department’s Split Season Use Instream Leases.

Opportunities for Future Research

Information related to outputs and outcomes is of key importance to watershed management program managers looking to communicate results to the legislature in order to build or ensure future funding support. While existing research has approximated an endogenous-to-exogenous variable fiscal multiplier effect for both watershed coordinator and watershed capital project investments, based on WMO analysis and Bureau of Economic Analysis regional models (Hibbard & Bonner, 2002; Hibbard & Lurie, 2005; Nielsen-Pincus, et al., 2009; Nielsen-Pincus & Moseley, 2010), ecological outcomes need to be ascertained related to Pacific Northwest watershed management’s core goals of improving watershed health and recovering salmonid species. Toward this end, additional research related to riparian, lacustrine and estuarine ecosystem services and their relationship to restoration activities would be beneficial for the purpose of quantifying the outcomes of watershed investments. As the recent Judge Redden ruling shows, although rural job creation is imperative to Pacific Northwest state legislatures, ecological outcomes are vital to continued federal support of watershed restoration as an official hydro-mitigation strategy. In most case study states, these federal funds comprise the vast majority of overall financial support for watershed restoration.

Finally, there exists an opportunity for research exploring the relationship of state-level watershed management frameworks to their corresponding outputs, in terms of formal institution efficiency or return on investment. A preliminary scan of PCSRF data for each of the four case study states suggests that for every million dollars invested in a State, vastly different outputs result; examples of these output discrepancies are detailed in Table 9 and Figures 8 through 13 below, based on the Salmon Habitat Protection and Restoration category for 2000-2008, PCSRF Project Reports, accessed August 17, 2011 (National Oceanic and Atmospheric Administration, 2011b).

Table 9. Total PCSRF and State Funds Reported 2000-2008

	PCSRF Funds (\$)	State Funds (\$)	Total Funds (\$)
California	\$ 55,263,680	\$ 36,807,532	\$ 92,071,212
Idaho	\$ 13,283,818	\$ 7,577,882	\$ 20,861,700
Oregon	\$ 3,522,209	\$ 145,701,200	\$ 149,223,409
Washington	\$ 127,989,186	\$ 76,248,983	\$ 204,238,169

