AN ABSTRACT OF THE DISSERTATION OF

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Title: Reallocating Resources, Rebuilding Community: The Klamath Basin Agreements and the Emergence of Adaptive Governance

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The concept of "adaptive governance" represents a spectrum of hybrid approaches to environmental governance employed to guide management of complex social-ecological systems under conditions of high uncertainty. While the concept of adaptive governance has benefited from over a decade of theoretical development, empirical examples of transitions towards adaptive governance are lacking across a host of disciplinary literatures that approach environmental governance, including scholarship on resilience, law, human geography, and political science. In addition, there is no common framework and methodology to explore, analyze, and compare empirical examples of AG. To address these gaps, I propose a framework for identifying and characterizing empirical evidence of transitions toward adaptive governance. I then apply the proposed framework to analyze a case study of a governance transition taking place in the Klamath Basin, USA between 2001-2010, which includes the recent (2010) development of a set of negotiated agreements aimed at comprehensive, basin-scale, social-ecological restoration. Methods for this study include a review of public records and technical resource management documents, as well as 38 semi-structured interviews with individuals intimately involved in the Klamath governance transition. This data further informs a

series of institutional mapping and social network analysis methods that clearly describe the emergence and institutionalization of adaptive governance in the basin. The Klamath case reveals that the literature lacks any substantial discussion of power and politics relative to transitions toward adaptive governance. Further, I argue that an investigation into the role of power and politics cannot be avoided in adaptive governance research as the process of unraveling political interactions can reveal root causes of transformations in environmental governance. Political forces acting upon processes of adaptive governance have the potential to defray or reinforce ecological degradation and social marginalization in terms of access to resources. Thus, research on adaptive governance can benefit from the additional analytical lens of political ecology in an effort to address the normative commitments inherent in a transition toward adaptive governance. Lastly, this dissertation suggests that the most pressing work to be done with regard to adaptive governance is to determine how to foster conditions that allow emergence of adaptive governance, and how to support some degree of institutionalization across the current range of approaches to environmental governance.

Reallocating Resources, Rebuilding Community: The Klamath Basin Agreements and the Emergence of Adaptive Governance

by
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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Brian C. Chaffin, Author

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LIST OF ABBREVIATIONS AND ACRONYMS

AG	Adaptive Governance
BA	Biological Assessment
BIA	Bureau of Indian Affairs
BiOp	Biological Opinion
BLM	U.S. Bureau of Land Management
CA	State of California
CDFG	California Department of Fish and Game
COPCO	California and Oregon Power Company
CWA	Clean Water Act
DOI	Department of Interior
EIR	Environmental Impact Report (CA)
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FACA	Federal Advisory Committee Act
FERC	Federal Energy Regulatory Commission
KBA	Klamath Basin Adjudication
KBAC	Klamath Basin Advisory Council
KBCC	Klamath Basin Coordinating Council
KBEF	Klamath Basin Ecosystem Foundation
KBRA	Klamath Basin Restoration Agreement
KBRT	Klamath Basin Rangeland Trust
KFA	Klamath Forest Alliance
KHP	Klamath Hydroelectric Project
KHSA	Klamath Hydroelectric Settlement Agreement
KID	Klamath Irrigation District
KPOP	Klamath Project Operations Plan
KRITFWC	Klamath Inter-Tribal Fish and Water Commission
KWUA	Klamath Water Users Association
NCRWQCB	CA North Coast Regional Water Quality Control Board
NEC	North Coast Environmental Center
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NMFS	National Marine Fisheries Service
NRC	National Academy of Sciences, National Research Council
NWR	USFWS National Wildlife Refuge
ONRC	Oregon Natural Resources Council
OR	State of Oregon
OWEB	Oregon Water Enhancement Board
OWRD	Oregon Water Resources Department
PCFFA	Pacific Coast Federation of Fishermen's Associations
Klamath Project	Klamath Reclamation (Irrigation) Project
RPA	Reasonable and Prudent Alternatives

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

SES(s)	Social-ecological System(s)
SRRC	Salmon River Restoration Council
TAT	Technical Advisory Team
TMDL	Total Maximum Daily Load
UKBCA	Upper Klamath Basin Comprehensive Agreement
UKBWG	Upper Klamath Basin Working Group
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service

1. CHAPTER 1. INTRODUCTION

1.1 The Klamath Basin Water Crisis of 2001

On May 7th, 2001, the rural south central Oregon town of Klamath Falls emerged in the national spotlight, its name splashed across media outlets, with headlines like "Klamath Livelihoods Wither: Water Shut-Off Along Oregon Border Takes Toll on Farmers" (Brazil 2001) and "Klamath Water Wars: Systems Out of Sync" (Zuckerman 2001). The population of this rural agricultural town of 20,840[1] residents nearly doubled overnight—transformed into a hotbed of anti-government protest and social unrest reminiscent of the Sagebrush Rebellion of the 1970s and 1980s[2] (Doremus and Tarlock 2008; Most 2005). For the first time since 1905, farmers irrigating land on the U.S. Bureau of Reclamation's Klamath Irrigation Project (herein 'Project' or 'Klamath Project') were informed by the federal purveyor that no irrigation water would flow to project lands for the remainder of the growing season. The decision lay on the back of a recent U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BiOp) upheld by the local circuit court that the project was in violation of the Endangered Species Act (ESA, Public Law 93-205)—jeopardizing the survival of two species of sucker fish in Upper Klamath Lake by drawing down lake levels to irrigate Project lands (Doremus and Tarlock 2008). In addition, a second biological opinion by the National Marine Fisheries Service (NMFS), ordered the Bureau of Reclamation (USBR) to ensure that a minimum volume of 1,000 cubic-feet per second (cfs) remained in the Klamath River below the Project to ensure adequate habitat and the ultimate survival of threatened Coho salmon in the downstream reaches of the basin. To comply with these mandates and the subsequent court injunction, the USBR closed the irrigation canal headgates in April 2001,

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[1] According to the 2000 U.S. Census counts. Available at: http://censusviewer.com/city/OR/Klamath%20Falls (last accessed 14 April 2014).

[2] The "Sagebrush Rebellion" is a term that encapsulates a movement of protest in the 1970s and 1980s in an effort to gain more local control over large tracts of federal land in the 13 Western U.S. States with more than 30% federally controlled lands (Cawley 1993). The rhetoric of the movement survived the 1980s and 1990s as the "Wise Use" movement (McCarthy 2002), and exists today in contemporary libertarian politics visible in the areas rural American West, such as those surrounding the agricultural community of Klamath Falls, OR.

effectively shutting off over 1,400 farms and 210,000 acres of previously irrigated Project farmland (Doremus and Tarlock 2008).

In a basin where the dominant culture reflects a rural agrarian lifestyle, but for agriculture to be successful the climate has necessitated a century-long relationship with irrigation, the shutoff was bound to solicit a reaction. During the summer of 2001 Klamath Falls became ground zero for civil disobedience, protest, and semi-violent destruction of federal property. Several decades of a Western U.S. debate over states rights issues related to land management and land ownership policies was reinvigorated and revived as thousands of people from across the country poured into Klamath Falls to support the irrigators denied water (Most 2006). The local sheriff stood by idly in further defiance as protestors forced open headgates to the major project canal several times, allowing water to flow towards fallow fields (Barnard 2001b; Milstein 2001a). Eventually, federal marshals were called in to protect the project headgates as the protests continued and community tensions rose (Jehl 2001). It wasn't until the arrival of a new ground zero—the Sept. 11th, 2001 attacks—that the Klamath protests ceased. Although post-9/11 rhetoric unified communities across the U.S. in solidarity against terrorism on American soil, it is likely that the residents of Klamath Falls were only half-heartedly unified, if at all. Many residents felt as if their government had failed them, and further, did not have their best interests in mind (Bragg 2001). The systems in the Upper Klamath Basin designed to allocate water for the livelihood and prosperity of the agrarian community had failed. Many believed that governance of environmental resources, specifically water, had failed.

When environmental governance structures fail, acute crisis can arise, much like the water shutoff and subsequent protests in Klamath Falls in 2001. However, post-crisis, governance structures often begin to reorganize or rebuild as the relationship between resources and resource users has not vanished, despite any significant alterations. In the Klamath post-2001, crisis continued as resource users chose sides and dug trenches in the battlegrounds of the media and the courtroom. The basin landscape and its people were further fragmented and polarized for years to come with no help from watershed events such as the death of more than 30,000 Chinook salmon in the Lower Klamath Basin in

the Fall of 2002 (CDFG 2004). Around 2004, however, the strain of media and legal struggles wore thin and a courageous set of leaders from both sides convened in a neutral location in the central basin. A legal and media ceasefire was constructed that set the tone for what would be a 5-plus year process of informal discussions and formalized confidential negotiations amongst parties involved in resource governance within the basin.

1.2 From Crisis to Agreement

Fast forward to February 18th, 2010. On the steps of the Oregon Statehouse rotunda in Salem, a group of leaders from stakeholder groups across the basin, as well as federal agency officials, representatives from the Departments of Interior, Commerce, and Justice, and the governors of both California and Oregon, gathered to witness the partial signing of Klamath Basin Restoration Agreement (KBRA) and the Klamath Hydroelectric Settlement Agreement (KHSA)[3] (Learn 2010; Shevory 2010). This moment represented the culmination of years of formal negotiations over how best to solve resource use issues in the basin. More than that, it represented the most comprehensive and inclusive set of resource governance agreements ever envisioned in the western U.S., including a plan for prioritized and comprehensive basin-wide ecological restoration. Some specifics of the agreements included:

- Settlement of historically disputed tribal water rights claims (contests to the Klamath Basin Adjudication (KBA) process) in the upper basin
- Reliable river flows and lake levels for endangered fish species
- Return of some tribal land to the Klamath Tribes

[3] Technically the federal agencies could not "sign" the KBRA, however, per the FERC process, the Department of Interior (on behalf of the BLM, USBR, and USFWS) and NMFS (Department of Commerce) signed the KHSA. In order to be parties to the KBRA, federal agencies must receive Congressional authorization. Accordingly, the Klamath Agreements were introduced as legislation in the both the U.S. Senate and U.S. House of Representatives on 10 November 2011 by Senator Jeff Merkley (OR-D) and Congressman Mike Thompson (CA1-D) as the "Klamath Basin Economic Restoration Act" (Merkley 2011). As of April 2014, the legislation has stalled in committee in both houses and will most likely be replaced by subsequent legislation in May 2014 (AP 2014).

- A plan for the phased removal of four mainstem Klamath River dams of the Klamath Hydroelectric Project (KHP) creating fish passage and the potential for likely water quality improvements
- Water security for upper basin agriculture: the development of a program to predict water availability earlier in the season so that farmers and ranchers can weigh financial risks and make improved business decisions
- Funding and capacity for fisheries habitat restoration programs across the basin
- Non-point source pollution reduction from agricultural runoff by targeting lands for water use retirement and riparian vegetation restoration
- A reintroduction program for Coho salmon above the current location of the KHP

The KBRA and KHSA represented a different approach to governing resource use and protection in the basin. On the surface, the agreements were an approach to policy creation despite the inherent complexity and uncertainty associated with the management of water, habitat, and fisheries. They included provisions for shared management of Klamath Basin resources among those with livelihoods most affected by resource management decisions, but at the same time, the agreements integrated the best available science and upheld existing law. Below the surface, however, the KBRA and KHSA were the product of a process much bigger and more robust than its outcome. The agreements were just the first formalized outcome of a shift in the governance of environmental resources in the Klamath Basin—a shift that reorganized power relations, increased communication and information sharing amongst key actors and organizations, and generated, at least at the level of basin leadership, a vision of a shared future for Klamath Basin communities.

While the agreements themselves were historic, the process—trust built, relationships forged, and channels of communication opened—could be considered a true paradigm shift. The relationships created and networks built in the Klamath Basin between 2001-2010 were the embodiment of the shift in governance taking place, a shift from reactionary crisis management, to a more diffuse, flexible governance more likely to adapt to surprises or transform when social and ecological conditions become untenable. The critical questions to be asked of this case are questions of "how" and "why." *How* did the governance of water and associated resources in the Klamath Basin make such a

dramatic shift from 2001-2010? And maybe more importantly, *why*? What were the underlying drivers that caused this transformation? Are there generalizations to be extracted from the Klamath transition in governance? If so, are they useful in other contexts of untenable resource governance across the U.S. and beyond? Does the Klamath represent a larger trend in the changing relationship of humans and the environment, towards one of recognizing and planning for uncertainty and surprise? An attempt to answer the above questions requires an investigation of both the concepts of environmental governance in general, and the Klamath context more specifically.

1.3 A Dissertation on Governance: Theoretical Influences

What factors can aide resource users and resource managers in preparation for unforeseen disturbances such as those of the revolving Klamath crises? How is balance achieved between social demands on resources (including the strong forces of a globalized political economy), while at the same time managing ecosystems for continued functions such as water quality, carbon sequestration, and aesthetic or other cultural values? In this dissertation, I argue that these are questions of a larger framework of governance, specifically of environmental governance.

1.3.1 Environmental Governance

Governance, as opposed to government, is the "the action, manner, or system of governing"[4] and includes a range of institutions and relationships asserted in governing. This includes rulemaking, enforcement, and sanctions whether formal or informal, specifically with regard to the governance of resource use (Pierre and Peters 2000). Governance suggests both the hierarchical nature of top-down, command-and-control methods of government, as well as the informal "steering" of process and relationships that organize resources to achieve public policy outcomes (Bingham 2009).

Environmental governance—governance applied to the earth's natural resources—is a term given to the collection of institutions (laws, rules, norms) and

[4] Definition of "governance" referenced from the *World English Dictionary*, cataloged by Dictionary.com. Available at: http://dictionary.reference.com/browse/governance?s=t (last accessed 14 April 2014).

organizations that determine the use and protection of natural resources (Lemos and Agrawal 2006). Further, environmental governance can and needs to be differentiated from environmental management: governance is how we arrive at environmental policy decisions and management is how we implement them. Throughout this dissertation, I argue that environmental governance is a key link between humans and nature. While not the only link (e.g., labor according to Karl Marx), studies of environmental governance can serve to build our knowledge of causation, influence, and other interactions between social and ecological phenomena. Environmental governance is a series of human-nature relations: decisions are made to govern the use and/or protection of natural resources and those decisions have consequences for resource users and the resource itself. Consequences manifest themselves as fluctuations in scarcity, extractability, and quality of a resource, and have reciprocal consequences for further human use and subsequent governance of that use. If environmental governance structures are too rigid to deal with unexpected feedbacks from the natural system, environmental governance can fail and crisis may ensue. Examples of this type of failure are visible in any study of historic natural resource exploitation and are common outcomes of pure modes of environmental governance such as solely state- or market-based regimes (Lemos and Agrawal 2006). As a result, environmental governance scholars Lemos and Agrawal (2006) describe the promise of hybrid modes of governance to address the complexity of coupled human-natural systems, specifically, by recognizing the multiscalar nature of environmental problems and by bridging the multilevel structure of existing approaches to governance.

1.3.2 The Changing Nature of Environmental Governance

While ecosystem function is increasingly valued and prioritized by communities at a variety of scales, often a mismatch in scale exists between approaches to environmental governance and the nature and complexity of environmental degradation (Young 2002). Governance approaches also often fail to integrate social components such as an institutional design necessary to best facilitate the maintenance of ecosystem function (Folke et al. 2005). In response, Berkes and Folke (1998) posited the concept of

"social-ecological systems" (herein 'SES') in an effort to conceptually unify human systems, natural processes, and complex feedbacks between the two. The underlying assumptions of the SES concept are 1) that resource management is necessary, although not in the utilitarian sense of defining a resource and targeting a maximum sustained yield; and 2) that managing an ecological system requires an equal emphasis on the social institutions that continuously influence the resource (Berkes and Folke 1998). The SES concept is useful in an investigation of environmental governance and resource management problems by providing a common framework from which to describe interactions between human systems and ecological systems as a single, complex whole.

Governance literature framing research in terms of SESs highlights the importance of self-organizing, informal, not-yet-institutionalized forms of environmental governance fostered by various degrees of collaboration and emerging in situations where existing approaches to governance do not match the scale of environmental crisis (e.g., Brunner et al. 2005; Scholz and Stiftel 2005). Networks or collaborative groups may emerge from these situations due to their inclusiveness and inherent flexibility, especially when contrasted against government agencies controlled by bodies of public policy beholden to legacy governments and political cycles. While network and collaborative governance often emerges first at a local scale, it can produce sweeping institutional change at a more regional level (e.g., Brick et al. 2001). By recognizing an informal governance network as a formalized organization or by changing the direction of controlling bodies of policy, power can shift from hierarchical, federal, or nation-state dominated decision-making authorities, to more local- or regionally-driven, resource dependent networks, individuals, organizations, and communities (Österblom and Folke 2013).

At first glance, the multidimensional approach found in the KBRA and KHSA (herein 'Klamath Agreements') reflects this type of shift towards a hybrid form of environmental governance. The Klamath Agreements are an effort to address social, economic, and ecological stressors affecting the basin in an integrated manner while creating "durable solutions which… contribute to the public welfare and the sustainability of all Klamath Basin communities" (KBRA 2010, Sec. 1.3). However, it is

highly unlikely that the Klamath Agreements represent the final outcome of a shift in governance. What is more certain is that environmental governance of the Klamath Basin is in transition—morphing into a state with more flexibility to adjust or adapt to uncertainty, complexity, and unforeseen change such as surprise and disturbance. Scholars have posited numerous models of environmental governance aimed at explaining transitions towards new forms of governance that recognize a complexity of interests and issues as well as the uncertainty of interactions and feedbacks between social and ecological parts of the system (e.g., "collaborative rationality" (Innes and Booher 2010) or "resilience-based governance" by reflexive law (Garmestani and Benson 2013)). One model of governance that holds a significant amount of promise is that of *adaptive governance*.

1.3.3 Adaptive Governance

The term adaptive governance (AG) was coined in 2003 in an effort to describe the type of environmental governance necessary to govern social-ecological systems (SESs) when human knowledge of a system was wrong and/or incomplete (Dietz et al. 2003). The original definition of AG—managing diverse human-environment interactions in the face of extreme uncertainty—placed an emphasis on the need for governance systems to be "adaptive" and thus flexible enough to shift and change given feedbacks from both the social and biophysical parts of the system (Dietz et al. 2003). While this definition emanated from the work of a group of scholars studying collective action (or self-organization) of small-scale groups of individuals uniting to collectively manage common-pool natural resources, the concepts behind AG had also been building for some time in the research and publications of resilience scholars and political scientists studying collaborations for natural resource management and environmental governance (e.g., Brunner et al. 2005; Gunderson et al. 2005).