Figure 8. Stream Miles Treated per \$1 Million of Funds

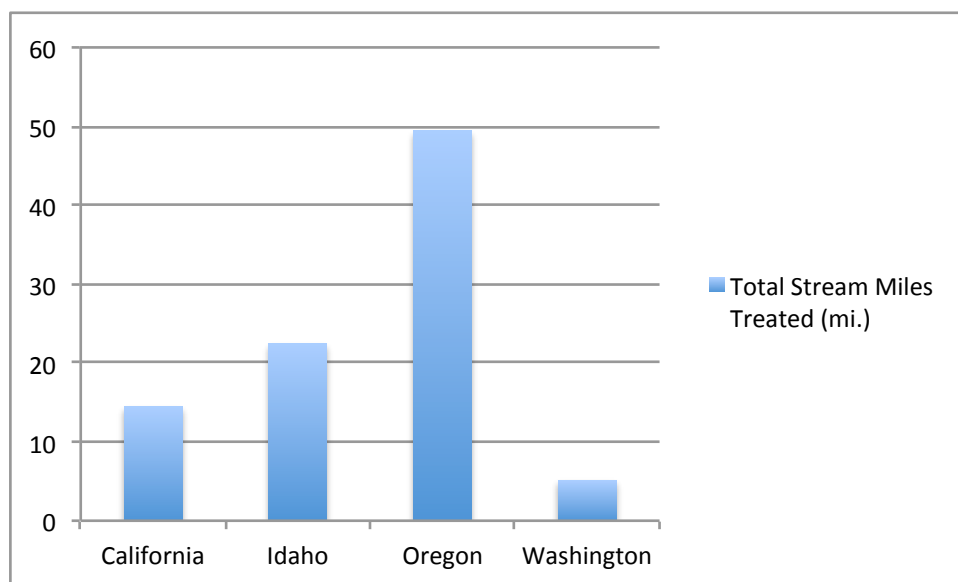


Figure 9. Riparian Acres Treated per \$1 Million of Funds

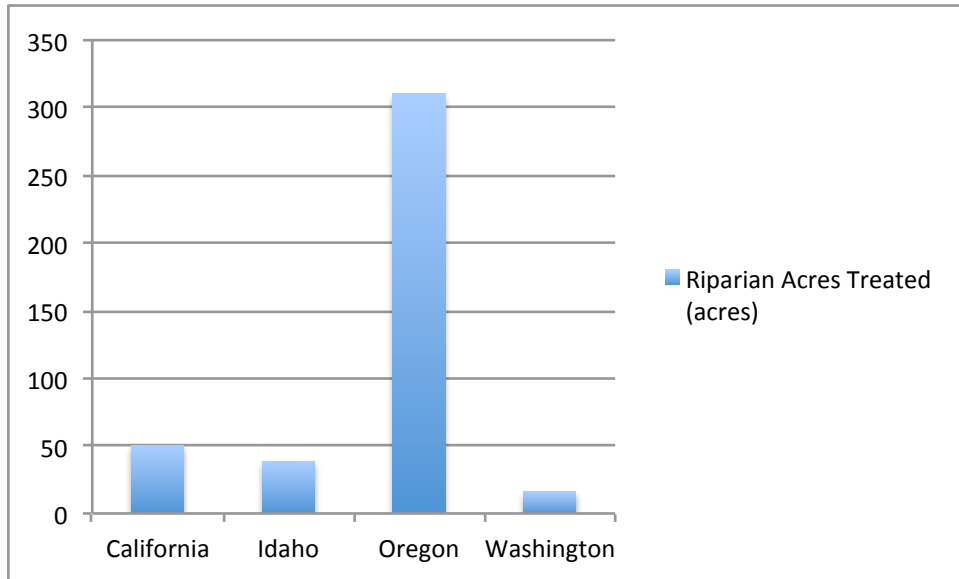


Figure 10. Upland Habitat Treated per \$1 Million of Funds

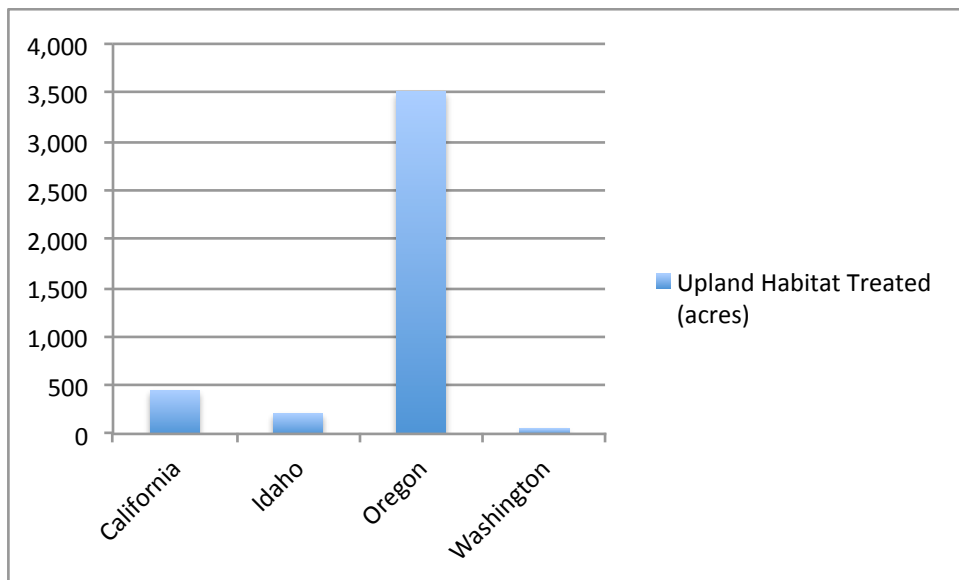


Figure 11. In-stream Water Flow Returned per \$1 Million of Funds

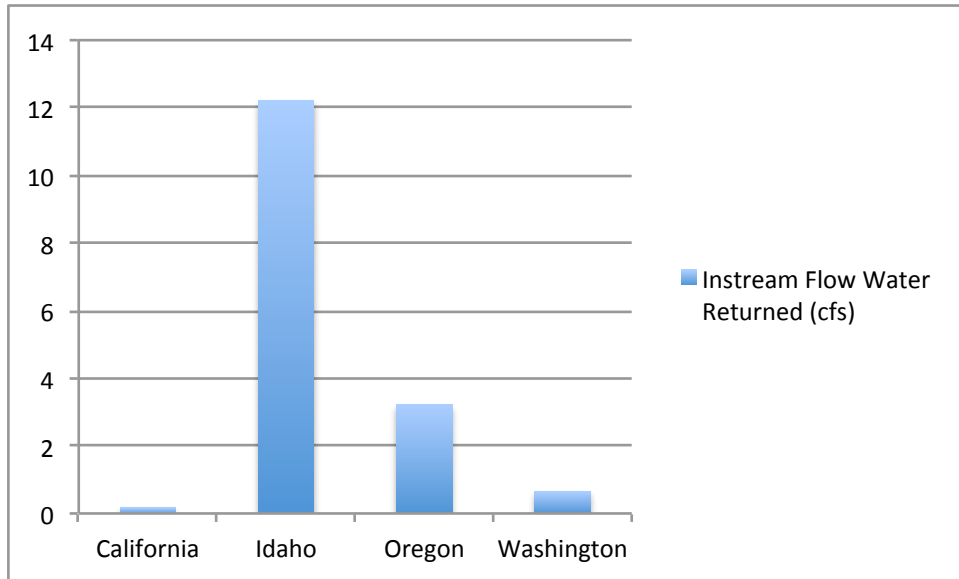


Figure 12. Miles of Road Treated per \$1 Million of Funds

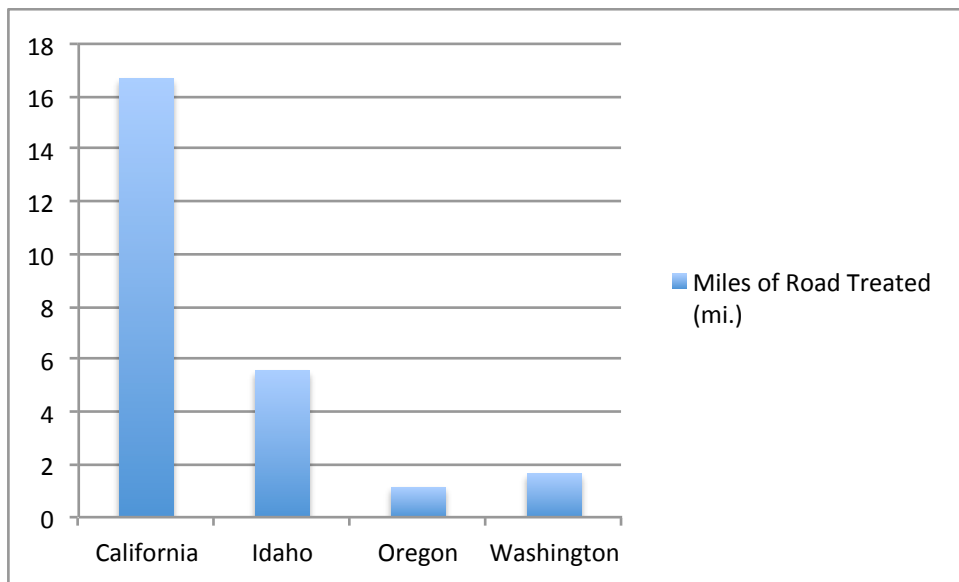
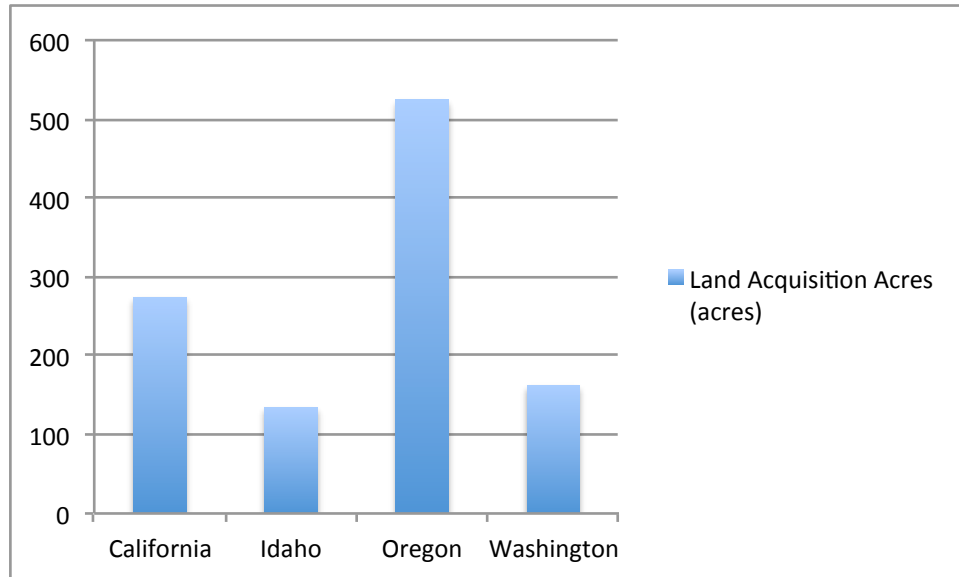


Figure 13. Land Acquisition Acres per \$1 Million of Funds



Since the PCSRF maintains an online database with data related to each state’s funding level and required reported outputs, the information is readily accessible. However, the data does not explain why Oregon’s PCSRF allocation appears starkly low, which may be due to the reporting methodology, as PCSRF funding is directed through OWEB. As the data shows, for every \$1 million of total State and PCSRF funding, Oregon appears to treat the most land by every metric, except for miles of road treated. Though not shown, Oregon also appears to lead stream miles treated, fish passage barriers removed, and fish screens installed in terms of total restoration work. Findings from this study indicate that California’s high level of treatment of roads is likely due to the sheer level of development and its related transportation infrastructure in the state’s watersheds. Findings also indicate that Idaho’s relatively high level of investment in returning in-stream water flows is likely due to its high relative capacity to do so, given available water resources and a limited population, while California’s output was

relatively low in that category likely due to a water supply constraint under high resource demand. In conclusion, these differences in state-level outputs per every dollar of investment hint at state-level watershed management framework differences, warranting further analysis in order to better understand the relationship between funding, state-level frameworks, outputs, and outcomes.

APPENDIX

WATERSHED AGENCIES AND PROGRAMS BY STATE

California

1. State of California
 - a. California Environmental Protection Agency
 - i. Department of Pesticide Regulation
 1. Pesticide Program Division
 - a. Chemigation Initiative
 - b. Dormant Spray Water Quality Initiative
 - c. Ground Water Protection Program
 - d. Surface Water Protection Program
 - ii. State Water Resources Control Board
 1. Regional Water Quality Control Boards
 - a. Water Quality Control Plans/Basin Plans (CWA and Porter-Cologne Act)
 2. Division of Water Quality
 - a. Strategic Plan
 - i. Watershed Management Initiative
 1. Integrated Plan 303(d) and 305(b)
 - a. Regional Water Board WMI Chapters

- 2. Watershed Management Initiative
Workgroup
- 3. Watershed Management Initiative
Committee

- b. Surface Water Ambient Monitoring Program
- c. GeoTracker (T)
- d. Electronic Water Rights Information Management
System (T)
- e. California Integrated Water Quality System (T)
- f. Stormwater Multi-Application, Reporting, and
Tracking System (T)
- g. Division of Financial Assistance
 - i. Proposition 13 CALFED Watershed
Program (\$)
 - ii. Proposition 13 Watershed Protection
Program (\$)
 - iii. Proposition 50 Integrated Regional Water
Management Program (\$)
 - iv. Proposition 40 Integrated Watershed
Management Program (\$)
 - v. Financial Assistance Application Submittal
Tool (T)
 - vi. Agricultural Drainage Loan Program (\$)

- vii. Agricultural Drainage Management Loan Program (\$)
- viii. Agricultural Water Quality Grant Program (Propositions 40 and 50) (\$)
- ix. Proposition 50 Groundwater Monitoring (\$)
- x. Small Community Groundwater Grant Program (\$)
- xi. Small Community Wastewater Grant Program (\$)
- xii. CALFED Drinking Water Quality Program (Propositions 13 and 50) (\$)
- xiii. Coastal Nonpoint Source Pollution Control Program (Propositions 13 and 50) (\$)
- xiv. Federal CWA Section 319 NPS Implementation Program (\$)
- xv. Nonpoint Source Pollution Control Program (Propositions 13 and 40) (\$)
- xvi. Proposition 40 Urban Storm Water Grant Program (\$)
- xvii. Proposition 84 Storm Water Program (\$)
- xviii. Clean Water State Revolving Fund (\$)
- xix. Water Recycling Funding Program (\$)
- xx. Clean Beaches Initiative Grant Program (\$)

- h. Groundwater Ambient Monitoring and Assessment Program
- i. Marinas and Recreational Boating – NPS Program (USEPA)
- j. Low Impact Development – Sustainable Storm Water Management (T)
- k. Nonpoint Source Pollution Control Program (\$)
 - i. Statewide NPS Program Plan
 - ii. NPS Implementation and Enforcement Policy
 - iii. NPS Interagency Coordinating Committee
- l. Storm Water Program
 - i. CalTrans Program
 - ii. Construction Program
 - iii. Industrial Program
 - iv. Municipal Program
- m. CWA Sections 303(d) and 305(b) Integrated Report
- n. Recycled Water Policy
- o. Wetland and Riparian Area Protection Policy (T)
 - i. Dredge/Fill (CWA Section 401) and Wetlands Program

3. Executive Office

- a. San Francisco Bay/Sacramento – San Joaquin Delta Estuary (Bay-Delta) Program
 - i. The Bay-Delta Plan
 - ii. Delta Flow Criteria
 - iii. Water Quality Control Plans/Basin Plans
 - 4. 20x2020 Agency Team on Water Conservation
 - 5. Office of Enforcement
 - a. Water Quality Enforcement Policy
 - b. Statewide Policy on Supplemental Environmental Projects (penalty-based mitigation)
- b. California Natural Resources Agency
 - i. Office of the Secretary
 - 1. Fish and Wildlife Strategic Vision
 - a. Stakeholder Advisory Group
 - 2. California Environmental Resources Evaluation System (T)
 - 3. Land Use Planning Information Network (T)
 - 4. Cal-Atlas Geospatial Clearinghouse (T)
 - ii. Bonds and Grants Division
 - 1. Statewide Bonds Oversight
 - a. Propositions 1E and 13 (DWR), 40, 50, and 84 (T)
 - 2. Grant Programs
 - a. California River Parkways (\$)

- b. Urban Greening Program for Sustainable Communities (\$)
 - c. Environmental Enhancement and Mitigation Program (with CalTrans) (\$)
 - iii. Department of Conservation
 - 1. Division of Land Resources Protection
 - a. Statewide Watershed Program
 - i. Watershed Coordinator Grant Program (\$)
 - 1. Cooperation Database (T)
 - ii. CALFED Watershed Program Grants (\$)
 - iii. State Watershed Advisory Committee
 - iv. California Watershed Portal (T)
 - 1. California Watershed Success Stories (T)
 - v. California Watershed Assessment Manual (UC Davis) (T)
 - b. Resource Conservation District Assistance
 - i. Training Program (T)
 - ii. RCD Information Sharing Library (T)
- iv. Department of Water Resources
 - 1. Strategic Water Planning Branch
 - a. California Water Plan
 - i. Basin Plans (Porter-Cologne Act)

- ii. Chapter 27: Watershed Management
 - iii. Statewide Integrated Water Management
 - iv. Regional Forums
 - v. Statewide Water Analysis Network (T)
 - vi. Water Plan Information Exchange (T)
 - b. California Drought Contingency Plan
- 2. Division of Statewide Integrated Water Management
 - a. Water Use and Efficiency Program
 - i. 2009 Water Use Efficiency Grant Program (\$)
 - ii. Land and Water Use Program (T)
- 3. Water Data Library
 - a. California Data Exchange Center (T)
 - b. Integrated Water Resources Information System (T)
- 4. Division of Planning and Local Assistance
 - a. Watershed Program (moved to SWRCB in 2009)
 - i. Watershed Assessment Framework
 - ii. Watershed Grant Program (\$)
 - iii. Watershed Mapping Program (T)
 - b. Fish Passage Improvement Program (CALFED Ecosystem Restoration Program) (\$)
 - c. Urban Streams Restoration Program (\$)
- 5. Bay-Delta Office

- a. Pelagic Fish Action Plan
 - b. Delta Conveyance Branch
 - i. Delta Conveyance Fish Science Section
 - c. Modeling Support Branch
 - i. Integrated Water Flow Model (T)
 - ii. CALSIM Water Resources Simulation Model (T)
 - iii. Delta Simulation Model II (T)
 - iv. REALM: River, Estuary, and Land Model (T)
 - v. Particle Tracking Model (T)
 - vi. Delta Island Consumptive Use Model (T)
 - vii. Cross Section Development Program (T)
 - viii. Artificial Neural Network Model of Delta Flow-Salinity Relationship (T)
 - ix. Trihalomethanes Simulation Model (T)
 - x. HEC-RES Hydraulic Engineering Center-River Analysis System (T)
 - xi. MIKE11 basin modeling (T)
6. State Water Project
7. Division of Environmental Services
- a. Flood Protection Corridor Program (\$)
 - b. Drought Water Bank

- c. Feather River Program
 - d. Environmental Real-time Monitoring and Support
(T)
 - e. Aquatic Ecology Section
 - f. Special Studies Section
 - g. Delta Fish (Four Pumps) Agreement
 - h. Habitat Expansion Plan
- v. California State Parks
- 1. Office of Grants and Local Services
 - a. Habitat Conservation Fund (\$)
 - b. Land and Water Conservation Fund Program(\$)
 - 2. Planning Division
 - a. Delta Recreation Proposal
 - 3. Natural Resources Division
 - a. Natural Resource Acquisition Program
 - i. Keystone Watershed Protection
 - b. Watershed Management (\$)
 - c. Natural Heritage Stewardship (\$)
 - d. Natural Resource Deferred Maintenance (\$)
 - e. Ongoing Natural Resource Maintenance (\$)
 - f. Statewide Resource Management (\$)
- vi. Department of Fish and Game
- 1. California Fish and Wildlife Strategic Vision