Early champions of AG in governance scholarship called for a new approach to environmental governance that integrated scientific and other types of knowledge into public policies that advanced the common interest through open decision-making structures and community-based initiatives (Brunner et al. 2005). These scholars called

for a paradigm shift away from governance arrangements that were overly technocratic and run in a top-down fashion by large bureaucracies striving for efficiency. AG was instead a vision of a wide array of local interests intimately involved in resource decision-making, balanced with the capacity and legitimacy for governance provided by state- and market-based mechanisms (Brunner et al. 2005; Scholz and Stiftel 2005). Early conceptualizations of AG by scholars of the collaborative conservation movement emerging across the U.S. (and the greater developed world) tended to focus on local-scale participation in governance and environmental conflict resolution, highlighting the context-dependent roles of social learning and consensus building (e.g., Wondolleck and Yaffee 2000; Brosius et al. 2005; Brunner et al. 2005).

At the same time, early conceptualizations of AG were also developing as a result of "resilience thinking" (Walker et al. 2004; Folke et al. 2005; Walker and Salt 2006). The theories of resilience emerged in the late 1960s and early 1970s from studies of ecology (specifically predation studies) that challenged the commonly accepted view that a preferred steady-state existed in ecological systems, linearly framed by theories of succession and carrying capacity (Holling 1973; Folke 2006). The dominant paradigm at the time dictated that a static equilibrium could be achieved or restored through focused resource policies that attempted to control change. C.S. Holling, a prominent ecologist contrasted the dominant paradigm by positing an existence of "multiple stability domains" or multiple steady states in which "resilience determines the persistence of relationships within a system and is a measure of the ability of these systems to absorb change of state variables, driving variables, and parameters, and still persist" (Holling 1973, 17). While the goal of contemporary management trajectories of the time was to minimize variability, the concept of resilience suggested high variability, redundancy, and the ability to learn as key attributes. Managing SESs from a resilience perspective shifts policy focus from controlling or limiting change to managing the ability of a system to cope with, adapt to, and shape further change (Berkes et al. 2003; Folke 2006). Managing a SES for increased resilience to surprise, disturbance, and abrupt change becomes an important concept given the current unpredictability of global environmental change (Walker et al. 2004). Resilience as a guiding framework has since transcended

ecological studies to become an integral part of research on social-ecological relationships, environmental governance and natural resource management generally, as well as AG specifically (Folke et al. 2005; Folke 2006; Walker et al. 2004).

To understand the power of resilience thinking in social-ecological studies such as those of environmental governance, Gunderson and Holling (2002) generated a heuristic model from observations of ecosystem dynamics that is helpful in conceptualizing the non-linearity of SESs as well as the important role of disturbance and change (Figure 1.2). This "adaptive cycle" depicts a relationship or cycle between four phases along the axes of potential (y-axis) and connectedness (x-axis): exploitation (r), conservation (K), release (Ω), and reorganization (α). Carl Folke (2006, 258) published a succinct explanation of the adaptive cycle in his a review of resilience as a perspective for analyzing SESs:

> There are periods of exponential change (the exploitation or r phase), periods of growing stasis and rigidity (the conservation or K phase), periods of readjustments and collapse (the release or omega phase) and periods of re-organization and renewal (the alpha phase). The sequence of gradual change is followed by a sequence of rapid change, triggered by disturbance. Hence, instabilities organize the behaviors as much as do stabilities.

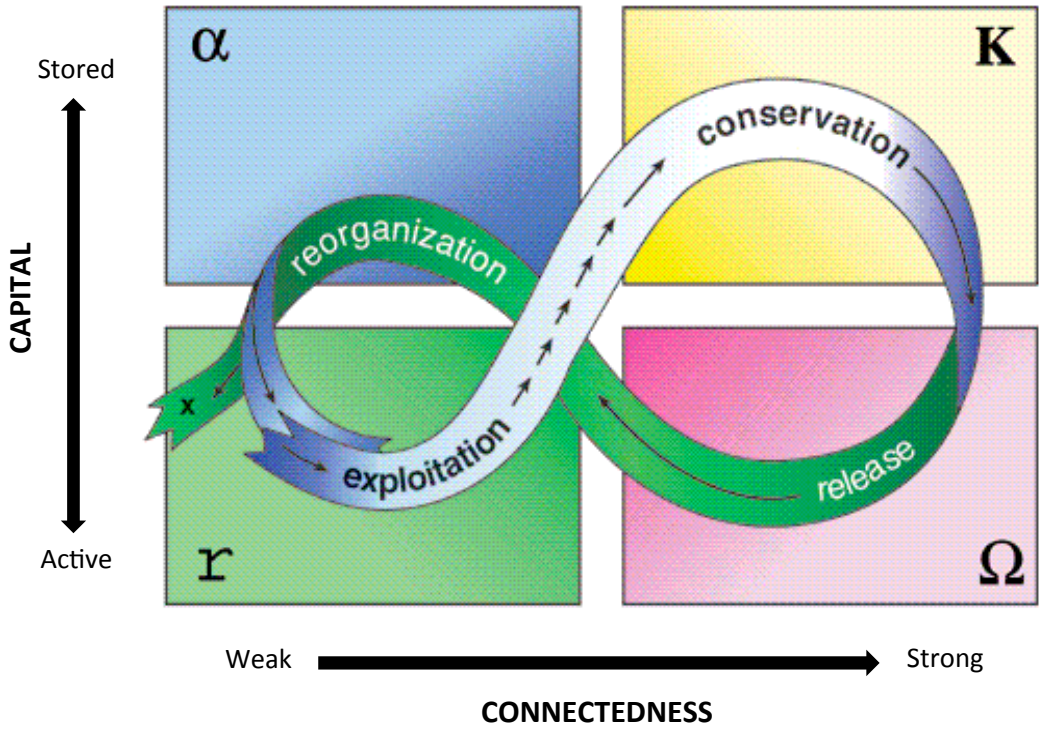

Figure 1.1. A visual representation of the adaptive cycle[5]

As a simple conceptual framework, the adaptive cycle is useful for organizing an analysis of the non-linear trajectories of SESs, with increasing emphasis on institutional diversity and feedbacks between social and ecological components (Walker et al. 2006). This framework becomes particularly important in the context of governing SESs because all SESs exhibit properties of the adaptive cycle (Gunderson and Holling 2002). However, another layer of analysis is necessary to tell a complete story of SES interaction. SESs exhibiting traits of the adaptive cycle are nested across spatial and temporal scales, the dynamics of which are described by the term Panarchy, which refers to the cross-scale nature of dynamic change in complex adaptive systems (Holling 2001; Gunderson and Holling 2002). Panarchy describes the idea that at certain times in the trajectory of the adaptive cycle (a certain scale or SES), cross-scale interactions from

[5] Taken directly from Gunderson and Holling (2002, 34).

nested cycles (above or below) can both create and/or limit space for innovation and change within the focal scale (Figure 1.3). Originally, the interplay across scales within a SES was represented by the concepts of "revolt" and "remember" (Gunderson and Holling 2002), but that concept has since evolved to recognize the importance of potential facilitative and/or inhibiting cross-scale interactions from multiple scales operating on different stages of the adaptive cycle (*see* Cosens et al. 2014, Figure 1, 2343). Cross-scale dynamics are integral to explaining the behavior of complex SESs and thus important to recognize in any investigation of SES governance (Cash et al. 2006; Folke 2006).

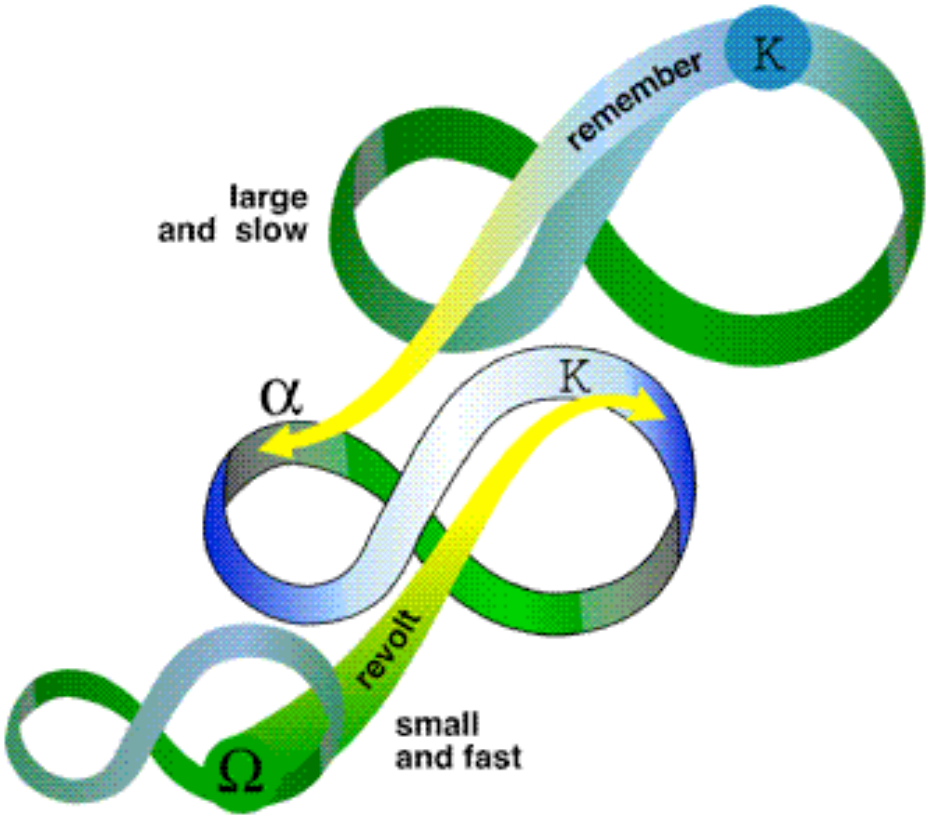

Figure 1.2. A visual representation of panarchy[6]

[6] Taken directly from Gunderson and Holling (2002, 75).

1.3.4 The Continued Influence of Resilience Scholarship on the Conceptual Development of Adaptive Governance

Much of the early research on governance of SESs focused on the exploitation and conservation phases of the adaptive cycle (Berkes et al. 2003). Holling and Meffe (1996) attribute this to a classical focus in environmental management on the efficient production of economic goods and services. Research on managing resources for efficiency and conservation include those that take a single-species or product approach to management (as well as to corresponding governance priorities), such as the maximum sustain yield (MSY) paradigm (Walker et al. 2004). More recent literature on the management of SESs for resilience has shifted focus from the exploitation and conservation phases to the release and reorganization phases of the adaptive cycle, also known as the "back loop" (Berkes et al. 2003; Gunderson and Holling 2002; Holling 2001). This shift has been in part facilitated by the need to further understand the dynamic role and importance of social components inherently linked in SESs. Within the back loop of the adaptive cycle, control of systems is weak or confused and individuals or institutions have the greatest opportunity to influence environmental governance at the lowest cost (Berkes et al. 2003). Systems are presented with "windows of opportunity" within which alternative futures are possible through adaptation to change (Folke et al. 2005, Olsson et al. 2006). Folke et al. (2005, 446) assert that sudden events or abrupt disturbances in a social-ecological system create "space for new management trajectories of resources and ecosystems." Therefore, resilience-inspired AG research has focused on back loop processes and institutional responses to SES dynamism—how specific cultural, economic, and political systems influence reorganization of SES governance and situated resource management.

Resilience scholars were first drawn to the concepts of AG as a way to create conditions that promote the application of adaptive management (e.g., Gunderson 1999; Holling 2005; Gunderson and Light 2006; Cosens and Williams 2012). Adaptive management refers to a systematic application of experiments as policies where results are continuously monitored to further inform and change that policy (Walters 1986; Walters 1997; Lee 1999). Adaptive management was initially pursued as the preferred approach to implement management decisions in the face of extreme uncertainty—when

management decisions must be made and "no action" was not an option (Allen and Gunderson 2011). Early in the development of AG, some scholars recognized the role of AG to facilitate adaptive management (Dietz et al. 2003; Folke et al. 2005)—when very little flexibility to do so existed in governance regimes (Gunderson 1999)—while others recognized adaptive management as a critical component or tool of AG in an effort to integrate the best available scientific information into governance priorities and foster an SES-wide learning environment for the dissemination of information about environmental management decisions (Gunderson and Light 2006; Pahl-Wostl et al. 2007). Both viewpoints are critical, and overall, the role of adaptive management in AG has been to translate the principles of resilience to the scale of management decisions within SESs through creating a culture of system-wide learning.

The continued development of AG theory throughout the late 2000s was predominantly forwarded by the work of resilience scholars (e.g., Olsson et al. 2006; 2007; 2008; Huitema et al. 2009), but with a slight turn back towards an investigation of institutional arrangements necessary for the concept in real-world settings. In Chapter 2, I present a detailed overview of the development of a proposed AG structure including a comprehensive review of "components" or "criteria" called upon as necessary by scholars of AG (e.g., polycentricity, redundancy, diversity, leadership, trust-building, networks, social-learning, etc.). For this introductory chapter it is important to note that early theoretical investigations and a later shift in focus toward empirical examples shed light on two major processes defining AG: emergence and institutionalization. The concept of "emergence" captures the notion that AG is a product of local self-organization of resources users and governance officials (i.e., collaborative conservation). However, without some degree of institutional change, emergent AG is destined to remain a transient, self-organized collaboration without any lasting claim of legitimacy. The initial empirical examples of AG in the literature (Olsson et al. 2004b, 2006) highlighted these two major processes of AG as "preparing the system for change" and "building resilience in SESs." Olsson et al. (2006) also describes a bridge between these two phases as "windows of opportunity" that link the processes of AG emergence with some degree of institutional change, confirming a shift in environmental governance.

Since the Olsson example (Sweden, *see* Chapter 2), further development of empirical studies of AG have provided much detail on the process of emergence as well as potential and actualized windows of opportunity, but have failed to describe the process of institutionalization in as much detail. The paths to "institutionalizing" AG are unclear, especially among the myriad of legal, jurisdiction, and market complexities that make up environmental governance systems in highly developed nations such as the U.S.

1.3.5 Gaps in the Adaptive Governance Literature

A review of the AG literature reveals three major gaps, and significant space for further research. The first is the omission of a well-developed set empirical examples that investigate the full processes of governance transformation toward AG (Olsson et al. 2008; Huitema et al. 2009). While a literature search for examples of AG does yield substantial results (Chapter 2, Figure 2.1), an intimate investigation of these results confirms that most empirical studies referring to examples of AG are not concerned specifically with the processes of AG development such as emergence, institutionalization, and windows of opportunity developed in the theoretical literature. This presents a problem—the theoretical construction of AG is not substantially "grounded" in empirical evidence. As a result, there is a significant research opportunity to decipher what the empirical phenomena of environmental governance transformations can add to the conceptualizations of AG and vice versa. In Chapter 2 (Table 2.4), I highlight four examples of empirical AG research that investigate transformations to AG in a manner that accurately reflects the current theoretical development of the concept—these studies can and should be jumping off points for further investigations.

Second, and potentially responsible for the lack of more empirical studies, the current AG literature lacks both a consensus on the definition of AG as well as common, interdisciplinary frameworks used to investigate examples of AG. These problems partially stem from the wide use and addition of the terms "adaptive" or "adaptability" to concepts of governance in many arenas beyond that of environmental scholarship (e.g., international trade (Cooney and Lang 2007)). But within environmental governance scholarship, the wide variance of empirical contexts that shape transformations in governance suggest the need for multiple ways of explaining these phenomena instead of

the consistent search for commonalities or generalizations across examples. Context is critical, but generalizations of transformations toward AG may help to reveal a set of practical applications from AG research that answer the call of scholars who suggest that creating opportunities for AG is an important step in creating good governance practices able to confront high levels of uncertainty and complexity in SESs (Dietz et al. 2003; Folke et al. 2005; Lebel et al. 2006). AG research will eventually be called upon to yield practical applications—interventions that can be applied in real-world situations to aide in the transformation away from untenable forms of environmental governance. Employing a common framework in research investigating potential examples of AG can create the foundation for a set of "lessons" describing the conditions necessary for AG to emerge and become institutionalized, thus informing potential interventions.

Third, the current AG literature lacks of any substantial discussion of power and politics as it relates to governance transformations toward AG. This represents a real shortcoming in the AG literature, as power and politics are inherent components of governance. In early recognition of the inherent role of power and politics in investigations of resource management and environmental governance, resilience scholars Neil Adger, Katrina Brown, and Emma Tompkins (2006) wrote (citing Foucault, Lukes, and Few) that "power is in the very fabric of social systems and resides in every perception, judgement, and act, no matter what the context" and further, power is "embedded in the ideas and discourses that frame the resource management problem in hand and operates largely independent of scale." In the specific context of environmental governance, power is "a social relation built on an asymmetrical distribution of resources and risks" and politics "is understood as the practices and processes through which power, in its multiple forms, is wielded and negotiated" (Paulson et al. 2003, 209). Thus the role of power is inherent in shaping the processes and outcomes of transformations toward AG. In a review of the relationship between conceptual frameworks of resilience and political ecology, Matthew Turner (2013, 5) even refers to governance as "the myriad of ways in which power is exercised within society."

The lack of a real, robust discussion of power and politics in the AG literature stems from the dominant influence of resilience scholarship on the theoretical

development of AG, and mirrors a growing critique of resilience scholarship more generally (e.g., Davidson 2010; Beymer-Farris et al. 2012; Welsh 2012). The major critique of resilience scholarship, and by extension that of AG research, is that resilience thinking has not adequately addressed the normative implications of the "desired state" for SESs (Beymer-Farris et al. 2012). First articulated by Carpenter et al. (2001) and later by Adger et al. (2006), Lebel et al. (2006), and Smith and Stirling (2010), the critical question is *who* articulates the desired state to be pursued by AG, *who* wins and *who* loses if this vision is seen through, and *what power relations* enable the desired state? Beymer-Farris et al. (2012) argue that resilience thinking is adequate to describe ecological relations, but provides too few insights into the role of social and behavioral relations shaping resilience-based governance and management regimes. The critical insight missed in resilience-framed research on AG is *for whom* are governance transformations good or bad, and how do these transformations introduce or reinforce social and environmental injustices. In response, Smith and Stirling (2010) call to open up SES and AG research to explicitly include analyses of power and politics. Such analyses have the potential to describe: 1) how locally based initiatives (such as those that building during emergence of AG) challenge dominant power structures and to what end; 2) the processes and outcomes of conflict resolution as part of a transformation toward AG; 3) how the processes of AG emergence link to "general-purpose and formal institution of political authority and democracy", i.e., processes of institutionalization (Smith and Stirling 2010).