2. Ecosystem Conservation Division

a. Habitat Conservation Planning Branch

- i. Lake and Streambed Alteration Program
- ii. Natural Community Conservation Planning
- iii. Conservation and Mitigation Banking
- iv. Voluntary Habitat Enhancement for
Agricultural Landowners
- v. Federal Habitat Conservation Plans
- vi. Agreement on Biological Diversity (MOU)
- vii. Coordinated Resources Management and
Planning (MOU)

viii. Lands Program

1. Ecological Reserves
2. Comprehensive Wetland Habitat
Program

a. Public Lands Programs

b. Private Lands Incentive

Programs

- i. Permanent Wetland
Easement Program
- ii. Landowner Incentive
Program

b. Water Branch

- i. Bay-Delta Conservation Program
(CALFED)
 - ii. Ecosystem Restoration Program (CALFED
\$)
 - iii. Statewide Water Planning Program
 - 1. Water Rights Program
 - 2. Instream Flow Program
 - 3. California Water Plan (input)
3. Wildlife and Fisheries Division
- a. Fisheries Branch
 - i. Heritage and Wild Trout Program
 - 1. Wild Trout Policy
 - ii. Fisheries Restoration Grant Program (\$)
 - b. Biogeographic Data Branch
 - i. ACE-II: Areas of Conservation Emphasis
(T)
 - ii. BIOS: Biogeographic Information and
Observation System online mapping tool (T)
 - iii. VegCAMP: Vegetation Classification and
Mapping Program (T)
 - iv. CNDDDB: California Natural Diversity
Database (T)

- v. CWHR: California Wildlife Habitat Relationships (T)
 - vi. GIS: Geographic Information Systems Program (T)
 - 4. Law Enforcement Division
 - 5. Office of Spill Prevention and Response
 - a. Environmental Enhancement Fund grant program (\$)
 - 6. Fish and Game Regions
 - a. Northern Division
 - i. Shasta and Scott Rivers Watershed-Wide Permitting Programs
 - ii. Interior Timberland Planning Program (T)
 - iii. Coastal Watershed Planning and Assessment Program
 - 1. Watershed Assessment Reports
 - vii. Department of Forestry and Fire Protection
 - 1. Resource Management Program
 - a. Forest Practices
 - i. Forest Practice Watershed Mapper (T)
 - ii. Watershed Assessment and Planning
 - iii. Anadromous Salmonid Protection Rules
 - b. Forestry/Landowner Assistance Section

- i. California Forest Improvement Program (\$)
 - ii. Forest Legacy Program
 - iii. California Forest Stewardship Program (\$ T)
 - iv. Urban and Community Forestry Program (\$)
- 2. Fire and Resource Assessment Program
 - a. Forest and Range Assessment
 - i. Water Quality and Quantity chapter
 - b. Watershed Resources
 - i. Evaluating Stream and Watershed
Conditions in Northern California (T)
 - ii. Monitoring Study Group
 - iii. Watershed Reference Watershed Viewer and
Database (T)
 - c. California Business, Transportation and Housing Agency
 - i. Department of Transportation
 - 1. Engineering
 - a. Highway Design Manual: Chapter 810 Hydrology
 - 2. Division of Environmental Analysis
 - a. Statewide Stormwater Program
 - i. Stormwater Management Plan
 - 1. Watershed Planning Team
 - ii. Monitoring and Research Program
 - 1. Watershed Planning

- iii. District Stormwater Coordinators
 - iv. Water Quality Planning Tool (T)
 - 3. Division of Local Assistance
 - a. Environmental Enhancement and Mitigation Program (\$)
 - 4. Landscape Architecture Program
 - a. Scenic Highway Program
 - i. Corridor Protection Program
- d. California Department of Food and Agriculture
 - i. Plant Division
 - 1. Integrated Pest Control Branch
 - a. Weed Management Area Program
- e. Governor's Office of Planning and Research
 - i. State Clearinghouse and Planning Unit
 - 1. Environmental Goals and Policy Report
- f. Strategic Growth Council
 - i. Multi-Agency Work Group – State Program Coordination
 - ii. Urban Greening for Sustainable Communities Grant Program (\$)
- g. California Conservation Corps
 - i. Salmon Restoration Program
 - ii. CCC/AmeriCorps Watershed Stewards
 - iii. CCC Grant Program (Proposition 84)
- h. Little Hoover Commission

- i. Managing for Change: Modernizing California’s Water Governance report
- i. University of California at Davis
 - i. Center for Watershed Sciences
 - ii. Cooperative Extension
- j. California State University at Monterey Bay
 - i. The Watershed Institute
- k. Interagency
 - i. State Board of Food and Agriculture
 - 1. Water Subcommittee
 - ii. State Board of Forestry and Fire Protection
 - 1. Anadromous Salmonid Protection Rules
 - 2. Forest Practice Committee
 - 3. Resource Protection Committee
 - 4. Management Committee
 - 5. Technical Advisory Committee (Anadromous Salmonid Protection/Threatened or Impaired Watershed Rules)
 - 6. vTAC Technical Advisory Committee
 - 7. Forest Management Policies
 - 8. Joint Policy Statement on Pacific Salmon and Anadromous Trout (with Fish and Game Commission)
 - iii. Central Valley Flood Protection Board
 - 1. Strategic Plan

- iv. California Coastal Commission
 - 1. Coastal Management Program
- v. San Francisco Bay Conservation and Development Commission
 - 1. Coastal Management Program for San Francisco Bay
 - 2. Suisun Marsh Local Protection Program
 - 3. Coastal Zone Management Act Section 309 Grants (\$)
- vi. Delta Protection Commission
 - 1. Land Use and Resource Management Plan
 - 2. Primary Zone Study
 - 3. Delta Working Landscapes project
 - 4. Planning Process for Delta Agriculture Conservation Easement Program
- vii. Fish and Game Commission
 - 1. Commission Designated Wild Trout Waters
 - 2. Cooperatively Operated Rearing Programs for Salmon and Steelhead
 - 3. Joint Policy Statement on Pacific Salmon and Anadromous Trout (with Board of Forestry)
 - 4. Golden Trout Policy
 - 5. Salmon Policy
 - 6. Anadromous Rainbow Trout Policy
 - 7. Striped Bass Policy
 - 8. Trophy Black Bass Program

9. Trout Policy
 10. Endangered and Threatened Species Policy
 11. Land Use Planning Policy
 12. Water Policy
 13. Wetlands Resources Policy
 14. Planning Policy
- viii. Parks and Recreation Commission
1. Policy II.3: Resource Management in State Reserves and State Preserves
 2. Policy III.1: Planning
 3. Policy III.3: Acquisition and Development
- ix. Wildlife Conservation Board
1. California Riparian Habitat Conservation Program (\$)
 2. Forest Conservation Program (\$)
 3. Inland Wetlands Conservation Program (Central Valley Joint Venture)
 4. Ecosystem Restoration on Agricultural Lands (\$)
 5. Rangeland, Gracing Land and Grassland Protection Program (\$)
 6. Oak Woodlands Conservation Program (\$)
 7. Habitat Enhancement and Restoration Program (\$)
 8. Land Acquisition Program
 9. Natural Heritage Preservation Tax Credit Program (\$)

- x. California Tahoe Conservancy
 - 1. Environmental Improvement Program
 - 2. Watersheds and Stream and Stream Environment Zone Restoration
 - 3. Wildlife Enhancement
 - 4. Stormwater Quality
 - 5. Environmentally Sensitive Land Acquisition
 - 6. Land Bank Program
- xi. Sacramento-San Joaquin Delta Conservancy (Delta Conservancy)
 - 1. Interim Strategic Plan
 - 2. Ecosystem Restoration Workgroup (forming)
 - 3. Delta Investment Fund (State Treasury \$)
- xii. Sierra Nevada Conservancy
 - 1. Proposition 84 Grant Program (\$)
- xiii. California Coastal Conservancy
 - 1. Conservancy Grant (\$)
- xiv. Bay-Delta Conservation Plan
 - 1. Steering Committee Working Draft
- xv. Delta Habitat Conservation and Conveyance Program
- xvi. California Biodiversity Council
 - 1. Watershed Work Group
 - a. Best Funding Practices
 - b. General Watershed Principles

- xvii. Delta Stewardship Council (was CALFED Bay-Delta Program)
 - 1. Ecosystem Restoration Program
 - a. Ecosystem Restoration Program Element (\$)
 - b. CALFED Watershed Program Element (\$ T)
 - i. Interagency Watershed Advisory Team
 - ii. Bay-Delta Public Advisory Committee –
Watershed Subcommittee
 - iii. Watershed Partnership Seminars
 - 1. Learning Management System (T)
 - c. Science Program
 - i. Delta Science Fellows Program (T)
 - ii. Delta Science Fellowships (T)
 - iii. Grant Program (T)
 - d. Delta Independent Science Board
- xviii. CalFish: A California Cooperative Anadromous Fish and Habitat
Data Program
 - 1. California Fish Passage Assessment Database Project (T)
 - 2. Fish Passage Forum (T)
 - 3. California Habitat Restoration Project Database (T)
 - 4. Fish Passage Improvement Program (T)
- xix. California Water Quality Monitoring Council
 - 1. A Comprehensive Monitoring Program Strategy for
California

- a. California Wetland Monitoring Workgroup
 - i. Tenets of a State Wetland and Riparian Monitoring Program
 - b. California Water Quality Monitoring Collaboration Network
 - c. Groundwater Ambient Monitoring and Assessment
 - d. Healthy Streams Partnership (pending)
- 2. My Water Quality Portal (T)
- xx. California Environmental Data Exchange Network
 - 1. Regional Data Centers (T)
 - 2. SWAMP Data (T)
 - 3. My Water Quality Portal integration (T)
- xxi. Klamath Basin Restoration Agreement
 - 1. Hydroelectric Settlement
 - 2. Fisheries Program
 - a. Fisheries Habitat Restoration, Reintroduction, and Monitoring Program
 - 3. Water Resources Program
 - a. Interim Program
 - b. Upper Klamath Basin Water Program
 - c. Drought Plan
 - d. Monitoring Plan
 - e. On-Project Plan

- f. Pumping Power Program
 - g. Counties Program
 - h. Tribal Program
 - 4. Klamath Basin Coordinating Council
 - 5. Klamath Settlement Group
- xxii. Interagency Ecological Program
 - 1. Bay-Delta and Tributaries Project
 - 2. IEP Science Advisory Group
 - 3. Pelagic Organism Decline Management Team
- xxiii. Yuba River Management Team
 - 1. Lower Yuba River Accord
- xxiv. Interagency Watershed Mapping Committee (CalWater)
 - 1. California Watershed Map (CalWater 2.2.1) (T)
- xxv. Pacific States Marine Fisheries Compact Commission (CA, ID, OR, WA, AK)
 - 1. Fish Habitat Program
 - a. Watershed Tour Program
- xxvi. Western Governors' Association
 - 1. Western States Water Council
 - 2. Watershed Restoration Through Partnerships Policy
 - 3. The Restoration Economy Policy
 - 4. Water Resource Management in the West Policy
 - 5. Water Quality in the West Policy

6. State Watershed Strategy Guidebook (1999)
- xxvii. West Coast Governors' Agreement on Ocean Health (CA, OR, WA)
 1. Ecosystem-Based Management
 2. Integrated Ecosystem Assessment

Idaho

1. State of Idaho
 - a. Department of Environmental Quality
 - i. Board of Environmental Quality
 - ii. Water Quality Division
 1. Water Quality Management Plan
 2. Surface Water Program
 - a. Integrated Report – CWA §303(d) and §305(b)
 - b. Nonpoint Source Management Program
 - i. Idaho Nonpoint Source Management Plan
 - ii. Unified Watershed Assessment and Restoration Process
 1. Watershed Restoration Action Strategies
 - c. TMDLs: Water Quality Improvement Plans
 - i. Sub-Basin Assessments
 - ii. Implementation Plans

- iii. Local Advisory Groups
 - 1. Basin Advisory Groups
 - 2. Watershed Advisory Groups
 - 3. Technical Advisory Groups (T)
 - d. Beneficial Use Reconnaissance Program
 - 3. Ground Water Program
 - a. Ground Water Management Plans
 - 4. Wastewater Program
 - 5. Drinking Water Program
 - a. Source Water Assessment Program
 - 6. Grant and Loan Program
 - a. Nonpoint Source Management §319 Subgrants (\$)
 - b. Source Water Protection Grants (\$)
- b. Department of Lands
 - i. Forest Assistance Bureau
 - 1. Forest Practices Act
 - a. Cumulative Watershed Effects
 - ii. Lands, Minerals, Range Division
 - 1. Navigable Waters Regulatory Program
 - a. Priest Lake Management Plan
 - 2. Conservation Lease Program
- c. Department of Water Resources
 - i. Idaho Water Resources Board

1. Comprehensive State Water Planning
 2. Comprehensive Basin Planning
 3. MIKE Basin Modeling (T)
 4. Minimum Stream Flows
 5. Nez Perce Agreement
 6. Protected Rivers
 7. State Water Plan
 8. Water Transaction Program
- ii. Water Planning Bureau
1. Comprehensive State Water Plan
 - a. State Protected Rivers
 2. Comprehensive Basin Planning
 3. Statewide Comprehensive Aquifer Planning and Management Program
 - a. Aquifer Planning and Management Fund (\$)
 4. State Protected Rivers
 5. Idaho Water Transaction Program (Qualified Local Entity, Columbia Basin Water Transactions Program)
 6. Water Supply Bank
 7. MIKE Basin Modeling (T)
- iii. Financial Program
1. Water Management Account (\$)
- iv. Stream Channel Protection Program

1. Stream Channel Alteration Permits
 - v. Water Data (T)
- d. Department of Fish and Game
 - i. Fish and Game Commission
 - ii. Idaho Watershed Initiative (1FY \$)
 - iii. Habitat Improvement Program (\$ T)
 - iv. Cooperative Endangered Species Conservation Fund (ESA Section 6) (\$)
 - v. Idaho Conservation Data Center (T)
- e. Department of Parks and Recreation
 - i. Statewide Comprehensive Outdoor Recreation and Tourism Plan
 1. Idaho Wetland Conservation Prioritization Plan
 - ii. Land and Water Conservation Fund (\$)
- f. Department of Agriculture
 - i. Division of Agricultural Resources
 1. Water Quality Section/Agricultural Water Quality Program
 - a. Ground Water Monitoring Program
 - b. Surface Water Quality Program
 - i. Agricultural TMDL Implementation Monitoring Program
 - c. Confined Animal Feeding Lot (CAFO) Water Quality Program
 - d. Pesticide and Ground Water Program

- e. Implementation and Education Program (T)
 - f. Nutrient Management Program
 - g. Idaho Home Assessment System (Home*A*Syst)
 - i. Pasture and Riparian Management (T)
 - g. Office of Species Conservation
 - i. Statewide Conservation Plans
 - 1. Bull Trout Conservation Plan
 - ii. Statewide Sub-Basin Planning lead (NWPC)C)
 - iii. Salmon Recovery and Coldwater Fisheries (\$)
 - h. University of Idaho
 - i. Agricultural Experiment Stations (T)
 - ii. Cooperation Extension System (T)
 - i. Idaho Soil and Water Conservation Commission
 - i. Water Quality Program for Agriculture (\$)
 - ii. Resource Conservation and Rangeland Development Loan Program (\$)
 - iii. TMDL Agricultural Implementation Plans
 - iv. Ground Water Quality Management
 - v. Conservation Reserve Enhancement Program
 - vi. Agricultural Pollution Abatement Plan
 - vii. Idaho OnePlan (T)
 - j. Interagency
 - i. Basin Environmental Improvement Project Commission