Despite its interdisciplinary nature, however, resilience scholarship seems to lack the appropriate tools for an explicit analysis of power and politics in transformations toward AG (Beymer-Farris et al. 2012; Turner 2013). Thus, there is ample space for synergy between the conceptual frameworks of resilience and that of political ecology in a concentrated effort to "move beyond resilience as metaphor and toward its use as the analytical concept envisioned by its proponents" (Turner 2013, 5). Political ecology is "a field that seeks to unravel the political forces at work in environmental access, management, and transformation" (Robbins 2004, xvi). Political ecology is "predicated on the assumption that any tug on the strands of the global web of human-environment

linkages reverberates throughout the system as a whole" (Robbins 2004, 5), and is thus an approach that should be 'at home' in the realm of complex SESs, resilience, and AG research. The underlying premise in political ecology research is that environmental change and ecological conditions are inherently products of political processes (Robbins 2004). In addition, political ecologists hold three basic assumptions: 1) costs and benefits of environmental change are distributed unequally; 2) this reinforces or reduces existing social and economic inequalities; and 3) results in political implications, specifically altered and unequal power of actors (Brant and Bailey 1997; Robbins 2004). A political ecology approach to AG would be concerned with human access to resources, decision-making, control, and power over those resources, and the restructuring of power relations toward a more equitable distribution of the resources. The current AG literature seems to be naïve about both the potential for social and environmental marginalization in transformations toward AG, as well as the role of research in exposing injustices resulting from these transformations.

Political ecologists are generally upfront about their assumption that there are better ways of doing things (Robbins 2004). Thus political ecologists often take a more participatory or advocacy worldview as compared to a post-positivist or pragmatic worldview taken by other social scientists; political ecologists reject the structure of post-positivism as it does not provide the flexibility necessary for an agenda of change or to assist marginalized populations often the foci of research efforts. Robbins (2004, 12) clearly articulates this as a research goal for political ecology: "exploring alternatives, adaptations, and creative human action in the face of mismanagement and exploitation." However, taking a rather optimistic, and possibly naïve view of political ecology, SESs, and environmental governance research, I cannot help but see how the approaches compliment each other (*see* Turner 2013). Critically exposing the 'who, why, and how' in the politics of transformations toward AG is essential to the search for new modes of environmental governance more apt to deal with complexity and uncertainty, i.e., finding a "better way of doing things." Paulson et al. (2003, 209) call for "a more explicit conceptualization of power and politics… to better operationalize research on environmental changes and conflicts and to develop better ways of addressing practical

problems of resource degradation and social marginalization." Thus, the "hatchet" of political ecology can (and dare I say *should*) be used to dissect AG in order to ensure that processes such as emergence and institutionalization are both equitable and just (Robbins 2004).

1.4 Research Questions

Building upon current conceptualizations of AG and in direct response to the identified gaps in the AG literature, the purpose of this dissertation is to achieve clarity among published theoretical and empirical accounts of AG and produce a conceptual framework to guide future research. To achieve this, I present a thorough review of the current AG literature as well as an empirical investigation of a transformation in governance in the Klamath River Basin between resulting in the historic signing of the Klamath Agreements. Generally, I seek to determine *how an empirical case study of a transformation in environmental governance in the Klamath Basin further informs the theoretical understanding of AG.* Specifically, I aimed to answer the following research questions in an attempt to further bridge gaps in the literature and contribute to expanding knowledge of AG processes:

> *To what degree are the Klamath Agreements evidence of a transition toward AG in the Klamath bioregion, based on the current conceptualization of AG in scholarship?*
>
> *What can an analysis of environmental governance in the Klamath Basin conceptually framed by political ecology illuminate about the role of power and politics in transitions toward AG?*
>
> *Are there lessons from the Klamath case relevant to promoting transformations to AG in other geographic contexts, e.g., fostering conditions for emergence and/or supporting institutionalization of AG?*

1.5 Methods

Measuring AG or a transition toward AG becomes complicated, as the characteristics of AG are both, not fully theorized and not associated with universally recognized, quantifiable metrics. Thus an approach of qualitative inquiry such as that described by Creswell (2007) makes the most sense for investigating the potential

emergence of AG in the Klamath Basin. Although a qualitative approach utilizes multiple sources of data including quantifiable metrics and statistical data analysis, "[q]ualitative inquiry represents a legitimate mode of social and human science exploration, without apology or comparisons to quantitative research" (Creswell 2007, 11). Qualitative inquiry recognizes the role of the researcher as a key instrument, allowing for reflection on inherent biases associated with this role, but at the same time builds robustness in research through the collection of exhaustive data and the creation of a holistic account and inductive analysis of the phenomenon under study (Creswell 2007).

In order to retain "holistic and meaningful characteristics of real-life events," I have chosen to employ a qualitative case study design in the investigation and analysis of the transition in environmental governance apparent in the Klamath Basin between 2001-2010 (Yin 2009, 4). According to Yin (2009, 18):

> A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.

Searching for evidence of AG in the Klamath Basin environmental governance transition from crisis to agreement is inquiry ripe for a case study. There is a need to study the shift in governance as a phenomenon within relevant social and ecological histories and the contemporary forces both from within the basin and interacting across broader spatial scales. A case study allows for this and is particularly useful for detecting and maintaining "chain[s] of evidence" through triangulation of inductive findings through the collection, analysis, and comparison of multiple sources of data (Yin 2009, 15). In addition, the case study approach provides a somewhat flexible, yet structured framework for organizing a large amount of data in a "logical sequence that connects the empirical data to a study's initial research questions and, ultimately, to its conclusions" (Yin 2009, 26).

Although ultimately flexible, a case study generally includes the following elements: research questions, critical assumptions and propositions, the unit(s) of analysis, logical models linking data to propositions, and criteria for interpreting findings

(Yin 2009). This research consists of a single case study investigating the phenomenon of negotiation and subsequent drafting of the Klamath Agreements. The case is bounded temporally between 2001-2010 as indicated by the context of a sequence of historical events previously described in this chapter. Spatially, I bound this case as the Klamath Basin—the topographical boundary physically dividing the flow of water between catchment basins—however, I explicitly recognize the importance of cross-scale interactions to the relevant context in which the phenomenon of the Klamath Agreements emerged, and I strive to incorporate this into the analysis of the case. I hold a singular *a priori* assumption critical to this research: a transition in governance of environmental resources in the Klamath *did* take place between 2001-2010, as evidenced by the narrative of change I described earlier from crisis to governance agreement. Based on this assumption, I propose that this transition in governance resembles the emergence of theoretical adaptive governance, and throughout the research process I use this proposition as a hypothesis and guide to determine where to find relevant data and competing hypotheses.

A case study approach to qualitative inquiry is not devoid of challenges. While the strength of a case study approach is its ability to accommodate a full range of evidence, there will inevitably be many more variables of interest than data points for analysis (Yin 2009). Case studies (as with other qualitative methods) have been criticized in the academy due to sloppiness on the part of previous researchers and the inherent difficulties involved in isolating and overcoming researcher bias (Flyvbjerg 2006). Although Yin (2009) points out that case studies provide little basis for scientific generalizations and cannot determine true causal relationships, case studies provide a rich platform for theory development and analytical generalizations. For example, in this case study I rely on a review of existing theory surrounding the concept of AG (Chapter 2) prior to empirical data collection in order to deductively develop a framework for characterizing and evaluating evidence of AG in Klamath Basin environmental governance. In this way, I compare previously developed theory with empirical results to make analytical generalizations about how the Klamath case can inform existing theory and further research on AG. This approach, while dependent on the context of empirical

evidence, is consistent with the concept that "case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes" (Yin 2009, 15).

The power of a case study lies in its potential for holistic explanation of real-world phenomena through the organization and synthesis of an extraordinary amount of data. And although this too can be thought of as a weakness of the approach (hard to manage, unwieldy, hard to communicate), it is increasingly essential for investigating and explaining complexity such as that associated with the emergence of AG. In the remainder of this section, I describe the specific data collection methods used to inform the case study of analysis of the Klamath Basin governance transition.

1.5.1 Literature Review and Document Analysis

According to Yin (2009), a literature review should be thought of as a way to develop sharper and more insightful questions about a topic of investigation, as opposed to a method of answering questions themselves. A literature review is method to 'get up to speed' on what is known about your topic of inquiry and inform critical questions, the answers of which will contribute to the overall body of knowledge. A literature review also provides the benefit of placing your research in a disciplinary context that will allow it to get more traction through predefined publication outlets and a captive audience of informed and capable critics.

A thorough literature review of AG was a critical first step in this case study research. Initially, I used popular web-based search engines such as *Web of Science*, *Google Scholar*, and *Lexis-Nexus Academic* to search for peer-reviewed journal articles containing the phrase "adaptive governance." I analyzed the content of the returned citations for relevance and reference to further works not returned in my initial search. This "snowball sampling" of references yielded hundreds of works which I organized using a computer spreadsheet and then sorted for analysis by characteristic such as year published, times cited, journal published, and author. This analysis served as the basis for Chapter 2, a synthesis of AG.

In addition to the review of peer-reviewed and grey literature on AG, I concurrently performed a literature review and compilation of public records associated with environmental governance in the Klamath Basin, specifically related to the transitory activities of negotiation and drafting the Klamath Agreements. This literature and public document analysis continued throughout the research process from 2011-2014 due to the relatively "current" nature of environmental governance changes in the Klamath Basin[7] including the continual release of informative documents such as the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR 2013) on the potential KHP facilities removal published by the U.S. Department of the Interior in 2013. Because environmental governance in the Klamath is complex, the associated public record is prohibitively large. In an effort to account for this, I turned to the use of computer software throughout the process to aide in the analysis of large amounts of text. I used NVivo 10[8] qualitative software to search public documents for words, phrases, and concepts identified deductively during the literature review of AG in order to detect evidence of AG in Klamath environmental governance institutions and organizations. In addition, I reviewed public records inductively for the appearance of major themes and concepts that could further inform my effort to build upon established AG theory. My analysis of the public record forms the base for Chapter 3 of this dissertation and is integral to the analysis of evidence of AG in the Klamath case, as discussed in Chapter 4. In addition, both the literature review and the public records/documents analysis were necessary to choose and pursue additional data collection methods such as institutional mapping, semi-structured interviews, and social network analysis.

1.5.2 Institutional Mapping

The institutional and organizational landscape that governs natural resources in the Klamath Basin is highly complicated, if not complex[9]. The watershed boundary of

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[7] See Chapter 5 for a brief discussion of the "current" status of the Klamath Agreements as of April 2014.

[8] NVivo Qualitative Analysis Software is a registered trademark of QSR International, Doncaster, Victoria, Australia.

[9] See Axelrod and Cohen (2001) for a clear definition of the difference between complicated and complex.

the Klamath Basin crosses 2 states, 7 counties, includes land owned by 6 Native American tribes, and intersects the jurisdiction of more than 25 natural resource agencies across multiple levels of government. In addition, 47 different stakeholder representatives signed the original KBRA in 2010. In an effort to organize and analyze this tangled web of involvement and interaction, I employed a technique known as institutional mapping (Aligica 2006), but also called stakeholder mapping (Daniels and Walker 2001), or situation mapping. Institutional mapping is a method employed to create a cognized model of a real-world operational environment (Aligica 2006). Institutional mapping techniques involve research and the presentation of findings about what actually happens among users of limited or common pool resources (Stimie et al. 2001). The outcomes of institutional mapping can inform resource management through a qualification of institutional linkages and relationships as well as through the identification of significant barriers to collective resource management. There is no single preferred method to map social institutions, social space, or social theory; from different perspectives or with different goals in mind, multiple 'maps' can be equally accurate (Aligica 2006). Institutional maps often take the form of flow charts, tables, Venn diagrams, and cartographic maps (Aligica 2006; World Bank 2011). Depending on the activity, social phenomena, or geographic space to be analyzed, an institutional mapping procedure generally includes: 1) an inventory of institutions involved; 2) an analysis of relevant institutions' roles and inter-institutional linkages such as power, influence, and position in physical or cognized space; and 3) a textual or visual depiction of the institutional environmental—a map (Aligica 2006).

The concept of institutional mapping as a technique for social analysis of resource use draws from a long history of mapping social space in geography (Claval 1984). Smith (2002) argued that institutional mapping is a process that inherently builds on the logic of GIS though it is not distinctly cartographic. Smith (2002) layered three "coverages"—qualitatively derived measures of scale, power, and capital—over four sets of institutions that affect watershed management. The analysis yielded a ranking of institutional influence on watershed management based on the combination of varying effects of institutional power, capital, and scale (Smith 2002).

Aligica (2006) noted the similarities between institutional mapping and stakeholder mapping, and concluded that they are two dimensions of the same procedure: an analysis of an institutional environment and an actor environment, respectively. In the context of institutional mapping, the term 'institutions' generally refers to either organizations or rules.

> **Organizations** are generally thought of as groups of people organized to achieve a common goal. Organizations include government entities, communities, NGOs, tribes, firms, families, and include groups with membership across vast political and geographic scales.
>
> **Sets of rules** are institutions that govern ownership and use of resources, production, exchange, and consumption under which economies work. Examples of these institutions include statutes, common or administrative law, and more informal rules such as social ethics, values, and norms (Stimie et al. 2001).

Often, an institutional mapping exercise is informed by an underlying meta-theory or framework that guides cataloging of institutions for visual or descriptive analysis of the institutional environment. To account for this, I first developed a descriptive list of organizations (both formal and informal groups of actors) and associated rules historically operational in the Klamath bioregion as well as those proposed under the opportunities and constraints posed as terms of the Klamath Agreements. Next, and heavily informed by the Klamath governance public records analysis, I was able to clarify and catalogue the nature of relationships between organizations and informal groups in the basin. Finally, I combined the results of mapping with data gathered during semi-structured interviews (*see* Sec. 1.5.3) with key participants in basin governance to develop a social network analysis procedure to further analyze governance relationships in the context of AG theory (*see* Sec. 1.5.4).

1.5.3 Semi-structured Interviews, Participant Observation and Analysis

Between 2011-2014 I performed 38 semi-structured interviews with individuals identified as directly or peripherally involved with the negotiation and drafting of the KBRA and KHSA. Interviewees included representatives from: federal, state, and tribal agencies working in the Upper and Lower Klamath Basin; local, regional, and national

NGOs; and other stakeholders groups such as irrigation districts. Interviewees were chosen purposively, based on their involvement with Klamath water resources, the KBRA, and/or their understanding of the pros, cons, and tradeoffs associated with a shift towards more flexible management of water resources and the approaches proposed in the Klamath Agreements. I employed a technique of "snowball sampling," in which interviewees were asked for names of other important participants, especially those with diverging viewpoints or those in "rare" or difficult-to-reach populations (such as tribes), in order to obtain a breadth of perspectives (Lee 1993; Salganik and Heckathorn 2004). Prior to the semi-structured interviews, I developed an interview guide as part of the Oregon State University Institutional Review Board approval process (*see* Appendix A).

The guide consists of a series of 15 questions intended to solicit information from interviewees that could serve as evidence or support for the proposition that AG developed in the Klamath between 2001-2010. I initiated the majority of the interviews via the first question of the guide, but often deviated from the structure, referring back to the guide when refocusing tangents or clarify information. Interviews lasted from 45 minutes to 5 hours, with the average interview lasting over an hour. I transcribed all interviews into text and used a combination of manual reading and highlighting as well as automated analysis via NVivo qualitative software to perform a content analysis and overlay "open coding" on the interviews (Strauss 1987). My coding process consisted of a tiered series of codes, much like the "classes" described by Berg (2009) in order to gather evidence about the events taking place in the Klamath between 2001-2010 as well as the evidence to support theoretical propositions explaining governance change in the basin during that time. I used the framework I developed (Chapter 2) for identifying characteristics of AG in order to analyze the interview data deductively for any evidence of emergent AG. However, I also inductively investigated the interview data for themes that seemed to emerge iteratively and held the potential to further inform my research questions and aide in the development and testing of subsequent hypotheses (Strauss 1987).

In addition to interviews, I also relied on participant observation at a series of three public hearings in 2011 on the preliminary EIS/EIR to support Secretarial

Determination (Secretary of the Interior) of the possibility of KHP facilities (dam) removal as proposed in the KHSA (I attended meetings in Chiloquin, OR; Klamath Falls, OR; and Yreka, CA). Participant observation is a method wherein the observer seeks to become a temporary member of the observed group to better understand "their social and 'symbolic' world through learning their social conventions and habits, their use of language, and non-verbal communication" (Robson 2002). Furthermore, the majority of semi-structured interviews I performed between 2011-2014 were in person interviews taking place within the basin. In this manner, I was a participant observer each time I entered, traveled, and interacted within Klamath Basin communities. Although my case study is bounded by the negotiation and initial signing of the Klamath Agreements, the environmental governance transition in the Klamath Basin was still very much alive and visibly part of the basin communities during my research travels to the basin.

1.5.4 Social Network Analysis

While performing qualitative interviews with key informants who have a working or actual knowledge of the KBRA and the processes that led to its inception, I collected data necessary to qualify (and even quantify) the relationships between actors, groups of actors, and organizations involved in environmental governance in hopes of performing a social network analysis (SNA) on relationships in the basin. A social network map is a visual or graphical depiction of nodes (actors, organizations, events, etc.) and ties (connections or linkages between nodes) within a defined network (community, social group, or related interest network) and can be used to trace channels of information transfer or relationships (Wasserman and Faust 1994). SNA builds on network theory in order to mathematically calculate metrics that describe relationships between nodes (Borgatti et al. 2009). These metrics, while subject to qualitative interpretations, can assist researchers in describing the pattern of relationships among stakeholders in resource-based communities and has been suggested as a key to understanding the role of relationships critical to environmental governance (Bodin and Crona 2009; Bodin et al. 2006; Crona and Bodin 2006). Strong networks have also been shown to promote trust among stakeholders and increase a community's ability to overcome barriers potentially

inhibiting transitions toward adaptive governance of resources (Folke et al. 2005; Huitema et al. 2009).