- ii. Bear River Commission (with UT and WY)
 - 1. Bear River Compact
- iii. Big Payette Lake Water Quality Advisory Commission
 - 1. Big Payette Lake Management Plan
 - a. Best Management Practices: Riparian and Buffer Zones
- iv. Lake Pend Oreille Basin Commission (Lakes Commission)
- v. Pacific States Marine Fisheries Compact Commission (CA, ID, OR, WA, AK)
 - 1. Fish Habitat Program
 - a. Watershed Tour Program
- vi. Idaho Invasive Species Council
- vii. Western Governors' Association
 - 1. Western States Water Council
 - 2. Watershed Restoration Through Partnerships Policy
 - 3. The Restoration Economy Policy
 - 4. Water Resource Management in the West Policy
 - 5. Water Quality in the West Policy
 - 6. State Watershed Strategy Guidebook (1999)
- viii. Tri-State Water Quality Council (ID, WA, MT)
 - 1. Water Quality Monitoring Program
 - 2. Clark Fork River Voluntary Nutrient Reduction Program
 - 3. Montana and Idaho Border Nutrient Load Agreement

- 4. Pend Oreille River Watershed Advisory Group
- ix. Northwest Power and Conservation Council (ID, OR, WA, MT)
 - 1. Columbia Basin Fish and Wildlife Program
 - a. Upper Salmon Basin Watershed Program
 - b. Clearwater Focus Program
 - x. Columbia Basin Fish Accords
 - 1. Idaho Water Transactions Fund (\$)
 - xi. West Coast Governors' Agreement on Ocean Health (CA, OR, WA)
 - 1. Ecosystem-Based Management
 - 2. Integrated Ecosystem Assessment

Oregon

- 1. State of Oregon
 - a. Governor's Natural Resource Office
 - b. Oregon Watershed Enhancement Board
 - i. Oregon Plan for Salmon and Watersheds
 - ii. Sustainability Plan
 - iii. Grant Program
 - 1. Regular Grants
 - a. Assessment (\$)
 - b. Education/Outreach (\$)
 - c. Land Acquisitions (\$)

- d. Monitoring (\$)
 - e. Restoration (\$)
 - f. Technical Assistance (\$)
 - g. Water Acquisition – Instream Water Lease and Transfer (\$)
- 2. Small Grant Program (\$)
 - 3. Watershed Council Support (\$)
 - 4. Grant Management System (T)
 - 5. Investment Tracking Tool (T)
- iv. Monitoring and Reporting Program
- 1. Oregon Plan for Salmon and Watersheds Monitoring Strategy
 - a. Oregon Plan for Salmon and Watersheds Monitoring Team
 - 2. Effectiveness Monitoring Program
 - a. Conservation Reserve Enhancement Program Effectiveness Monitoring
 - b. Irrigation Efficiency/Water Management Effectiveness Monitoring
 - c. Juniper Management Effectiveness Monitoring
 - d. Livestock Exclusion Effectiveness Monitoring
 - e. Small Dam Removal Effectiveness Monitoring

f. Fish Passage Improvement Effectiveness

Monitoring

3. OWEB Project Reports (Implementation Monitoring)
4. Watershed Assessment Library (T)
5. Restoration Priorities
6. Intensively Monitored Watersheds
7. Volunteer Water Quality Monitoring Program
8. Oregon Watershed Restoration Inventory (T)
9. Pacific Coastal Salmon Recovery Funding Reporting
10. Restoration and Protection Research Fund (\$)

v. Policy and Oregon Plan Coordination

1. Mitigation Policy
2. State/Tribal Government-to-Government Policy
3. Working Lands Easements
4. Special Investment Partnerships (\$)
5. Oregon Conservation Reserve Enhancement Program
6. Whole Watersheds Restoration Initiative (interagency \$)
7. Oregon 150 (interagency sesquicentennial \$)
8. Local Innovation Fund (\$)

vi. Fiscal Services

1. Grant Fiscal Program

c. Department of Fish and Wildlife

- i. Oregon Plan Monitoring for Coastal Basins Program

- ii. Watershed Council Liaison Program
- iii. Transportation Liaison Program
- iv. Regional/District Field Staff (T)
- v. Oregon State Police – Fish and Wildlife Division (\$)
- vi. Wildlife Division
 - 1. Habitat Conservation Program (Wildlife Habitat Conservation and Management Program)
 - a. Access and Habitat Program (\$)
 - b. Willamette Wildlife Mitigation Program (BPA \$)
 - c. Western Oregon Stream Restoration Program (T)
 - 2. Habitat Resources Program
 - a. Riparian Lands Tax Incentive Program (\$)
 - 3. Oregon Conservation Strategy
 - a. Conservation Strategy Implementation Grants (\$)
 - 4. Oregon Habitat Joint Venture (private groups)
 - 5. Woodland Fish and Wildlife Project (T)
- vii. Fish Division
 - 1. Conservation and Recovery Program
 - a. Native Fish Conservation Policy
 - i. Native Fish Conservation and Recovery Plans
 - 2. Fisheries and Propagation Programs
 - a. Fisheries Restoration and Enhancement Program (\$)

3. Fish Passage Program
 4. Fish Screening Program
 5. Natural Resource Information Management Program
 6. Ocean Salmon and Columbia River Program
 - a. Columbia River Coordination Section (T)
 7. Salmon Trout Enhancement Program (volunteer)
 8. Water Quality and Quantity Program
 9. Corvallis Research Lab
- viii. Oregon Fish, Wildlife and Habitat Restoration Grant (OWEB \$)
- ix. Research, Monitoring, and Evaluation
1. Conservation and Recovery Program monitoring
 2. Native Fish Investigations Program
 - a. Columbia River Investigation Program
 3. Aquatic Inventories Program
 4. Western Oregon Research and Monitoring Program
 5. Northeast-Central Oregon Research and Monitoring Program
 6. Rogue Watershed District Monitoring Program
 7. Oregon Hatchery Research Center (T)
- d. Department of Environmental Quality
- i. Laboratory Division
 1. Water Quality Monitoring Program
 - a. Watershed Assessment Section

- i. Regional Probabilistic Stream Assessments
 - b. Volunteer Water Quality Monitoring Program
 - c. Toxics Monitoring Program
- ii. Water Quality Division
 - 1. Integrated Water Resources Strategy
 - 2. Integrated §303(d) and §305(b) Report
 - 3. TMDL Program
 - a. Willamette River TMDLs Council
 - 4. NPS Program
 - a. Clean Water State Revolving Fund Loans Program (\$)
 - b. NPS §319 Grant Program (\$)
 - c. Oregon Watershed Approach
 - 5. Drinking Water Protection Program (T)
 - 6. Groundwater Protection Program
 - 7. Water Quality Permitting Program (NPDES §401)
 - 8. Wastewater Permitting Program
 - 9. Water Reuse Program
- iii. Land Quality Division
 - 1. Brownfields Program
 - a. Brownfields Site Assessment Grants
 - 2. Voluntary Cleanup Program
 - 3. Willamette River Sediment Study

- iv. Office of Compliance and Enforcement
 - 1. Supplemental Environmental Projects
 - e. Department of Transportation
 - i. Technical Services Branch
 - 1. Geo-Environmental Section
 - a. Statewide Transportation Improvement Program (STIP)
 - i. Fish Passage and Large Culvert Program
 - ii. Transportation Enhancement Program
 - b. Water Resources Program
 - i. Stormwater Management Initiative
 - 1. Stormwater Management Program
 - c. Wetlands Program
- f. Department of Agriculture
 - i. Plant Division
 - 1. Oregon Invasive Species Council
 - 2. Native Plant Conservation Program
 - a. Habitat Conservation Plan (with ODOT)
 - b. Habitat rehabilitation and native plant restoration projects
 - 3. Noxious Weed Control Program
 - a. Noxious Weed Control Grants (\$)
 - ii. Natural Resource Division