There are two basic types of SNA investigations: ego networks and whole networks (Knoke and Yang 2008). In an ego network survey, the bounds of a network under investigation are generally not known and respondents (egos) are asked to identify others (alters) with whom they are connected based on some criteria presented (Knoke and Yang 2008). The nature of the Klamath Agreements—strict confidentiality agreement signed by all parties involved in negotiations—is not conducive to an ego network investigation as very few respondents would be able to legally or ethically reveal their alters depending on the context of the research inquiry. However, using the signatories of the Klamath Agreements (and the designated responsibilities therein) as a starting point, and working back through interview and public records data in a process similar to snowball sampling, I was able to identify all groups directly involved in the confidential negotiations, thus creating a more complete picture of the network of environmental governance in the basin. In addition, through the public record analysis, institutional mapping process, and analysis of semi-structured interviews (detailed above), I was able to reconstruct relative relationships between formal and informal organizations interacting in the Klamath network of environmental governance. This process was further enhanced through the SNA statistical analysis and mapping software package UCINET.[10] Using UCINET, I constructed a series of numeric variables to compare the relative positions of organizational actors in the Klamath environmental governance network. The goal of performing the SNA on the Klamath Basin organizational landscape was to map relationships between organizations involved in environmental governance across geographic, political, and social scales, and in order to observe how the network (and embedded relationships) structure changed between 2001-2010. Evidence of change and development in governance networks has been linked to the emergence of AG (Olsson et al. 2004b, Österblom and Folke 2013) and this concept could be further informed by evidence from the Klamath case.

[10] UCINET is a product of Analytic Technologies, Lexington, KY (Borgatti et al. 2002).

1.6 Overview of Dissertation

The research presented in the remainder of this dissertation characterizes AG as a relatively nascent form of environmental governance emerging from a desire to build resilience to uncertainty in scaled social-ecological systems through more flexible approaches to governance. AG can be thought of as a generic term for systems of environmental governance emerging as a result of the social will to manage for specific ecosystem services or ecological functions in the face of social-ecological complexity and uncertainty. Much theorization has been done on AG, but little research has grounded the existing theories by tracing real-world transitions in environmental governance towards this more adaptive form. To formally address this gap, I use this dissertation to present results of a qualitative case study of AG, which include a discussion of key findings, lessons learned, and avenues for further research.

In Chapter 2, I present a chronology of major scholarship on AG, synthesizing efforts to define the term and identifying the array of governance concepts associated with potential transformations toward AG. Based on this synthesis, I define AG as a spectrum of hybrid approaches to environmental governance emerging in pursuit of a desired state for social-ecological systems. While the term 'adaptive governance' is not exclusively applied to the governance of social-ecological systems, related research represents a significant outgrowth of literature on resilience, social-ecological systems, and environmental governance, and I identify contributions of each of these bodies of scholarship to the development of AG. In addition, I identify and discuss ambiguities in AG scholarship, including a redefinition of the roles of adaptive management, crisis, and the 'desired state' for governance of social-ecological systems. Finally, I suggest a framework for identifying empirical examples of transitions toward AG through the identification and analysis of evidence for six critical components of AG: emergence, participation, bioregional scale, power shifts, a culture of learning, and institutional change. I also suggest examples of the type of evidence needed to evaluate these components as well as data collection methods for gathering such evidence.

In Chapter 3, I introduce the Klamath case study and trace the history of environmental governance in the basin from Euro-American contact to development of

the Klamath Agreements in 2010. As described in the theories of resilience and panarchy, all complex SESs such as the Klamath Basin exhibit properties of the adaptive cycle, and thus I frame the historical narrative of the Basin in terms of the adaptive cycle throughout Chapter 3. Given that much of the theoretical development of AG is framed by the theories of resilience and panarchy, it is helpful to also frame any empirical investigation similarly in order to align terminology and create a case study for possible comparison to other contexts. Characterizing the historical trajectory of the Klamath Basin as phases of the adaptive cycle allows me to identify key aspects of potential system transformation toward AG, including a rich historical description of past social and ecological system states, and the identification of barriers and thresholds for transitions in governance created by both spatial and temporal cross-scale interactions. Through the analysis of peer-reviewed and grey literature on the ecology, hydrology, geology, history, and demography of the Basin—including court cases, statutes, government documents, and other public records—I outline the dynamic interactions that have defined the Klamath social-ecological system through different time periods leading to the most recent phases of collapse and reorganization that produced the Klamath Agreements. In Chapter 3, I generate the contextual evidence for assessing the potential emergence of AG in the basin between 2001-2010. Only through this detailed review and discussion of internal forcing factors and cross-scale interactions acting upon the Klamath SESs am I adequately able to analyze a trajectory towards institutionalization of AG in Chapter 4.

As such, in Chapter 4 I apply the framework presented in Chapter 2 to identify and discuss evidence of AG emergence and institutionalization in the Klamath Basin between 2001-2010. I utilize the historical narrative of events outlined in Chapter 3 to unravel the political nature of resource use and protection in the Klamath and the effect of these political interactions on a transformation toward AG. I review the multitude of evidence supporting the emergence of AG in the basin, including but not limited to: 1) the *emergence* of individual leadership from crisis and the development of shadow networks of communication which guided management decisions in an informal manner; 2) *participation* and inclusion of interests from across the 3) *bioregional scale* of the

basin, including underrepresented interests and geographies; 4) a visible and measurable *shift in power relations* amongst governance actors and groups traditionally at odds over the management of basin resources; 5) a substantial increase in *social-learning* as a result of formalized water negotiations for the settlement of Indian water rights and FERC relicensing; and 6) the formalization of *institutional change* as recognized in the terms of the Klamath Agreements. Through this analysis, I discuss how the processes that led to the KBRA and KHSA provide evidence of important AG dynamics such as the self-organizing process of emergence, critical exploitation of windows of opportunity, and the range of institutional change that can result. Further, using the analytical approach of political ecology, I dissect the tangled "webs" of power relations that explain much of the nested, political interactions that ultimate led to the Klamath Agreements (Blaikie and Brookfield 1987; Rocheleau 2008).

I conclude Chapter 4 with a brief commentary on the status of the agreements today and subsequent ramifications for AG. The Klamath process showcased the necessity of robust alternative dispute resolution and conflict management techniques, support from the highest levels of government, a dedicated commitment from an inclusive and diverse set of resources users, the best available science and scientists, and complex political maneuvering. Informal governance networks and shadow politics played a critical role in deciding the terms of the Klamath Agreements. Because the bioregional scale of AG will generally intersect a myriad of administrative boundaries, and the reality of setting up a single, legitimate governing body is unlikely, informal governance often takes over in the form of networks, agreements between parties, and social norms. In the Klamath Basin, informal governance was a product of political and personal relationships between individuals—individuals who had identities tied to opposing the very individuals with whom they were now building relationships: irrigators vs. tribes; farms vs. fish; fishermen vs. tribes; irrigators vs. fishermen; and environmentalists vs. irrigators. A transformation in governance towards a more adaptive form was fueled by nested transformations within the system—including personal transformation. The transformation toward AG in the Klamath Basin was necessary to define the use and protection of scarce water resources, but in the end, it became more

about social-ecological balance and dealing with future uncertainties than about managing any single resource. While a transformation is arguably still taking place, the Klamath Agreement process highlights a transformation toward AG—a social and ecological restoration process—that may allow for a more coordinated approach to governing a desired system state through improved communication and a shared vision for collectively governing resources at a meaningful bioregional scale.

Overall, I conclude that the framework developed in Chapter 2 (and the associated methodolgy) is useful to reveal the Klamath Agreements as evidence of a transition towards AG in the Klamath bioregion. The Klamath governance transition intimately reflects current conceptualizations of AG and provides a narrative with which to compare further empirical examples of transformations toward AG. However, I also conclude that political forces acting upon the AG processes of emergence and institutionalization have the potential to reinforce ecological degradation and social marginalization in terms of access to resources. The inherent danger of transformations toward AG is that the resulting approach to governance and associated management decisions may not reflect the best solutions for governing a SES because of the unequal influence of powerful political actors, networks, or organizations, potentially coopting the processes of a transformation to AG. Thus, any empirical investigation of AG must include an explicit recognition of the role of power in politics in shaping governance transformation. With that in mind, the most pressing work to be done with regard to AG is to determine how to: 1) foster conditions that allows emergence of AG inclusive of all legitimate governance interests (including underrepresented groups); and 2) support a degree of AG institutionalization that promotes socially and environmentally just governance outcomes.

2. CHAPTER 2. THEORETICAL FOUNDATIONS OF ADAPTIVE GOVERNANCE IN SOCIAL-ECOLOGICAL SYSTEMS

2.1 Introduction to Adaptive Governance

As humans enter an age of unparalleled resource consumption, the inherent link between social and ecological systems increasingly reveals itself to be significant. Anthropogenic global warming and accelerated rates of biodiversity loss are just a few of numerous indicators that social and ecological systems do not and cannot exist in isolation, but instead exist as a complex whole, each a function of the other and expressed in a series of complex feedbacks (Berkes and Folke 1998, Berkes et al. 2003). Managing the complex relationship between the social and the ecological through approaches to resource or environmental governance is of paramount concern for those interested in establishing sustainable natural resource use patterns. Environmental governance can be viewed as both a link between the social and the ecological, and a mechanism to influence the trajectory of social-ecological systems (SESs).

Broadly, environmental governance can be thought of as a "set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes" (Lemos and Agrawal 2006, 298). Brunner et al. (2005) define environmental governance with an emphasis on the role of scientifically derived information about ecosystem function in decision making, while Kay et al. (2001) characterize the concept in a more normative way, as the process of resolving trade-offs and of providing a vision and direction for sustainability. Although I contend that appropriate governance processes increase the likelihood that "good governance" choices are made, I take a value neutral approach to the goals of environmental governance (Lockwood 2010). In short, environmental governance is the system of institutions (including rules, laws, regulations, policies, and social norms) and organizations involved in governing environmental resource use and/or protection, and there are a variety of different approaches.

One emergent approach is that of adaptive governance (AG). AG is an outgrowth of the theoretical search for modes of managing uncertainty and complexity in SESs (Dietz et al. 2003, Walker et al. 2004, Folke et al. 2005, Folke 2006). Given the

uncertainties associated with global environmental change, including climate change and massive shifts in land-use, environmental governance systems going forward must be highly adaptive. Governance systems, particularly those of top-down, state-based orientation, rarely match a relevant scale of ecological complexity, especially in the face of rapid environmental change (Young 2002). Centralized governance via top-down directives or command-and-control policies often fails to provide effective solutions for acutely contextualized situations, and also often falls short in efforts to coordinate governance across large-scale ecosystems that cross multiple jurisdictional boundaries (Lemos and Agrawal 2006). In response, a growing number of bottom-up approaches to governance have emerged via groups of local actors, social networks, and various collaborations of community leaders sensing the need for alternatives to top-down government and new approaches to environmental decision making (Weber 2003, Brosius et al. 2005). However well received and effective these pockets of local governance can be, they too suffer from coordination problems across complex geographies, e.g. large river basins (Cosens et al. 2014). Additionally, local governance is not always inclusive of all voices, especially those of stakeholders who are marginalized by dominant power relations and deprived of rightful access to resources, e.g. indigenous communities. There is a need, therefore, to champion new approaches to environmental governance capable of confronting landscape-scale problems in a manner both flexible enough to address highly contextualized SESs and dynamic and responsive enough to adjust to complex, unpredictable feedbacks between social and ecological system components.

AG is increasingly called upon to fill the need for a governance approach to confront complexity and uncertainty (Dietz et al. 2003, Folke et al. 2005, Lebel et al. 2006), and the concept is being applied in a variety of arenas. For example, theoretical and empirical exploration of AG is ongoing in disciplines of international trade (Cooney and Lang 2007), health research (Andrew and Kendra 2012), political science (Heilmann and Perry 2012), disaster research (Djalante 2012, Djalante et al. 2011), and appropriately, in law (Ebbesson and Hey 2013, Garmestani et al. 2013, Garmestani and

Allen 2014). In this chapter, I organize and clarify conceptualizations of AG posed in literatures on environmental governance, resilience, and the management of SESs.

Speaking directly to that literature, over a decade has passed since Dietz et al. (2003) formally coined the term "adaptive governance" in *Science*, and nine years have passed since Folke et al. (2005) presented AG as a system to mediate the social conflict that plagues adaptive management of complex ecosystems. Since 2004, use of the term "adaptive governance" has grown tremendously (Figure 2.1), but a review of the literature suggests that consistent use of the term and an explicit research agenda have not yet coalesced. A synthesis of the literature on AG is thus necessitated by two related issues: 1) the search for new models of environmental governance that can address the dynamic, large-scale nature of the most pressing environmental crises; and 2) the widespread and growing interest in AG as a potential model. I address this need in my dissertation by articulating a clearer vision of the drivers, components, and pathways to AG.

In the remainder of this chapter, I aim to: 1) provide an overview and brief chronology of the major scholarship on AG and its development in the environmental governance, SES, and resilience literatures; 2) synthesize existing theoretical and empirical literature on AG into an integrated definition that characterizes governance systems as AG; 3) explore and critique underdeveloped discussions in the AG literature, e.g., the concept of a "desired state" for SESs, and the relationship between AG and adaptive management; and 4) suggest a framework that not only organizes previously posited characteristics and peripheral concepts characterizing AG, but also serves as a guide for identifying and describing empirical examples of AG.

2.2 Theoretical Foundations and Major Works

A *Web of Science*[11] topic search for "adaptive governance" reveals that citations have increased dramatically since 2004 (Figure 2.1). The top two cited articles returned in this search, Folke et al. (2005) and Folke (2006) are cited 696 and 611 times,

[11] The *Web of Science* search engine name is a registered trademark of the Thomson-Reuters Corporation, New York, NY.

respectively (1545 and 1462 times respectively according to *Google Scholar*[12]). This 'keyword search' of peer-reviewed publications indexed within *Web of Science* does not reveal all references relevant to AG. For example, the search does not highlight the initial article proposing AG, Dietz et al. (2003), cited 739 and 1944 times according to *Web of Science* and *Google Scholar* respectively. For the literature review presented in this chapter, I use a combination of *Web of Science* and *Google Scholar* searches as well as a snowball sampling of citations within foundational articles in order to identify key references related to the genesis, definition, and application of AG (Table 2.1).

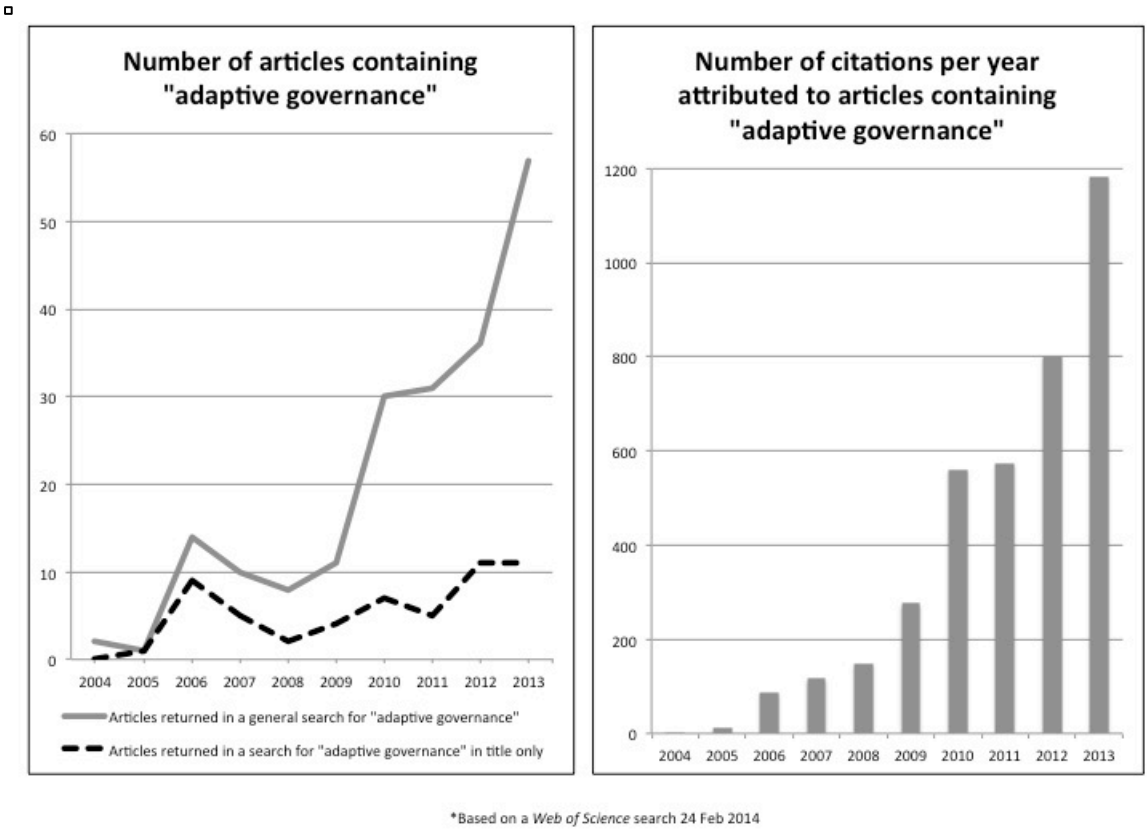

Figure 2.1. Adaptive governance citation record since appearance of term (2004-2013)*

[12] *Google Scholar* is an open-access web search engine that indexes scholarly and peer-reviewed literature across disciplines, operated by Google, Mountain View, CA.

Table 2.1. A chronological timetable of foundational references defining adaptive governance.

Year	Author(s)	Times Cited*	Publication	Definition	Contribution	Research
2003	Dietz et al.	739	*Science*	Managing diverse human-environmental interactions in the face of extreme uncertainty.	Coined term	Theoretical
2004	Walker et al.	480	*Ecology & Society*	The process of creating adaptability and transformability in SESs; the evolution of rules that influence resilience during self-organization.	Placed AG within the context of resilience scholarship.	Theoretical
2004	Olsson et al.	111	*Ecology & Society*	Dietz et al. 2003	First case study to analyze a transition to AG; highlights the role of social transformation.	Empirical
2005	Brunner et al.	n/a	Edited Book	Scientific and other types of knowledge integrated into policies that advance the common interest in environmental governance through open decision-making structures championed by community-based initiatives.	Contrasts AG against purely technocratic scientific management focused on efficiency and implemented through bureaucracy. Recognizes the need to include and balance a wide array of community interests in environmental governance as well as both scientific and local knowledge.	Both
2005	Folke et al.	696	*Annual Review of Environment and Resources*	The social contexts necessary to manage resilience in SESs.	Proposes the first comprehensive review and definition of AG. Relates AG to previously established concepts of adaptive management and adaptive comanagement. Foundational cite for building upon what is needed for successful AG.	Theoretical
2005	Scholz & Stiftel	n/a	Edited Book	The evolution of new governance institutions capable of generating long-term, sustainable policy solutions to wicked problems through coordinated efforts involving previously independent systems of users, knowledge, authorities, and organized interests.	Authors espouse a vision for the practical importance of developing AG concepts. They address five challenges to creating AG institutions: representation, process design, scientific learning, public learning, and problem responsiveness.	Empirical
2006	Olsson et al.	194	*Ecology & Society*	Dietz et al. 2003; Folke et al. 2005; environmental governance regimes that can deal with uncertainty and change.	Presents the importance of "windows of opportunity" in governance transformations toward AG. Links the concept of "transformability" (Walker et al. 2004) with early definitions of AG.	Both
2006	Folke	611	*Global Environmental Change-Human and Policy Dimensions*	Folke et al. 2005, but adds that systems of adaptive governance allow for management of essential ecosytem services through transformations in SES governance (as opposed to adaptation alone).	Folke links the aims and scope of environmental governance research with concurrent theoretical developments in literature on ecosystem services (see Carpenter et al. 2006); solidifies AG's place within resilience literature/scholarship.	Theoretical
2006	Gunderson & Light	55	*Policy Sciences*	Dietz et al. 2003; Folke et al. 2005; The integration of science, policy and decision making in systems that assume and manage for change as opposed to against it.	Thorough discussion and clarification of the relationship between adaptive management and AG.	Empirical
2007	Pahl-Wostl et al.	67	*Ecology & Society*	Folke et al. 2005	The learning environment fostered by AM is critically required for functioning AG, not just scaled up, but instead creating redundancy of learning through networks and across all scales and levels.	Theoretical
2007	Olsson et al.	55	*Ecology & Society*	Folke et al. 2005; a form of governance suitable for dealing with complex SES and enhancing the fit between institutions and ecosystem dynamics.	The authors develop the concept of "fit" between ecosystems and governance systems through more accurate scale matching and the function of bridging organizations.	Empirical
2008	Armitage et al.	146	*Global Environmental Change-Human and Policy Dimensions*	Brunner et al. 2005; Folke et al. 2005	Begins to recognize and link the subtle differences in terminology between the adaptive comanagement literature and AG literature.	Theoretical
2008	Olsson et al.	85	*Proceedings of the National Academy of Sciences USA*	Dietz et al. 2003; Folke et al. 2005	AG criteria are critical for transformations in governance. Transformations in perception (i.e. social transformation) through public involvement should not be overlooked as a window of opportunity for transformations in governance.	Empirical
2009	Huitema et al.	65	*Ecology & Society*	Folke et al. 2005; Olsson et al. 2006; authors never explicitly define AG, but their review of the ACoM literature with governance literature creates a synthesis very close to previous definitions of AG.	Present four key prescriptions for ACoM (with specific reference to water resources) extracted from literature on "governance." Polycentric governance, public participation, experimentation, and bioregional scale are also key contributions as prescriptions of AG.	Theoretical
2009	Pahl-Wostl	134	*Global Environmental Change-Human and Policy Dimensions*	Dietz et al. 2003; Folke et al. 2005; AG is essential for governing SESs at times of abrupt change.	Presents a framework that characterizes AG as a multi-level learning process for clarification of how AG functions; supports the role of informal networks in AG as a critical part of the learning process.	Theoretical

**Based on Web of Science statistics gathered 24 February 2014.*

2.2.1 Common Beginnings

Based on a high profile National Research Council (NRC 2002) report on the state of managing common-pool natural resources, Dietz et al. (2003) first recognized the need for "adaptive" governance of SESs because our knowledge of any system is likely to be wrong or at least incomplete, and the required scale of governance may shift due to changes in the biophysical and social system components. Research on collective action with specific attention to common-pool natural resource use revealed that effective governance conditions include systems in which: 1) resources and use can be monitored, verified, and understood at a relatively low cost; 2) rates of change are moderate; 3) communities have dense, intimate networks; 4) outsiders can be excluded at a relatively low cost; and 5) users support effective monitoring and enforcement (NRC 2002, Dietz et al. 2003). However, these conditions rarely (if ever) exist in coordination with one another. Instead, actual resource governance scenarios are generally predicated on incomplete information and conflicting or changing human values (Ostrom 2005). Dietz et al. (2003) therefore recognized the need for a system of resource governance that is highly adaptive and allows rules to evolve from feedbacks originating both in the human and biophysical realms as well as combined elements of the system. This suggested form of "adaptive governance" of SESs requires adequate information about the resource (ecological), values (social), the human-environment interactions (feedbacks through monitoring) as well as the most up-to-date information on uncertainty (Dietz et al. 2003). Dietz et al. (2003) also proposed the first general list of criteria necessary for AG: inclusive dialogue between resource users (analytic deliberation); complex, redundant, layered institutions (nesting); mixed institutional types (e.g. market- and state-based); and institutional designs that facilitate experimentation, learning, and change. The authors also defined what AG should do, thus providing a prescriptive research agenda going forward: 1) provide information (science and local knowledge); 2) deal with conflict; 3) induce rule compliance; 4) provide infrastructure; and 5) be prepared for change.

2.2.2 Situating Adaptive Governance in Resilience Scholarship

Much of the foundational AG literature approaches governance of SESs in terms of resilience—the capacity of a SES to absorb both natural and human disturbance while still maintaining structure and function (Holling 2001, Gunderson and Holling 2002, Folke 2007). An important component of a system's resilience is its ability to reorganize in the face of sudden change (Holling 1973). Scholars of resilience call for AG to deal with uncertainty in the face of unexpected disturbance or sudden change by either building resilience in the current state of the SES or facilitating transformation to an alternative state of system function (Walker et al. 2004, Folke et al. 2005, Folke 2006). Some authors refer to this as incremental v. transformative resilience building in SESs (Nelson et al. 2007, Pahl-Wostl et al. 2007). Using the terms "adaptability" and "transformability" to define properties of a SES and its associated governance institutions, Walker et al. (2004) firmly situated AG in the context of resilience scholarship. Governing SESs from a resilience perspective shifts the role of governance institutions and organizations from limiting change to managing and shaping the ability of a system to cope with, adapt to, and allow for further change (Berkes et al. 2003, Folke 2006, Gunderson and Light 2006).

Olsson et al. (2004b) presented an early case study analyzing a governance transformation under the resilience paradigm that took place in a wetland landscape in southern Sweden and involved the creation of a collaborative governance organization. Many of the factors critical to this transition, such as individual leadership and stakeholder dialogue, were associated purely with the social dimensions of SES transformation. Olsson et al. (2004a) framed the resulting governance institutions as "adaptive comanagement" (cited by others as "adaptive co-management" (e.g. Armitage et al. 2008) and "adaptive (co-)management" (e.g. Huitema et al. 2009)). Many of the early empirical and theoretical contributions to AG are framed in terms of adaptive comanagement, and although more aligned with the expansion, operationalization, and scaling of adaptive management, I feel that often (but not always) adaptive comanagement is used synonymously with AG (e.g. Hahn et al. 2006, Olsson et al. 2004a, 2004b, 2006, 2007, Huitema et al. 2009). Plummer et al. (2013) offer an excellent

discussion of the relationship between environmental governance (and AG) and adaptive comanagement. In the further consideration of AG concepts, I include foundational sources from the adaptive comanagement literature and draw distinctions in terminology where appropriate.

As a seminal work in the development of AG, Folke et al. (2005) presented AG as the social contexts necessary to actively manage resilience in SESs. Folke et al. (2005) suggested that adaptive management of resources alone is not enough to ensure resilient and sustainable outcomes because adaptive management is too narrowly focused on ecosystem outcomes. An exploration of the social contexts that enable adaptive management, they argued, could help to identify and avoid barriers to governance transformations at a scale larger than the management of specific resources. Folke et al. (2005) articulated a comprehensive set of criteria necessary for a successful governance transformation toward AG. Most criteria are a function of social capital and include: knowledge generation and learning, organizational learning, collaboration, devolution of management rights or power sharing, participation, organizational flexibility, trust, leadership, social memory, and the formation of actor groups or teams (Folke et al. 2005).

Folke et al. (2005) also contended that AG is operationalized by adaptive comanagement. It is tempting here to relate the two via a simple scaling up from adaptive comanagement to AG, but instead Folke et al. (2005) suggested that adaptive comanagement represents important, nested processes such as the collaboration and learning that are associated with specific resource management objectives, and, without which, AG could not function. Alternately stated, adaptive comanagement consists of scaled approaches to resource management provided for and coordinated within an adaptive and collaborative learning environment fostered by AG (Olsson et al. 2006). It is important to note that in order to create such an environment, AG requires functioning social networks that connect individuals and organizations across multiple levels and scales (Folke et al. 2005). Similarly, Olsson et al. (2006) introduced the importance of shadow networks and key leaders in taking advantage of windows of opportunity for governance system transformations toward AG. The authors presented a set of case studies from around the world to depict governance transformations to AG in two phases:

preparing the system for change and navigating that change. This seminal article directly connected the proposed structure of AG (Folke et al. 2005) with the concept of transformability (Walker et al. 2004), which has bearing on the likelihood of emergent AG to take advantage of windows of opportunity for further growth and institutionalization. Under the right conditions, they theorize, AG is an adaptation or transformation in social organization to better achieve an agreed-upon ecological vision.

According to Nelson et al. (2007), "[s]uccessful adaptation… [is] steering processes of change through institutions…" (409). This insight hints at the normative nature of most characterizations of AG—adaptability and transformability are seen as necessary characteristics of governance regimes, employed to guide an SES toward a "desired ecosystem state" (Folke 2006, Walker et al. 2004), e.g. "ecosystem health" (Rapport et al. 1998). Some discussion has proceeded in the literature regarding the implications of this normative stance (Adger et al. 2005, Nelson et al. 2007, Smith and Stirling 2010) but I suggest that more attention should be paid to the potential disconnects between what science tells us is necessary for a healthy ecological system, what society wants from that ecosystem, and perhaps more importantly, what is politically feasible. The resilience literature outlines the objectives of a system of AG—to reach and maintain a desired state for coupled SESs—but who and what sets of values determine the desired state, in both ecological and social terms? I revisit this idea in later in this chapter, under section 2.4.1.

2.2.3 Concurrent Conversations: Collaborative Natural Resource Management

While AG was developing as an outgrowth of resilience scholarship, a different group of scholars concurrently adopted the term to explain governance changes taking place in policy arenas with relation to the emergence of community-based natural resource management (CBNRM). Brunner et al. (2005) offered a practical view of AG in their edited volume, *Adaptive Governance: Integrating science, policy, and decision making*, as an alternative to legal and political gridlock in resource governance. The authors presented AG as a framework for adapting "policy decisions to real people" and for the "adaptation of policy decisions on the ground" through examples of both

successful and unsuccessful transitions to AG (Brunner et al. 2005, 19). They further suggested that AG cannot be reduced to a list of specific prescriptions, but is instead context dependent, and thus "a pattern of practices" (Brunner et al. 2005, 19). I suggest that the type of narrative case study presented in Brunner et al. (2005) has been previously framed as collaborative conservation (Cestero 1999, Snow 2001, Wondolleck and Yaffee 2000), civic environmentalism (DeWitt 1994), community-based initiatives (Brunner et al. 2002), and CBNRM (Brosius et al. 2005, Dressler et al. 2010). Taken together, this literature documents techniques, tools, and case studies of consensus building and conflict resolution in natural resource decision making—all potentially foundational for fostering emergent AG.

Literature on CBNRM highlights the importance of local resource management initiatives for resolving contestations over resource use arising at small scales and often involving livelihoods that are (seemingly) incompatible with higher-scale policy directions (Brosius et al. 2005, Dressler et al. 2010). CBNRM initiatives also have the potential to infuse larger-scale resource use conflicts with local knowledge, leadership, and capacity (Brosius et al. 2005). However, this approach alone is not fully adequate to manage natural resource conflicts. Community-based initiatives often suffer from a lack of governing authority, legitimacy, funding, adequate flow of knowledge and resources, and sustained leadership (Brosius et al. 2005, Brunner et al. 2005). Furthermore, they function at a scale smaller than most ecosystems they rely on, leaving them vulnerable to change outside their sphere of influence (Cash et al. 2006). Several governance scholars have suggested that AG has the potential to address failures of CBNRM by bridging locally oriented resource management initiatives with larger-scale government interests for the development of improved environmental governance policies (Nelson et al. 2008; Scholz and Stiftel 2005). Theoretically, AG is an approach to governance in which CBNRM initiatives are not inhibited, but instead integrated into a broader framework of governance to achieve a desired state in SESs through either adaptation or transformation.

2.3 Characterizing Adaptive Governance

A review of AG definitions and the contributions of major works (see Table 2.1) reveals that AG is viewed as a system of environmental governance with the potential to mediate the vast complexity and uncertainty inherent in SESs. AG can be thought of simply as the social conditions that enable ecosystem management through the implementation of adaptive management (Folke et al. 2005; Gunderson and Light 2006). AG encompasses the social contexts that collectively reconcile what humans want from ecological systems, e.g., a certain level of function or a specific set of services. Despite this explicitly normative outcome of AG, the concept can still be thought of as value neutral, i.e. neither good nor bad. For example, a system of environmental governance focused on rapid resource extraction can exhibit properties of AG similar to that of a system with a goal of sustainable resource use; the determining factor is what is prioritized in governance. With that in mind, AG of SESs can be broadly defined to represent:

> *A spectrum of hybrid approaches to environmental governance emerging in pursuit of a desired state for social-ecological systems*.

In the remainder of this section I synthesize insights from existing scholarship on the characteristics and features of AG.

2.3.1 The Role of Adaptive Management

Brunner et al. (2005) wrote that the "rise of community-based initiatives marks the emergence of adaptive governance from the remnants of scientific management in certain places…" (19). Beginning with Holling (1978), scholars (particularly resilience scholars) have recognized that the bureaucratic and efficiency-driven maximum-sustained yield (MSY) paradigm (part of what Brunner et al. (2005) refers to as "scientific management") is inadequate in the face of inherent uncertainty about ecosystem dynamics. Instead, adaptive management, where experiments become policy and results are continuously monitored to further inform that policy, is the preferred approach (Walters 1986, Walters 1997, Lee 1999, Gunderson 1999). Dietz et al. (2003) recognized

the inherent relationship between AG and adaptive management early on, referring to AG as the social contexts that facilitate adaptive management.

Although not explicit, Brunner et al. (2005) began to articulate two fundamental aspects of the dialogue linking adaptive management and AG. First, without the science-based monitoring and feedback loop made possible by processes of adaptive management, AG will fail to account for uncertainty and non-linearity in the response of ecological systems to management actions. Gunderson and Light (2006) built on Brunner et al.'s (2005) arguments concurring that adaptive management is a "critical component" of AG—one that focuses on integrating science with decision making to foster a greater learning environment in the face of uncertainty (325). In a discussion of water resource management, Pahl-Wostl et al. (2007) also explored the importance of adaptive management in fostering learning processes—generating feedback of information essential for guiding a vision and goals of AG. Multiple, nested implementations of adaptive management within a framework of AG create a 'culture of learning' that can provide a continuous flow of new information used to coordinate resource management across the SES (Cosens and Williams 2012, Folke et al. 2005).

Second, in complex SESs, adaptive management requires AG to be successful (Brunner et al. 2005, Gunderson and Light 2006, Huitema et al. 2009). Adaptive management has been difficult to implement due to the complex political nature of carrying out experiments with the goal of adjusting policy in response to monitoring results—no small feat given the short time frames associated with modern political cycles (Cosens 2010; Allen and Gunderson 2011). With the possible exception of single owner/single goal management, or totalitarian governments where adaptive management alone might be sufficient, implementation of adaptive management without the inclusion of governance principles will lack legitimacy and ultimately fail (Cosens 2010). AG employs networks to coordinate multiple adaptive management learning processes across levels of governance, while recognizing, working within, and shaping the complex social system within which governance goals are set (Folke et al. 2005). Cosens and Williams (2012) even use the term AG to indicate "the type of governance necessary to allow sufficient flexibility for adaptive management."

2.3.2 Finding a Governance "Fit" Between Social and Ecological Variables

Rijke et al. (2012) found that any lasting AG regime must operate on a scale with the best "fit" between social and ecological components of a system. However, finding adequate "fit" between governance systems and ecosystems is elusive due to the complex nature of biophysical systems (e.g. groundwater), the 'built' human-natural environment (e.g. dammed river basins or transbasin diversions), and the myriad of established and transient political boundaries. Olsson et al. (2007) discussed "enhancing fit" between ecosystems and governance systems as part of AG, suggesting a focus on three key social connectors: 1) leadership by individual actors; 2) coordinating actors across a multilevel governance system through networks; and 3) activating social memory stored in social networks. The authors also suggested that institutions are often mismatched with ecosystem dynamics and that AG relies upon moral, legal, and financial support from networks in order to connect governance with a specific scale of ecosystem dynamics to produce "adaptive governance that enables ecosystem management" (Olsson et al. 2007).

Huitema et al. (2009) introduced the concept of matching AG to a "bioregional scale," an operational scale where ecosystems and institutional arrangements are compatible. A bioregional scale crosses administrative and political boundaries and focuses on the optimization of governance by aligning ecological goals and social feasibility (Huitema et al. 2009). The bioregional scale mirrors the idea of a "problemshed": a geographical area affected by the environmental "problem" prioritized in management (Mollinga et al. 2007, USBOR 2014). That said, such a "fit" will vary from problem to problem and may change over time due to the variable political, economic, and cultural drivers that often determine jurisdictional boundaries (Ruhl and Salzman 2010, Rijke 2012). Introducing even greater complexity are situations in which the source of the problem occurs at a different scale than the locus of the affected people (Long 2009). Ideally, the scale of AG will be adapted to the social and ecological nature of the problem as well as to societal goals, through sufficient response flexibility within and between existing political boundaries (Termeer et al. 2010).