1. Confined Animal Feeding Operation Program
 2. Agricultural Water Quality Program
 - iii. Soil and Water Conservation Districts Program
- g. Department of Forestry
1. Private Forests Program
 - a. Forest Practices Act
 - i. Forest Practices Monitoring Program
 - b. Conservation Reserve Program (\$)
 - c. Wetlands Reserve Program (\$)
 - d. Forest Legacy Program (\$)
 - e. Forest Resource Trust (\$)
 - f. Forest Stewardship Plan (T)
 - g. Watershed Enhancement Incentives (OWEB)
 - h. Wildlife Habitat Incentive Program (\$)
 - i. Wildlife and Fish Habitat technical and educational assistance (T)
 - j. Underproductive Forestland Conversion Tax Credit (\$)
 - k. Riparian Function and Stream Temperature Study (RipStream) (T)
 - l. Safe Harbor Agreement for the Northern Spotted Owl
 2. Urban and Community Forestry Program

- a. Urban and Community Forestry Assistance Program
 - i. Small Projects and Scholarship Fund (\$)
 - 3. State Forests Management Program
 - a. Forest Management Plans
 - b. Habitat Conservation Plans
 - c. Watershed Analysis Projects
 - 4. Resource Planning Program
 - a. Indicators of Sustainable Forest Management
 - b. Dynamic Forest Ecosystems Work Plan
 - 5. Fish Presence and Stream Size data
 - 6. Stewardship Foresters Program
 - 7. Watersheds Research Cooperative (with OSU)
- h. Department of State Lands
 - i. Land Management Division
 - 1. Oregon Biodiversity Information Center (PSU T)
 - 2. Regional Management Plans (in development)
 - ii. Wetlands and Waterways Conservation Division
 - 1. Wetlands Program
 - a. Removal-Fill Program
 - i. Salmon recovery planning restoration permit streamlining
 - ii. Essential Salmon Habitat protection

- iii. State Scenic Waterway protection
 - iv. Oregon Rapid Wetland Assessment Protocol
 - v. Wetland and Tidal Waters Mitigation
 - 1. Mitigation Banks
 - 2. Mitigation Revolving Fund (\$)
 - 2. Lower Willamette River Management Plan
 - iii. Finance and Administration Division
 - 1. State Agency Coordination Program
 - 2. Essential Salmonid Habitat mapping (T)
 - iv. South Slough National Estuarine Research Reserve
 - 1. Partnership for Coastal Watersheds
- i. Department of Geology and Mineral Industries
 - i. Geologic information (T)
- j. Water Resources Department
 - i. Field Services Division
 - 1. Regional Technical Assistance (T)
 - 2. Instream Transfer/Lease Program
 - 3. OWEB Regional Review Teams
 - 4. Fish Screening or Passage Program
 - 5. Water Management and Conservation Program
 - a. Water Management and Conservation Plan
 - b. Municipal Water Management and Conservation Planning

- c. Agricultural Water Management and Conservation
 - Planning
 - 6. Allocation of Conserved Water Program
 - 7. Deschutes Ground Water Mitigation Program
 - ii. Water Rights Services Division
 - iii. Administrative Services
 - 1. Water Development Loan Program (\$)
 - 2. Oregon Water Supply and Conservation Initiative grants (\$)
 - 3. Water Conservation, Reuse and Storage Grant Program (\$)
 - iv. Director's Office
 - 1. Integrated Water Resources Strategy (pending)
- k. Oregon State Police
 - i. Fish and Wildlife Division
 - 1. Cooperative Enforcement Planning (with ODFW)
- l. Department of Land Conservation and Development
 - i. Statewide Planning Goals
 - 1. Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces
 - 2. Goal 6: Air, Water and Land Resources Quality
 - ii. Land Conservation and Development Commission
 - iii. Oregon Coastal Management Program
 - 1. Oregon's Coastal Nonpoint Pollution Control Program

- m. Parks and Recreation Department
 - i. Salmon Plate Fund-based restoration
 - ii. Land and Water Conservation Fund Grants (\$)
 - iii. Scenic Waterways Program
- n. Department of Energy
 - i. Oregon Small-Hydro Working Group
 - ii. Hydropower Advisors (T)
- o. Oregon University System
 - i. Oregon State University
 - 1. Institute for Natural Resources (T)
 - 2. Independent Multidisciplinary Science Team (T)
 - 3. Oregon Explorer
 - a. Oregon Watershed Restoration Tool (T)
 - 4. Extension Service
 - 5. Watersheds Research Cooperative (with ODF)
 - ii. University of Oregon
 - 1. Institute for a Sustainable Environment
 - a. Ecosystem Workforce Program (T)
 - b. Geographic Information Systems Lab (T)
- p. Oregon Business Development Department
 - i. Brownfields Redevelopment Fund (\$)
 - ii. Infrastructure Finance Authority
 - 1. Community Development Block Grants (\$)

- 2. The Safe Drinking Water Revolving Loan Fund (\$)
 - 3. Special Public Works Funds (\$)
 - 4. Water/Wastewater Financing (\$)
- q. Oregon State Lottery
 - i. Measure 66 (15% of lottery funds dedicated to OPRD and OWEB)
- r. Department of Motor Vehicles
 - i. Salmon Plate Program
- s. Oregon State Marine Board
 - i. Aquatic Invasive Species Prevention Program
 - ii. Oregon Adopt-A-River Program (with SOLV)
- t. Oregon Forest Resources Institute (T)
- u. Interagency
 - i. Columbia River Gorge Commission (OR and WA)
 - ii. Lower Columbia River Estuary Partnership (NEP)
 - 1. Habitat Restoration Program (\$)
 - 2. Habitat and Ecosystem Monitoring
 - iii. Oregon Invasive Species Council
 - 1. Oregon Invasive Species Action Plan
 - iv. Klamath Basin Restoration Agreement
 - 1. Hydroelectric Settlement
 - 2. Fisheries Program
 - a. Fisheries Habitat Restoration, Reintroduction, and Monitoring Program

3. Water Resources Program
 - a. Interim Program
 - b. Upper Klamath Basin Water Program
 - c. Drought Plan
 - d. Monitoring Plan
 - e. On-Project Plan
 - f. Pumping Power Program
 - g. Counties Program
 - h. Tribal Program
4. Klamath Basin Coordinating Council
5. Klamath Settlement Group
- v. Columbia Basin Fish Accords
 1. John Day Watershed Restoration Program
- vi. Pacific States Marine Fisheries Compact Commission (CA, ID, OR, WA, AK)
 1. Fish Habitat Program
 - a. Watershed Restoration Support (OR \$)
 - b. Watershed Tour Program
- vii. Western Governors' Association
 1. Western States Water Council
 2. Watershed Restoration Through Partnerships Policy
 3. The Restoration Economy Policy
 4. Water Resource Management in the West Policy

- 5. Water Quality in the West Policy
- 6. State Watershed Strategy Guidebook (1999)
- viii. Northwest Power and Conservation Council (ID, OR, WA, MT)
 - 1. Columbia Basin Fish and Wildlife Program
 - a. Sub-Basin Plans
- ix. West Coast Governors' Agreement on Ocean Health (CA, OR, WA)
 - 1. Ecosystem-Based Management
 - a. Integrated Ecosystem Assessment

Washington

- 1. State of Washington
 - a. Department of Ecology
 - i. Watershed Planning Grants
 - ii. Coastal Zone Project Assistance Grant Program
 - iii. Public Participation Grants
 - iv. Columbia River Basin Water Management Grant Program
 - v. Water Quality Financial Assistance
 - 1. Centennial Grant Program
 - 2. CWA Section 319 Grant Program
 - 3. Clean Water State Revolving Fund Loan Program
 - 4. Washington Water Acquisition Program
 - b. Conservation Commission