2.3.3 Polycentricity, Redundancy, and Diversity

As AG theory developed, scholars described the need for AG institutions and organizations to be nested across levels of governance, structured with multiple centers of power, redundant in function, and connected across space through networks (Dietz et al. 2003, Folke et al. 2005, Folke 2006, Huitema et al. 2009). These criteria are all related. A multilevel governance system made up of multiple governing authorities will generally house multiple centers of power that partially overlap and are often redundant within a given scale (McGinnis 1999). The term polycentricity or polycentric is used to describe multiple centers of power or decision making with authority divided amongst bodies with overlapping jurisdictions (Ostrom et al. 1961, McGinnis 1999, da Silveira and Richards 2013). Higher scales of governance are usually more generalized but house nested layers (or levels) of governance institutions with increasing specificity (Huitema et al. 2009). Polycentricity is thus related to redundancy in power relations, which is necessary for AG to continue to function in the face of disturbances and surprise (Huitema et al. 2009). Theoretically, an AG system requires a structure of nested institutions (complex, redundant, and layered) and institutional diversity (a mixture of market, state, and community organizations) at the local, regional, and state levels, connected by formal and informal social networks (Dietz et al. 2003).

As the past decade of AG scholarship reached its halfway point, the focus began to shift from major theoretical contributions and foundational empirical examples to a search for real world examples of adaptations and transformations that resemble conceptualizations of AG. Many potential examples of AG have been described, such as: the AG of Amazon deforestation (Boyd 2008); regional drought governance in Australia (Nelson et al. 2008); AG of the Great Barrier Reef World Heritage Site (Olsson et al. 2008); collaborative water governance in the California Bay Delta (Kallis et al. 2009); AG of climate change effects in the Pacific Islands (Lynch and Brunner 2010); AG in the English National Park protected landscapes (Clark and Clarke 2011); and assessments of AG in Model Forest reserves in Russia and Sweden (Elbakidze et al. 2010, 2012), among others. Theoretical work continues concurrently, however, including an increased focus

on learning processes (e.g. Armitage et al. 2008, Pahl-Wostl 2009) and the role of adaptive capacity in AG (e.g. Pahl-Wostl 2009, Gupta et al. 2010).

2.4 Discussion: Ongoing Conversations and Unanswered Questions

Having presented a chronology of key scholarship on AG as well as a synthesis of associated criteria and processes, I turn now to address some ambiguous and underdeveloped conversations on AG before concluding with a future research agenda. First, I suggest that the concept of AG as the pursuit of a "desired state" need to be unpacked, with particular consideration of the role of values and the principles of "good governance." Second, I identify unanswered questions about the conditions under which AG emerges, including the role of power and politics therein. And third, I call for further exploration of the question of whether and how adaptive governance can become institutionalized given the many legal and political barriers that generally work to maintain the status quo, and whether interventions such as legal reform can catalyze or complete transformations towards adaptive governance.

2.4.1 Disentangling the Role of the Desired State

In the context of AG of SESs, many, if not most scholars approach AG in terms of a vision for sustainability (e.g. Folke et al. 2005, Sanginga et al. 2010) and more specifically, as a "precondition for the emergence of sustainable development" (Clark and Clarke 2011, 314). Brunner and colleagues refer to the goal of AG as pursuing a "common interest" amongst stakeholders and public(s) involved in resource management (Brunner et al. 2002, Brunner et al. 2005, Brunner and Lynch 2010), while Olsson et al. (2007) discuss AG in the context of maintaining "the capacity of complex and dynamic ecosystems to generate services for human well-being." All these normative connotations suggest AG as the pursuit of a 'desired state,' and while the resolution of tradeoffs is an inherent function of governance, the problem associated with AG then becomes how the desired state is mediated during the process of transformation.

In most examples put forth as AG, the desired state is referenced as a set of ecological outcomes, generally agreed upon by users in the system, which not only necessitate a shift in governance in order to attain, but also serve to guide that shift (e.g.

Olsson et al. 2004b, 2008). However, in the context of AG of a SES, the desired state would theoretically include desirable social and governance outcomes as well, thus creating confusion as to whether AG itself is part of the desired state. This leads to a several important questions regarding the role of the desired state in the emergence of AG: 1) what is the relationship between the human values underlying a desired state and resultant AG approaches; and 2) how is a desired state identified and employed to initiate a shift in governance towards AG?

Separating the pursuit of a desired state from the values influencing this pursuit of outcomes may be counterproductive to realistic evaluations of processes leading to AG, including self-organization and emergence. If I assume AG emerges as the pursuit of a desired state (specific ecological and social outcomes), then deconstructing the context of that desired state could lead to a more complete understanding of AG. For example, do the values underlying the pursuit of a specific desired ecologic and social state have any bearing on the resultant structure, scale, timeliness, and resilience of AG? What social and governance factors are themselves part of a desired social-ecological state? Can AG theoretically achieve desired ecological outcomes at the expense of "good governance"? Or alternatively, are the principles of good governance (specifically legitimacy, transparency, accountability, inclusiveness, equity, and fairness) inherently part of a desired state for SESs and thus necessary for any transformation toward AG (Lockwood 2010)? In other words, is a shift toward AG of SESs just a shift toward good governance in the face of complexity and uncertainty?

An implicit assumption in my definition of AG is that a shift in governance towards AG, and thus the pursuit of a desired state, will only occur when the current state of an SES is undesirable, untenable or both (e.g. loss of important ecosystem function such as filtration, pollination, flood abatement, or on the other hand, social unrest such as conflict over the allocation of scare resources). What is unclear, however, is how this pursuit of a desired state emerges amongst entrenched resource users and established levels of governance, even in the face of resource crisis. Does the desired state need to be established publicaly? Although alternative forms of collaborative governance (including AG) have been critiqued for their call for consensus (e.g. Ansell and Gash

2008), it is unclear whether or not the desired state requires consensus amongst resource users and governance stakeholders in order to be pursued. Alternatively, is it enough to simply attempt to find consensus with every possible effort until critical mass is reached behind a desired state (Innes and Booher 2010)? If a shift towards AG is a reaction to the status quo controlling resource governance, how are established power relations challenged? These questions build the base for important discussions only beginning to take hold on the relationship between the emergence of AG and the values underlying both the motivation for its emergence as well as potential outcomes of its establishment.

2.4.2 Understanding How Adaptive Governance "Emerges"

Scholars refer to AG as an "emergent" form of governance (Folke et al. 2005, Olsson et al. 2004a, da Silveira and Richards 2013, Österblom and Folke 2013). By definition, the adjective refers to AG as "coming into view or notice" or "coming into existence, especially with political independence".[13] By and large, the term is an adequate descriptor of AG. Fledgling systems of AG emerge from other forms of environmental governance, particularly from systems of uncoordinated resource management embedded across multiple layers of governance. AG emerges as a potential solution to situations where existing environmental governance can no longer mediate between social goals and biophysical conditions.

The emergence of AG has been considered a form of self-organization (Folke et al. 2005) or "order out of chaos" (Prigogine 1971)—the exploration of a wide array of possible system configurations to determine more robust (and lasting) outcomes based on social-ecological contexts. Levin (1999) provides a definition of self-organization relevant to complex SESs and potentially relevant to governance as a complex adaptive system:

> [S]*elf-organization* provides a unifying principle that allows us to provide order to an otherwise overwhelming array of diverse phenomena and structures. By self-organization I mean simply that not all the details, or "instructions," are specified in the *development* of a complex system. The specifics are often simple rules that

[13] Definitions according to Dictionary.com, accessed 3 April 2014. Second quote definition (above) refers generally to the emergent of new political structures such as nation states.

> govern how the system changes in response to past and present conditions rather than in some goal-seeking behavior. The distinctions between these may seem subtle… however, self-organization characterizes the development of complex adaptive systems, in which multiple outcomes typically are possible depending on accidents of history (12, *emphasis retained*).

Despite the apparent contradiction between Levin's suggestion that self-organization is not necessarily "goal seeking behavior" and my assumption that emergence of AG can be in pursuit of a desired state for the SES, I propose that the concept adequately characterizes the emergence and eventual transformation of AG structures from amongst the myriad of different historical, political, cultural, economic, and biophysical factors that interact to determine environmental governance.

Referring back to the development of AG in the resilience literature, it is apparent that in order for a system of environmental governance to begin transformation towards AG, the social components of an SES must be adequately prepared (Olsson et al. 2004b, 2006). While it is essential that a diverse array of vested stakeholders have the capacity to participate, individual leadership and trust building among stakeholders at the local level begin to drive the emergence of AG (Folke et al. 2005, Olsson et al. 2004a, 2004b, 2007). To bridge various levels of existing multilevel governance structures, networks are developed that span scales from the local to bioregional to higher scales in order to attain resources necessary to facilitate change and collaborate with those who have the power to prevent it. Further, networks facilitate the communication and integration of both scientific and local knowledge as well as serve to encourage diversity and mobilize social capital, thus generating or activating adaptive capacity for flexible response, learning and adjustment (Bodin and Crona 2009, Bodin et al. 2006, Folke et al. 2005, Lebel et al. 2006).

Olsson et al. (2006) suggest that in addition to "preparing the system," a shift in governance towards AG may require the exploitation of "windows of opportunity." These windows may appear as a significant boost in capital or legitimacy, e.g. a shift in policy, a disruptive political election, a significant increase in funding or autonomy, a biophysical perturbation such as a natural disaster, or the recognition of a previously informal network as a formal governance organization. One such example noted by

Österblom and Folke (2013) was the formalization of ISOFISH, formally a network collaboration between government, industry, NGOs, and the scientific community, created to address the commonly perceived illegal fishing crisis in the south Pacific. In an earlier example from southern Sweden, legitimacy for the emergence of AG was attained through the creation of a formal (municipal) organization without rulemaking authority, but with adequate leadership, vision, and the capacity to participate in and facilitate governance collaborations (Olsson et al. 2004b). This 'status' or formal recognition was critical to ensuring legitimacy for AG as each organization in these examples was poised to serve in a bridging function between actors, networks, and other organizations within existing structures of multilevel governance—ultimately furthering the pursuit of a desired social-ecological state (Hahn et al. 2006).

But how does a guiding vision for a new desired state arise? How are the fetters of an existing system of environmental governance shed or adapted? When does preparation for a shift in governance begin? Threats to values, both ecological and social; intractable policies confounding resource management efforts; direct competition and conflict over scarce resources; and perceptions of crisis are generally recognized as signs of an undesirable state of environmental governance (Gunderson et al. 2005, Hahn et al. 2006, Olsson et al. 2004b, 2006, 2007, 2008), as is protracted litigation and civil disobedience in certain circumstances (Cosens 2013). The contested nature of scarce resources and the potentially negative effects of forced resource redistribution can be essential in mobilizing individuals, networks, and organizations towards a shift in governance (Olsson et al. 2008, Österblom and Folke 2013). Clark and Clarke (2011) found this to be true in their study of National Park governance units in England; fixed or finite resources were important in bringing stakeholders, including organizations, into efforts to transform governance toward AG. Further Österblom and Folke (2013) found that the perceived crisis of illegal fishing and the associated negative implications for fishery resources and commercial fishing livelihoods was enough to catalyze a shift in governance, as opposed to simply generating shared beliefs and values.

Resource management crises are often catalysts for change at a particular scale (Gunderson 1999, Gunderson et al. 2005). Crises can test the adaptive capacity of an

SES, but this capacity alone may not allow for the adaptation or transformation of established governance toward AG. However, crises can precipitate "windows of opportunity" for transitions toward AG that materialize in the form of a major policy change, a disruptive political election, a significant increase in funding or autonomy, or a further perturbation such as a natural disaster (Olsson et al. 2006). Crises can also create space for the emergence of shadow governance—networks primed to exploit a window of opportunity and initiate adaptation or transformation of existing governance toward a new system of AG, controlled by a new set of variables. Lynch and Brunner (2010) characterize this shift not as a discrete choice between two types of governance, but instead a realization that fundamentally new pathways beyond the status quo are needed to address complexity and uncertainty.

However, an entrenched status quo controlling environmental governance through a combination of policy, funding, authority, or knowledge, represents a significant barrier to the emergence of AG despite the presence of windows of opportunity. The narrative of the Everglades bioregion (USA) details an empirical example of this: a federal-level, command-and-control management structure and highly sought after federal subsides, promoted the rigid maintenance of a status quo of 'crisis-and-fix' environmental governance preventing any shift towards AG despite the capacity and several potential windows of opportunity (Gunderson 1999, Gunderson and Light 2006, Light et al. 2005). Often in hindsight these dynamics are easy to identify, but if any attempt is to be made to consciously catalyze AG or create windows of opportunity for governance transitions, an explicit analysis of relevant power and politics should preclude or accompany such interventions (Armitage 2008). Without explicit recognition of power dynamics as a controlling variable in an established system of environmental governance, the pursuit of a desired state, and potentially the very definition of the desired state, may result in unforeseen environmental and social injustices stemming from the marginalization of minority cultures, religions, worldviews, and environmental ethics.

2.4.3 Building Social-Ecological Resilience in the New Desired State

By exploiting a window of opportunity, it is likely that a transition towards AG gained some measure of legitimacy within a previously established system of multilevel governance (Hahn 2011). However, navigating a window alone is not enough to predict whether AG will last. The question of 'how' AG is institutionalized once a window of opportunity is exploited is the keystone question for environmental governance scholars to grapple with moving forward. How can adaptive capacity mobilized in earlier phases be institutionalized in order to preserve essential functions such as an ongoing search to "enhance fit" between governance, ecological resources, and the desired state (Olsson et al. 2007). How can the relationships between actors, networks, and organizations built during the preparation phase, which may be "robust yet fragile", be reinforced so as to withstand future disturbances to the governance system in particular and the SES in general (Janssen 2006)? This final phase in the transformation process can also be described as the process of building resilience in governance.

Borrowing from the language of Gunderson et al. (2005), two major hurdles apparent in moving from a window of opportunity to a more resilient system of governance can be described as 1) overcoming legal and institutional "barriers" and 2) building "bridges" from current governance structures. These steps represent a significant challenge and deserve further exploration. While legal reform may be the most direct means of bridging barriers in current governance structures (Ebbesson and Hay 2013, Garmestani et al. 2013, Garmestani and Allen 2014), the complex and politically charged nature of this process in most SESs renders legal reform often infeasible in the short term. Also, the slow and complex nature of changing institutions (rules, norms, laws, policies) presents a formidable barrier to establishing AG in an SES. Often, myths and underlying perceptions must be challenged in order for progress to be made (Gunderson et al. 2005). This may require an increased capacity for conflict resolution as well as significant participatory capacity: a function of access to different forms of knowledge (e.g. traditional, local, scientific), the ability to participate in knowledge generation (Bark et al. 2012, Cosens et al. *in review*), and the presence or absence of resources that promote and enable meaningful participation in decision making processes (Brunner et al. 2005). In

addition, a deep ecological understanding derived from generation of both scientific and traditional ecological knowledge is necessary to advance resource management systems under AG (Folke 2006, Bark et al. 2012).

Prior to potential legal reform and institutional change, and as a step towards building resilience in governance, existing governance organizations theoretically will begin to legitimize emerging AG networks through trusted actors shared by both networks and organizations (Lynch and Brunner 2010, Olsson et al. 2008, Österblom and Folke 2013). In this way, organizations across an existing multilevel governance system may take up similar roles toward achieving a desired state, promoting redundancy and overlap of function, and thus buffering against perturbations to the system (Folke et al. 2005). As formalized governance organizations begin to share a common vision of governance, it is more likely that polycentricity—multiple centers of power and authority—will develop across a system (da Silveira and Richards 2013, Huitema et al. 2009). Through the cascade of connections, from individuals through networks to organizations, it is likely that some devolution of power may be possible, especially if informal networks are institutionalized as organizations and provided with some decision making authority (Österblom and Folke 2013).

The reality is, however, that organizations are not only the formalization of networks but instead often have a long history and established culture, prior political relationships and responsibilities, and operate under a rigid set of social norms. In addition, the place in which these organizations operate, i.e. the SES in question, has its own legacy context including the history, politics, and conflict surrounding environmental degradation. Although AG may begin to emerge at the level of individuals, every SES has significant contextual differences, both ecological and social, that shape how individuals and networks further organize and operate, and thus how (and if) AG can be institutionalized (Elbakidze et al. 2010, Huntjens et al. 2012).

2.5 A Framework for Investigating Empirical Examples of Adaptive Governance

My review and synthesis of relevant literature paints a picture of AG as an emergent form of environmental governance that cannot be created by a unilateral action

of government. AG is never the same in two places; it is messy, often develops organically within the context of a SES, but can also be assisted with a targeted or opportune boost in capacity. It exists across a spectrum of governance—from top-down to bottom-up, from rigid to flexible, from global to local—but never exists at one extreme. The convergence of concepts from different areas of scholarship presented in this chapter supports the proposition that governance systems, with characteristics recognized as adaptive governance, are essential for dealing with the inherent uncertainty and complexity that accompanies use of scarce resources and impending global change. Articulations of idealized AG regimes represent robust attempts to use the most relevant social theory to describe how livable solutions for communities of resource users could be possible.

Therefore, there is significant interest among governance scholars and practitioners in discovering or creating appropriate conditions for emergence and opportunities for institutionalization of AG in scenarios where social and ecological controlling variables have become eroded or untenable. The allure of forcing a transition to AG is the inherent ability of AG to deal with complexity and uncertainty. In a world increasingly at risk of the many unknown and difficult-to-predict effects of global climate change, the imperative is to create governance systems able to absorb disturbances, adapt to changing biophysical conditions, and transform when parts of the SES become untenable. While a variety of legal reforms have been suggested as potential interventions for generating AG (Ebbesson and Hey 2013, Garmestani et al. 2013, Garmestani and Allen 2014), I argue that our understanding of the phenomenon is still in its infancy and that large-scale reforms may produce significant unintended consequences. It would be wise for scholars to first undertake a worldwide, multidisciplinary effort to uncover and analyze empirical examples of governance transitions toward AG in order to enhance any consensus on the concept(s), identify ways in which current theory could or should be modified, and determine if windows of opportunity for AG already exist within current legal frameworks and other governance structures.

It is strikingly apparent that in order to advance AG scholarship, a concentrated investigation of empirical examples is needed. Governance scholars (legal scholars, geographers, political and other social scientists) would greatly benefit from the adoption of a common language with which to compare examples of AG. To that end, I propose a framework for identifying and describing potential examples of AG within their relative social and ecological contexts (Table 2.2). Informed directly by my review of literature defining a theoretical trajectory toward AG, I propose a search for empirical evidence of six major components of AG found in 'on-the-ground' transitions in environmental governance. Although the degree and order in which these components occur will vary greatly among empirical examples, it is likely that most examples of AG will display evidence of: 1) **emergence**; 2) broad **participation** of resources users and governance stakeholders; 3) the articulation of an explicit **bioregional scale** for SES governance; 4) a **power shift** in existing governance or a power shift in social variables controlling the system; 5) the development of a **culture of learning** within the SES through employing the principles of adaptive management; and 6) **institutional change** formalizing certain aspects of a new regime of AG. Although scholars have identified many other concepts integral to AG (e.g. redundancy, polycentricity, etc.), most, if not all of these concepts can be subsumed under the main components of this proposed framework (Table 2.3). In addition, a deep investigation of these six components in potential examples of AG can yield a narrative of governance adaptation or transformation that is comparable across vastly different geographical contexts (*see* Table 2.4).

Table 2.2. A framework for identifying empirical examples of transitions toward adaptive governance.

Component of AG	Description	References
Emergence	Empirical examples of AG emerge through a cascade of self-organizing individuals, networks, and organizations. The social and ecological contexts of a SES prepare the governance system for either an adaptation or transformation toward AG. The adaptive capacity of the governance system is strengthened during emergence by trust building in networks and the leadership of key individuals.	Dietz et al. 2003 Olsson et al. 2004b Folke et al. 2005 Hahn et al. 2006 Olsson et al. 2006 Österblom and Folke 2013
Participation	Critical to AG is broad, diverse participation of resource users, key governance stakeholders, and those directly affected by the management of specific resources prioritized in the governance system. Participation is organized around finding and then pursuing a desired state for the SES.	Brunner et al. 2005 Hahn et al. 2006 Huitema et al. 2009 Cosens 2013 Cosens et al. *in review*
Bioregional Scale	As AG emerges, the evolution of the desired state will help to bound or "fit" ecological resources with human communities and governance systems already established to define a hybrid SES that potentially defies both political and true ecosystem boundaries.	Olsson et al. 2007 Huitema et al. 2009 Rijke et al. 2012

Table 2.2. (*continued*) A framework for identifying empirical examples of transitions toward adaptive governance.

Component of AG	Description	References
Power Shifts	Empirical examples of AG share a commonality of change—a shift from the status quo of environmental governance towards a new system, with new controlling variables and potentially different outcomes. While windows of opportunity are often critical to realize this power shift, without some reorganization in power dynamics amongst governance actors and organizations, the emergence of AG is likely to be thwarted and polycentricity cannot be achieved.	Olsson et al. 2004b Adger et al. 2005 Gunderson et al. 2005 Olsson et al. 2006 Smith and Stirling 2010
Culture of Learning	When AG is realized, ideally adaptive management will be nested across the bioregional scale providing a constant stream of information feedback used to adjust further management decisions as well as the structure of governance. Experimentation and the scientific method will guide on-the-ground resource management as well as determining how to configure governance arrangements.	Gunderson 1999 Gunderson and Light 2006 Pahl-Wostl et al. 2007 Huitema et al. 2009 Pahl-Wostl 2009
Institutional Change	AG cannot be fully realized without some evidence of lasting institutional change, e.g. the formalization of networks into governance organizations, altered or reformed laws or rules, or successfully challenged myths as evidenced by changed perceptions and norms. Checks and balances on governance may emerge, ensuring that AG is also "good governance."	Dietz et al. 2003 Olsson et al. (2004b) Folke et al. 2005 Gunderson et al. 2005 Olsson et al. 2008 Lockwood 2010 Garmestani and Benson 2013 Österblom and Folke 2013

Table 2.3. An expansion of the proposed framework for identifying adaptive governance

AG framework component	AG transformation process position (Olsson et al. 2004b)	Relationship between framework and AG concepts	Potential evidence from empirical examples	Data collection techniques
Emergence	Preparing the system for change	Crisis Self-organization Leadership Trust building Networks	Grassroots, bottom-up movements among resource users and citizens for change in resource management; network formation; articulation of alternative scenarios to status quo	Semi-structured interviews; historical analysis; participant observation
Participation	Preparing the system for change	Desired state Networks Diversity	Engagement of resource users and governance stakeholders from across levels in the SES; resolution of resource use conflicts; network expansion and bridging	Semi-structured interviews; participant observation; social-network analysis (SNA)
Bioregional Scale	Preparing the system for change/Window of opportunity	Social-ecological fit	Articulation of the "problemshed"; expansion of networks to match capacity with scale of resource issues	Public records/ document analysis; SNA
Power Shift	Window of opportunity	Altering status quo Polycentricity Redundancy	New comanagement arrangements; devolution of decision making authority or advisory capacity to stakeholder groups; key legal opportunities	Political and economic analysis; public records/ document analysis; institutional mapping
Culture of Learning	Building SES resilience	Adaptive management Flexible institutions	The formal or informal use of adaptive management; adjustments in governance based on new information; flow of information across SES	SNA; semi-structured interviews; public records/document analysis
Institutional Change	Building SES resilience	Altered laws, rules, policies, and norms; challenged myths; checks on power	Formalization of informal or shadow governance networks; legal reform towards flexibility and/or equity and justice; altered social norms	Public records/ document analysis; semi-structured interviews; institutional mapping

Table 2.4. A framework for identifying adaptive governance applied to four empirical examples found in the literature.

SES	References	Emergence	Participation	Biogreional Scale	Power Shift	Culture of Learning	Institutional Change
Kristianstads Vattenrike, SE	Olsson et al. 2004b, 2006, 2007; Hahn et al. 2006	AG "triggered by perceived threats among members of various local stewardship associations and local government to the area's cultural and ecological values."	A single individual leader was critical to mobilizing networks and actors across scales, facilitating trust building, organizing activities, and shifting perceptions amongst key political leaders	Determined mostly by geographic attributes of the area; governance conformed to these attributes via a bridging organization spanning multilevel governance.	Individual leadership was able to convince key politicians to create a municpal level (bridging) organization, "turning problems into possibilities" and creating legitimacy for AG.	The interplay between formal and informal networks and organizations built a process for creating and sharing knowledge that further increased legitimacy of AG.	Formalized bridging organization created to connect local actors with an established multilevel governance system.
Great Barrier Reef, AU	Olsson et al. 2008	A shared sense of urgnecy developed amongst key leaders to address the degradation to the Great Barrier Reef.	Key leaders generated buy-in from management agencies, elevating the effort to a priority, while key leadership in the agency garnered political support. The program targeted changing public perception and a cultural shift in management.	The ecological significance of the Great Barrier Reef drove the emergence of management at this scale, but other factors helped coordinate governance from multiple levels with an existing governance system.	Political support to draft and pass national legislation changing the management structure, scale, and level of protection for the Great Barrier Reef. Authors note that this enabling legislation alone would not have been enough; the change in public perception was critical.	The linking of key leaders across "multiple levels of human activity" secured a level of communication adequate to ensure that sharing of scientific and technical information influenced a shift in policy toward more ecosystem-based management.	National legislation, a shift in public perception about the resource condition, and a shift in the culture of management.
Pacific Islands, US	Lynch & Brunner 2010	Shared anticipation of a potential crisis coinciding with forecasts of an El Niño cycle year.	Catalyzed by the leadership vision of one high-ranking agency employee; then actors, organizations, and networks were brought together by the PEAC center as a bridging organization across multilevel (and multiscale) governance, creating a network of leaders.	This was a shift in governance across a SES scale where their wasn't necessarily governnace prior; this was a "fit" to this scale based on biophysical and governance similarities between island nations and territories to create a network of similar islands.	This example of emergent AG didn't displace an existing system of environmental governance, but instead built one to confront an environmental uncertainty at a given geographic scale.	The development of networks that spanned a multilevel governance system across a difficult geography was critical for communicating knowledge (both scientific and local) between the PEAC Center leadership and Island leaders. Local communities were then able to more adequately prepare for drought based on technical forecasts.	A shift in the science-policy-communication process occurred in this SES. Lasting communication was established between climate forecasting agencies and local island leadership tasked with preparing communities for drought and disaster.
Southern Pacific Ocean, CL/AU/NZ	Österblom & Folke 2013	Illegal fishing a perceived threat to fish stocks and thus a threat to commercial fishing livelihoods; shared perception of crisis developed among fishermen, corporations, environmental groups, and scientific community.	Individual "policy entrepreneurs" employed personal networks to create a new network of individuals with a range of organizational and institutional capacity.	The bioregional scale of this emergent system of AG was determined by the constraints of the environmental crisis: illegal, unreported, and unregulated (IUU) fishing in the Southern Seas.	A power shift took place when the "informal" governance network of individual leaders was formally recognized (by Treaty) as an international governance body.	In this example, the culture of learning that was created was a product of the informal governance network formed in response to the perceived crisis of IUU harvest. Learning was expanded through the sphere of influence of the network.	The formalization of the self-organized, informal governance network into an international governance body, the CCAMLR, is a clear example of institutionalizing AG.

2.6 Conclusion

The proposed framework is an ambitious attempt to synthesize a decade of AG scholarship into a roadmap for future researchers to collectively make strides toward identifying further empirical examples of AG, as well as to determine the contexts under which AG can emerge and exploit windows of opportunity to achieve some form of institutionalization. While a theoretical or empirical investigation of any one of the six components proposed in the framework for investigating AG could yield a dissertation within itself, a search for evidence of all six within real-world examples of governance transitions has the potential to create a much needed set of baseline data describing the spectrum of transformations toward AG taking place in the world. My framework provides two important features guiding future AG research: 1) a relatively simple guide of "what to look for" in environmental governance transitions; and 2) a method for comparing contextually diverse examples of AG in an effort to discover further commonalities defining the approach to environmental governance.

The power of this framework lies in its simplicity and its ability to be adapted across disciplinary boundaries. Several methodological approaches and data collection methods could be employed to discover both qualitative and quantitative evidence of the presence, absence, and degree of the six components of governance transitions that resemble a theoretical shift towards AG. In the remainder of this dissertation I employ a suite of social science methods including document and public records analysis, institutional mapping, social network analysis, and the qualitative analysis of semi-structured interviews with key informants, to analyze a real-world environmental governance transition in terms of the proposed framework. Specifically, I present an analysis of emergence, participation, bioregional scale, power shifts, a culture of learning, and institutional change in the Klamath River Basin of southern Oregon and northern California during a governance transition that took place between 2001-2010, and is likely still taking place. The analysis is a step towards building a set of comparable case studies from which scholars can draw empirical generalizations about the nature and function of AG, and more importantly, whether AG should be consciously adopted as a

governance strategy for nested SESs dealing with the cross-scale effects of global change.

3. CHAPTER 3. THE MORPHOLOGY OF GOVERNANCE: TRACING TRANSITIONS IN ENVIRONMENTAL GOVERNANCE IN THE KLAMATH RIVER BASIN SOCIAL-ECOLOGICAL SYSTEM

3.1 Environmental Governance and the Adaptive Cycle: A Historical Narrative of the Klamath Basin

In the preceding Chapter, I describe AG as a form of environmental governance employed at the scale of a SES for its potential to deal with the complexity of internal system interactions and the uncertainty that accompanies changing external conditions. However, as most histories of world resource consumption and environmental management suggest, very few SESs are governed in such a way that builds social *and* ecological resilience to potential disturbance and change. Further, researchers are only beginning to observe a shift in the goals of contemporary environmental governance from maximizing efficiency of production, to goals based more on the maintenance or restoration of critical ecological functions (Dietz et al. 2003; Folke et al. 2005). In other words, very few, if any, SESs employ environmental governance that resembles the description of AG provided in Chapter 2. Therefore, the underlying question of this dissertation transitions from *what is AG*, instead to: *how do existing systems of environmental governance transition toward AG*, and *how can scholars identify and characterize these transitions*?

Scholars suggest that existing systems of environmental governance either adapt or transform towards AG under a specific set of conditions, e.g. the failure of existing governance to maintain prioritized ecosystem function, or a sudden shift in what humans want from the ecosystem, i.e. a change in the goals of environmental governance (Walker et al. 2004, Olsson et al. 2006). Either way, adaptation or transformation in governance and a shift towards AG, represents a *transition* driven by both internal and external forces of change. Gunderson and Light (2006, 325) recognize that "adaptive governance is aimed at integrating science, policy and decision making in systems that assume and manage for change, rather than against change." To illustrate the dynamic and non-linear nature of change in SESs and the relationship to transitions toward adaptive governance, I employ the heuristic model of the adaptive cycle (Figure 1.2) and the associated theory of

panarchy (Figure 1.3) presented by Gunderson and Holling (2002). Of the adaptive cycle, Gunderson and Holling (2002, 49) wrote:

> Its value is as a metaphor to classify systems, order events, and suggest specific questions and testable hypotheses that are relevant for our theme of understanding transformations in linked systems of people and nature.

Thus, the adaptive cycle becomes a device to characterize SESs undergoing any degree of change and position the SES along a trajectory of potential change, connectedness, and resilience (Gunderson and Holling 2002). In the context of investigating adaptations or transformations in governance to identify evidence of emerging AG, the foreloop of the adaptive cycle (exploitation and conservation) holds the least potential for a shift in governance and the most resilience against change from its current state. However, once an SES has entered the release phase (at its highest potential for chance), connectedness amongst internal relationships is high, and transformative reorganization is possible. Identifying these dynamics in real-world transitions in environmental governance will not only help scholars build a readily comparable empirical record of cases, but will also further theory on key processes driving adaptations and transformations toward AG—with implications for catalyzing AG in situations where a shift in governance is desirable or necessary for a range of issues, including but not limited to concerns of social or environmental justice.

Therefore, in this Chapter I characterize the Klamath Basin as a dynamic SES moving along a trajectory of change as described by the metaphor of the adaptive cycle. By analyzing a host of public documents, secondary historical sources, and semi-structured interviews with basin residents, I create a rich historical narrative of environmental governance in the Klamath from Euro-American settlement of the basin to the presentation of the Klamath Agreements in 2010. A history of the relationship between humans and nature in the Klamath, mediated through tools of environmental governance, follows a trajectory of dynamic change represented in the adaptive cycle. Euro-American exploitation of the environment through extraction, the diversion and impoundment of water, and concurrent marginalization of native peoples and ecosystem function through landscape modification, eventually gave way to a period of stasis or

conservation where an entrenched status quo attempted to control ecological resources in favor of agricultural production. Increased production meant the need for efficiency and the loss of diversity both in social and ecological components of system. As the system became more homogenized, it also become less resilient to potential disturbances. A series of slow controlling variables such as the increase in drought conditions, the rise of legal tools for indigenous access to resources, the decreasing economic viability of extractive livelihoods, and degrading water quality and aquatic habitat, collided with faster governance variables like litigation and regulation. An acute incidence of drought combined with a forceful implementation of the ESA caused the Klamath SES to collapse, producing social and ecologic disturbances as a result. However, after a period of chaotic release, reorganization emerged first in the social sphere as relationships between humans and nature—governance of the SES—were addressed and explicitly (re-) negotiated.

In addition to the high potential and high connectedness of an SES undergoing a transition between phases of conservation and release, Olsson et al. (2006) identified "windows of opportunity" as a key element for initiating transitions towards AG. In an investigation of environmental governance in the Klamath, therefore, it is essential to identify and analyze historic windows of opportunity. In this Chapter and in Chapter 4, I argue that for the Klamath, a critical window of opportunity for a potential transformation towards AG began to open during the 2001 water crisis (and later in the FERC alternative relicensing process for the KHP), although it was not immediately recognized as such by all parties involved in governance of the basin's resources. The origins of this initial window of opportunity are rooted in the tangled web of complex interactions that span the Klamath SES, and can ultimately be traced to the biophysical contexts of the Basin. Geologic and geomorphic processes in the Klamath Basin have created a rich landscape of abundant physical and biological resources, and the resulting geography has encouraged human settlement, cultural development, and social construction for at least the past 11,000 years (Cressman 1956; NRC 2004). Therefore, in addition to a review of the dynamic changes in environmental governance affecting the basin over the past few

centuries, it is critical first to characterize the underlying biophysical contexts of the Klamath Basin SES.

3.2 A Geographic Characterization of the Klamath Basin

The Klamath River Basin is a complex landscape—both socially and ecologically (Figure 3.1). Over 15,000 square miles in area, the basin is bigger in area than the state of Maryland[14], straddles two states, eight counties, and contains a myriad of federal, state, county, municipal, and tribal land bases (Figure 3.2). The watershed boundary of the basin unites the Klamath as a bioregion—a region defined by its natural (physical) as opposed to social (administrative) boundaries (Huitema et al. 2009). The connecting feature of the basin, the Klamath River, flows 263 miles from its origins in the semi-arid Oregon desert through the southern Cascade Range, and to its mouth at the Pacific Ocean roughly 20 miles south of Crescent City, CA (NRC 2004, 2008). The Klamath is the 2nd longest river in California next to the Sacramento and once boasted the 3rd most productive salmon spawning habitat on the U.S. Pacific Coast (NRC 2004). The majority of the precipitation input into the Klamath River system accumulates in the lower basin, which is also the location of the majority of the basin's elevation and salmon-bearing stream habitat, namely in four major tributaries: the Shasta, Scott, Salmon, and Trinity Rivers (NRC 2004). Interestingly, some scholars and practitioners refer to the Klamath as an "upside down" or a "backwards" basin as it defies the more common generalizations of a river with fast, steep-gradient headwaters tapering off into a slow flowing mainstem (Doremus and Tarlock 2008; Vannote 1980). This feature is a product of geologic history—an intersection of major crustal blocks, extensive faulting, and in the lower portions of the basin, some of the fastest rates of uplift ever recorded in California as a result of the Cascadia subduction zone (NRC 2004).

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[14] According to the Maryland Geological Survey, Maryland is 12,193 square miles in area. Available at: http://www.mgs.md.gov/geology/areas_and_lengths.html (last accessed 12 March 2014). The Klamath Basin is 15,700 square miles according to the report of the National Research Council Committee on Hydrology, Ecology, and Fishes of the Klamath River (NRC 2008).