- vi. Columbia River Basin Water Management Program
- vii. Conservation Reserve Enhancement Program (riparian habitat restoration focused)
- viii. Coordinated Resource Management Program
- ix. Irrigation Efficiencies Grant Program (\$)
- x. Voluntary Stewardship Program
- xi. Livestock Program (\$ for CDs)
- xii. Water Quality Implementation Grants Program (\$ for CDs)
- xiii. Watershed Data Pilot Project
- c. Recreation and Conservation Office
 - xiv. Washington Invasive Species Council
 - xv. Habitat and Recreation Lands Coordinating Group
 - xvi. Estuary and Salmon Restoration Program (\$)
 - xvii. Family Forest Fish Passage Program (\$)
- d. Department of Fish and Wildlife
 - xviii. Fish Program
 1. Regional Fisheries Enhancement Group Program (\$)
 2. Fisheries Restoration and Irrigation Mitigation Act (USFWS \$)
 3. SalmonScape (T)
 4. Aquatic Land Enhancement Account Volunteer Cooperative Projects Grant Program (\$)
 - xix. Wildlife Program

1. Comprehensive Wildlife Conservation Strategy
2. Landowner Incentive Program (\$)

xx. Habitat Program

1. Lead Entity Program (i.e., WMOs)
 - a. Regional Recovery Plans
 - b. Lead Entity Strategies
2. Watershed Stewardship Team biologist (T)
3. Intensively Monitored Watershed project
4. Aquatic Habitat Guidelines Program (T)
 - a. Stream Habitat Restoration Guidelines
 - b. Design of Road Culverts for Fish Passage
 - c. Land Use Planning for Salmon, Steelhead and Trout
5. Cooperative Endangered Species Conservation Fund (ESA Section 6 Grants \$)

xxi. Enforcement Program

e. Department of Natural Resources

xxii. Forest Practices Division

1. Forest Practices Rules
 - a. Forest Practices Watershed Analysis
 - b. Washington Road Surface Erosional Model
 - c. Forest Practices Habitat Conservation Plan
2. Forest Practices Adaptive Management Program
 - a. Forests and Fish Report

xxiii. Aquatics Resources Division

1. Aquatic Lands Habitat Conservation Plan
2. Aquatic Reserves Program
3. Aquatic Restoration Program (\$)
4. Aquatic Habitat Guidelines Program (T)
5. Noxious Weeds – Invasive Species Program
6. Nearshore Habitat Program

xxiv. Asset and Property Management Division

1. Trust Land Transfer Program

xxv. Forest Resources and Conservation Division

1. Policy for Sustainable Forests
2. Forest Legacy Program (USFS)
3. Future of Washington Forests Project (with UW)
4. Washington Urban and Community Forestry Program

xxvi. Resource Protection Division

1. Washington Natural Heritage Program (T)
2. Natural Areas Program
 - a. Natural Resource Conservation Areas
 - b. Natural Area Preserves
3. Trust Lands Habitat Conservation Plan
 - a. Riparian Management Zones
 - b. Riparian Forest Restoration Strategy

xxvii. Small Forest Landowner Office

1. Forest Stewardship Program (\$ T)
 2. Forest Riparian Easement Program
 3. Family Forest Fish Passage Program
 4. Long Term Forest Practices Applications
 5. Small Forest Landowner Advisory Committee
 6. Road Maintenance and Abandonment Plans
 7. Washington Forest Stewardship Program (USDA)
 - a. Backyard Forest Stewardship
 8. Riparian Open Space Program
- f. Department of Agriculture
- xxviii. Dairy Nutrient Management Program (Ecology MOU)
 - xxix. Natural Resources Assessment Section
 1. Washington State Pesticide Management Strategy
 2. Surface Water Monitoring Program for Pesticides in Salmonid-Bearing Streams
 3. Endangered Species Program
- g. Department of Commerce (formerly CTED)
- xxx. Washington State Community Development Block Grant Program
 1. Planning-Only Grant (\$)
- h. State Parks and Recreation Commission
- xxxi. Clean Water Program
 - xxxii. Classification and Management Planning process
 - xxxiii. Modeling Sound-Friendly Development

- i. Department of Health
 - xxxiv. Drinking Water State Revolving Fund (\$)
 - xxxv. Source Water Protection Program
 - xxxvi. Surface Water Program
- j. Department of Transportation
 - xxxvii. Wetlands Mitigation
 - xxxviii. Stormwater Program
 - xxxix. Erosion Control Program
 - xl. Fish Passage Program
 - xli. Roadside Restoration Program
- k. Washington State University
 - xlii. Center for Sustaining Agriculture and Natural Resources
 - xliii. Natural Resource Extension
 - 1. Forest and Wildlife Extension
 - xliv. William D. Ruckelshaus Center
- l. Interagency
 - xlv. Columbia River Gorge Commission (OR and WA)
 - xlvi. Forest Practices Board
 - 1. Watershed Analysis Subcommittee
 - xlvii. Washington State Geographic Information Council
 - 1. Washington State Geospatial Clearinghouse (T)
 - xlviii. Natural Resources Cabinet
 - 1. One Front Door to Washington's Outdoors website (T)

xlix. Recreation and Conservation Funding Board

1. Washington Wildlife and Recreation Program (\$)
 - a. Urban Wildlife (\$)
 - b. Critical Habitat (\$)
 - c. Riparian Protection (\$)
 - d. State Lands Restoration and Enhancement (\$)
 - e. Natural Areas (\$)
2. Aquatic Lands Enhancement Account (\$)
3. Land and Water Conservation Fund (\$)
1. Governor's Salmon Recovery Office
 1. Regional Recovery Plans
 2. Statewide Strategy to Recover Salmon
 3. State Agencies Action Plan (Activities Report)
 4. Independent Science Panel
- li. Salmon Recovery Funding Board
 1. Estuary and Salmon Restoration Program (\$)
 2. Family Forest Fish Passage Program (\$)
- lii. Washington Biodiversity Council
 1. Washington Biodiversity Project
 - a. Washington Biodiversity Conservation Strategy
 - i. Conservation Opportunity Maps (T)
 - ii. Biodiversity Conservation Toolbox for Planners (T)

- iii. Habitat Farming Work Group
 - iv. Grass-Banking Work Groups
 - v. Biodiversity Scorecard (T)
 - vi. Citizen Science Collaborative
 - vii. Healthy Lands Initiative
 - b. Washington Forum for Conservation Incentives
 - i. Washington Conservation Incentives listserv (T)
- liii. Puget Sound Partnership
 - 1. 2020 Action Agenda
 - a. EPA NEPA Funding: Watershed Protection and Restoration (\$)
 - 2. Puget Sound Watershed Characterization Project (with Ecology and WDFW)
 - 3. Science Panel
- liv. Shared Strategy for Puget Sound
 - 1. Puget Sound Salmon Recovery Plan
 - a. Local Watershed Chapters
 - b. Watershed Leads
 - 2. Watershed Work Plans
- lv. Northwest Power and Conservation Council
 - 1. Columbia Basin Fish and Wildlife Program
 - a. Sub-Basin Plans

- lvi. Columbia Basin Fish Accords
 - 1. Walla Walla River Basin Fish Habitat Enhancement Project
 - 2. Klickitat Sub-Basin Monitoring and Evaluation Project
- lvii. Pacific States Marine Fisheries Compact Commission (CA, ID, OR, WA, AK)
 - 1. Fish Habitat Program
 - a. Watershed Tour Program
- lviii. Western Governors' Association
 - 1. Western States Water Council
 - 2. Watershed Restoration Through Partnerships Policy
 - 3. The Restoration Economy Policy
 - 4. Water Resource Management in the West Policy
 - 5. Water Quality in the West Policy
 - 6. State Watershed Strategy Guidebook (1999)
- lix. Tri-State Water Quality Council (ID, WA, MT)
 - 1. Water Quality Monitoring Program
 - 2. Pend Oreille River TMDL Development
- lx. West Coast Governors' Agreement on Ocean Health (CA, OR, WA)
 - 1. Ecosystem-Based Management
 - 1. Integrated Ecosystem Assessment

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