Figure 3.1. A map of the Klamath River Basin showing topography[15]

[15] USFWS (2013) available at: http://www.fws.gov/yreka/maps.html.

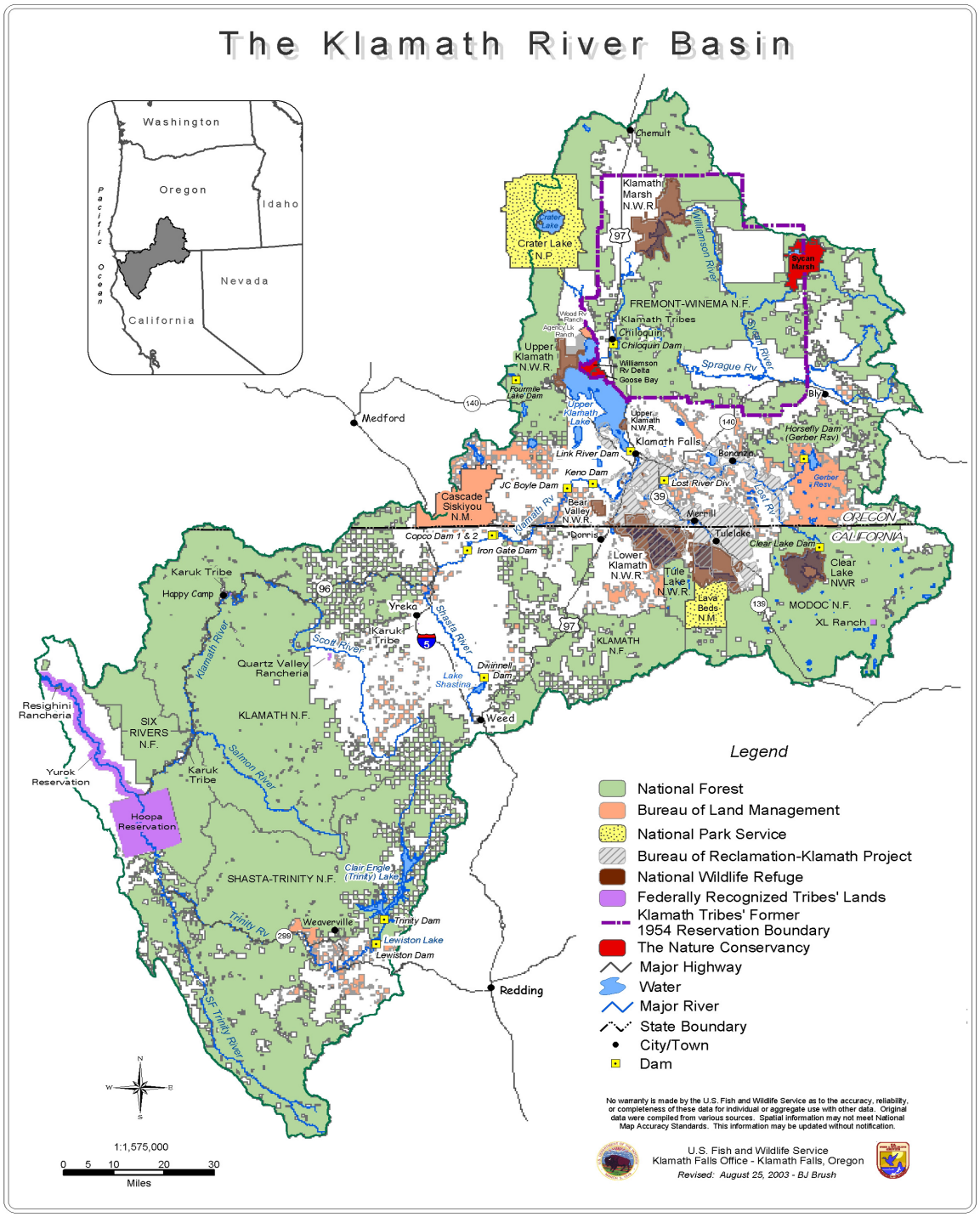

Figure 3.2. A map of the Klamath Basin showing land ownership[16]

[16] USFWS (2013) available at: http://www.fws.gov/yreka/maps.html.

3.2.1 Geology

The author, playwright, and historian Stephen Most (2006, ix), observed in his environmental history of the Klamath Basin that in the Klamath, "geography is destiny" and for that "geography, geology is destiny." A brief study of the basin's geologic history reveals what appears to be a distinct "upper" and "lower" portion of the basin segmented by the Cascadia volcanic arc, a mountainous range caused by the subduction of the Juan de Fuca and Gorda tectonic plates under the North American plate at the Cascadia subduction zone (NRC 2004). To the north and south of the basin loom the southernmost remnants of the Cascade Range volcanoes, Mt. Shasta to the South, Mt. Theilssen, Mt. McGloughlin, Mt. Mazama (site of present day Crater Lake) to the North. Beyond the Cascades, the Klamath Basin lies at the intersection of major geologic features: the Basin and Range Province to the east, and the boundary of the two crustal blocks, the Oregon fore-arc block and the Sierra Nevada block in the western, lower portion of the basin (NRC 2004; Wells and Simpson 2001). The geologic character of the Basin and Range province is that of crustal spreading and the feature is responsible for the broad valleys housing the lakes and marshes of the upper basin (Bennett et al. 1998). The lower basin is defined by extraordinary uplift as well as faulting along the boundaries of crustal blocks, creating steep, rugged terrain with substantial orographic effects and geomorphological constraints (*see* Figure 1.1 for a visual display of topography).

3.2.2 Hydrology

The hydrology of the Klamath Basin is so unique, that a working knowledge of its hydrologic pathways is essential to understanding potential environmental governance transitions in the basin. The southern reach of the Cascade Mountains roughly dividing the basin in half creates a rain shadow effect shielding the upper basin from moisture emanating from the Pacific Ocean. The west face of the Cascades and the topographically complex lower portion of the Klamath River Basin can receive up to 100 inches annually, generally over five times the rainfall received in the upper basin east of

the Cascade Range.[17] Water that falls as rain or snow near the headwaters of the Klamath catchment (generally half of yearly precipitation falls as snow) percolates into igneous terrain to emerge as springs in the upper reaches of the basin—on the southeastern slopes of the Cascade Range (NRC 2004). Manifested as the springs of the Williamson, Wood, Sycan, and Sprague Rivers, these Klamath headwater streams coalesce in a series of marshes and lakes, expanding and contracting with the seasonal freeze thaw of the Cascade snowpack. Upper and Lower Klamath Lakes, Tule Lake, and Clear Lake once represented the largest complex of freshwater lakes in North America west of the Great Lakes and spread nearly 80,000-94,000 acres during spring runoff and 30,000-40,000 acres in late summer (NRC 2004). In contrast, today only about 4,700 acres of marsh and open water remain (NRC 2004). A hydrologic connection existed between the higher elevation Upper Klamath Lake and the lower elevation Lower Klamath Lakes until 1917. This connection allowed Upper Klamath Lake to spill into Lower Klamath Lake via a pathway of the Link River, Lake Ewana, and the mainstem Klamath, and at other times, allowed Lower Klamath Lake to drain into the mainstem Klamath toward the lower basin (NRC 2004). The same is true for the Lost River slough and Tule Lake. During high spring flows, excess water could flow from the Klamath River to the lower elevation Tule Lake via the Lost River (NRC 2004). Today however, most of the historic Tule Lake bed is under cultivation, while impoundments and mechanization of the Lost River system allows the Klamath Project to dictate the direction and timing of flow (NRC 2004).

The collection of seasonal waters from the upper basin carved a path through the Cascades over a shelf-like reef structure at the site of present day Keno dam, serving roughly as the dividing line between the "upper" and "lower" portions of the basin and the outlet for waters of the upper basin (NRC 2004). As the Klamath River moves toward the Pacific, it travels through the Klamath and Siskiyou Mountains and its flow is augmented from major cool water tributaries. Uplift in the lower Klamath causes another rain shadow affect, less dramatic than the Cascades, but capturing moisture from frequent

[17] Based on an average precipitation comparison between Klamath Falls, OR (13.72 inches annually) and Klamath, CA (80.22 inches annually) and Happy Camp, CA (51.74 inches annually) according to the *Western Regional Climate Center*, *Desert Research Institute* (Retrieved 12 March 2014 from: http://www.wrcc.dri.edu/).

winter season storms off the rugged Northern California coast, causing seasonal peaks in river discharge during winter and spring months historically reaching over 100,000 cubic feet per second (cfs) (Figure 3.2).

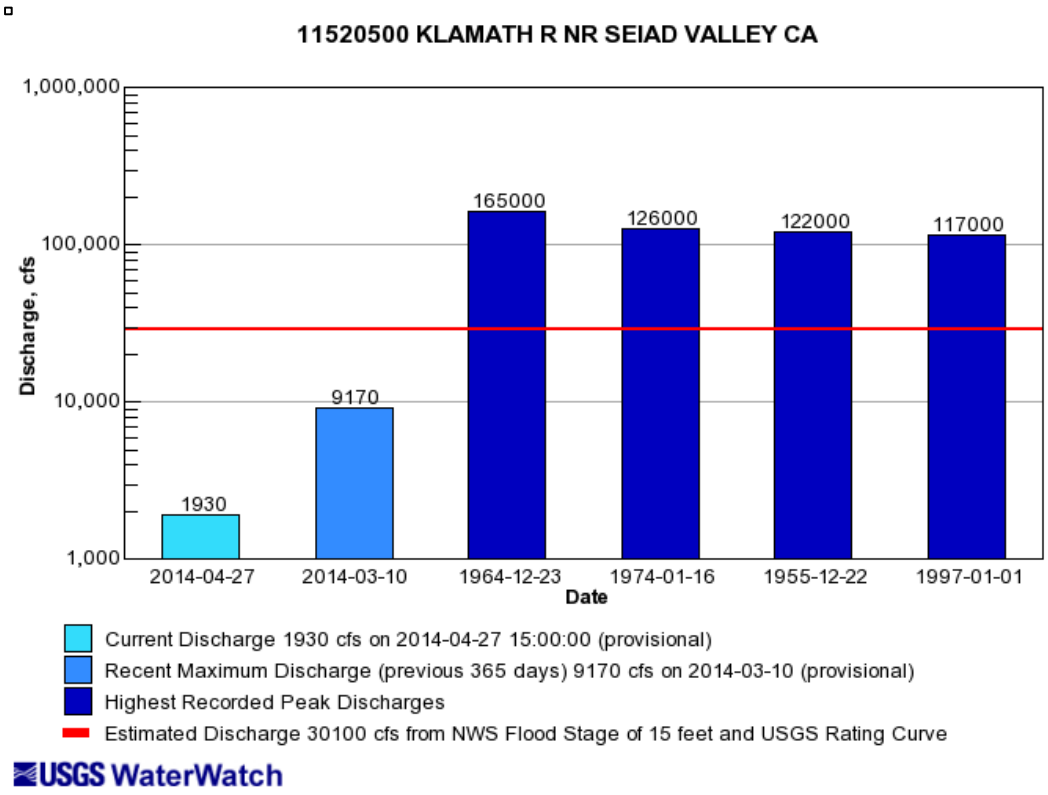

Figure 3.3. Bar chart comparing historically high discharge values for the Klamath River, CA below the Klamath Hydroelectric Project (Lower Klamath Basin) against recent and yearly high discharge values for 2014[18]

The importance of groundwater is oft forgotten in a discussion of hydrology in the Klamath, but it is no less important, especially in the context of groundwater pumping for upper basin agriculture. Extensive groundwater surveys performed in the upper basin by the Oregon Water Resources Department of (OWRD) and the U.S. Geological Survey (USGS) report that groundwater flow is mostly directional towards the center of valleys and sub-basins with recharge happening mostly on the slopes of the Cascades. While

[18] USGS (2014) available at: http://waterwatch.usgs.gov/?id=wwchart_ftc&vt=q&site_no=11520500.

there is no definitive model of groundwater flow in the Lower Klamath Basin below Iron Gate dam, recent investigations have characterized the river reach occupied by the KHP as very distinct from that of the upper basin, the dividing feature located around the present day Keno dam site (Draft EIS/EIR 2011; Gannet et al. 2010). There is an interesting correlation between this finding and the patterns of surface water flow in the basin—the Keno shelf apparently serving as a natural point of differentiation between the hydrologic zones defining an "upper" and "lower" basin: an outlet or 'valve' for surface water and a dividing line for groundwater. The basin surface-groundwater hydrology is highly connected, especially in the upper basin (Campbell 2013). Aquifers in both the upper and lower basin are an important source of baseflow for the Klamath River and major tributaries, and baseflow makes up the majority of summer/fall flows for many streams (Draft EIS/EIR 2011). Since 2001, groundwater pumping has increased in the upper basin by 50%, especially around lands of the Klamath Project (Draft EIS/EIR 2011). In these areas, Gannett et al. (2010) observed a drop in groundwater supplies of around 10 to 15 feet, only around 5 of which can be attributed to potential seasonal variations (Draft EIS/EIR 2011).

But the true hydrology of the Klamath River Basin includes a narrative of social-ecological hybridization—one in which the flow of water is complicated by a system of withdrawal, redistribution, conveyance, and fragmentation (Fiege 1999). Construction on the first irrigation canals in the upper basin began in 1882 and today over two million acres are under direct irrigation in the upper basin both "on" and "off" the Klamath Project (Draft EIS/EIR 2011; NRC 2004). The Klamath Lakes and marshes, once spreading across the majority of the surface area of the upper basin have been drained and reduced to only a small fraction of their original area, mostly protected by the Klamath National Wildlife Refuge Complex (Wilson 2010). The land where Lower Klamath and Tule Lake once expanded and contracted with the seasons is now under full cultivation at an elevation below the outlet to the mainstem Klamath River, necessitating a significant water pumping operation to convey irrigation return flows from Project lands back to Klamath River (not necessarily in an effort to reconnect hydrology, but more to prevent the flooding of Project farmlands). As water leaves the upper basin at

the historic site of the Keno shelf (a natural regulating outlet and the contemporary site of Keno dam) it enters the mainstem Klamath River and is immediately confronted with a series of four large hydroelectric dams, built between 1920-1964 in an effort to harness the hydroelectric potential of the river and provide affordable electricity to (what was at the time) growing rural communities, extractive industries (mining, logging, salmon canneries), and irrigated agriculture with a thirst for electricity to power irrigation and other water pumping infrastructure. The result of the completion of the Klamath Hydroelectric Project (KHP) in 1964 was a contract for cheap power for upper basin farmers for 50 years, a series of reservoirs along the Klamath River just over the Oregon border, and the complete blockage of fish passage for anadromous species of fish at Iron Gate dam (Draft EIS/EIR 2011; NRC 2004).

3.2.3 Biological Resources

Historically surrounding the upper basin lakes in all directions was a buffer zone of marsh habitat capable of handling the seasonal pulse of water. The yearly cycles of vegetation growth and loss built soils over time that would eventually be irresistible to potential farmers with the technology to drain these lands intermittently covered with water. In addition, the Upper Klamath Basin was and is a major stop on the Pacific flyway—each year hundreds of bird species and tens of thousands of individual birds stop over in the Klamath for respite as they migrate either south for the winter or north for a more moderate summer habitat (NRC 2004). Today the Klamath basin is one of the largest remaining pieces of a series of wetlands along the U.S. portion of the Pacific flyway that stretches from Alaska to South America (Wilson 2010).

The lakes of the Upper Klamath support a variety of fish with life histories adapted to the shallow intermittent waters of the upper basin. The most infamous of these species are the Lost River (*Deltistes luxatus*) and short nose (*Chasmistes brevirostris*) suckers. Suckers feed in the nutrient rich shallows of the marsh lined lakes and primarily migrate up local tributaries to spawn in river substrate where less predation of eggs occurs (NRC 2004). The first inhabitants of the upper basin found suckers to be

plentiful and a rich food source; suckers became central to native subsistence patterns, ceremony, and general culture of the Modoc and Klamath peoples (Most 2006).
In the Lower Klamath Basin, Coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*) as well as steelhead trout (*Oncorhynchus mykiss*)[19] and Pacific lamprey (*Lampetra tridentata*) return to tributaries of the Klamath River in search of their natal spawning streams after spending the majority of their juvenile and adult life feeding in marine environments. Salmon and lamprey spawn in the Klamath River and tributaries and then die, completing their anadromous life cycle and historically adding a rich input of nutrients to the inland aquatic and terrestrial ecosystems. While the abundance of salmon and steelhead populations once making the full journey past the upper basin lakes into the headwaters of the Klamath River is unknown, it is certain that native peoples in the lower and middle portions of the Klamath River developed a culture around salmon as a food source and a revered cultural symbol—a culture that persists today (Most 2006; NRC 2004). In addition, yearly Klamath salmon runs are indicative of the health and viability of a Pacific Ocean commercial salmon fishery off the coasts of Oregon, Washington, and parts of northern California and are used to determine restrictions and closures of the fishery (Spain 2007).

Although the Klamath River Basin could be considered a complex SES long before the arrival of Euro-Americans[20], a historical review of environmental governance since Euro-American contact more clearly reveals a non-linear narrative of a coupled system in transition between phases of the adaptive cycle. In the following four sections I propose a characterization of the basin in terms of exploitation, conservation, release, and reorganization, that provides the following: 1) a crisp narrative for analyzing the historical trajectory of governance in the basin; 2) a method for identifying the origins of critical system variables; and 3) a tool for analyzing the interactions of these variables as

[19] Same species as rainbow trout, but classified as a salmonid based on anadromous life history characteristics (NRC 2004).
[20] For example, there is evidence that the Klamath and Modoc peoples of the upper basin "manipulated the wetlands and riparian areas to increase their resources" which included burning riparian areas to increase production of root plants and "to lure animals that were attracted to the protein-rich shoots that grew after fire" (NRC 2004, 58).

they forced the Klamath SES between distinct phases of change (Figure 3.3). I pay particular attention to the terms of environmental governance in this analysis including, but not limited to: the vast and nebulous body of agrarian policy in the U.S. including early modes of land distribution and privatization; U.S.-Native American policy which includes sweeping changes in direction from termination to the legal recognition of the U.S.-Tribal trust responsibility in Native American water and natural resource law; and 3) the legacy and evolving implementation of the U.S. environmental policies of the 1960s and 70s. The interaction between these major controlling variables in the Klamath, combined with the basin's unique physical and biological features, has created space for and shaped recent transitions in environmental governance.

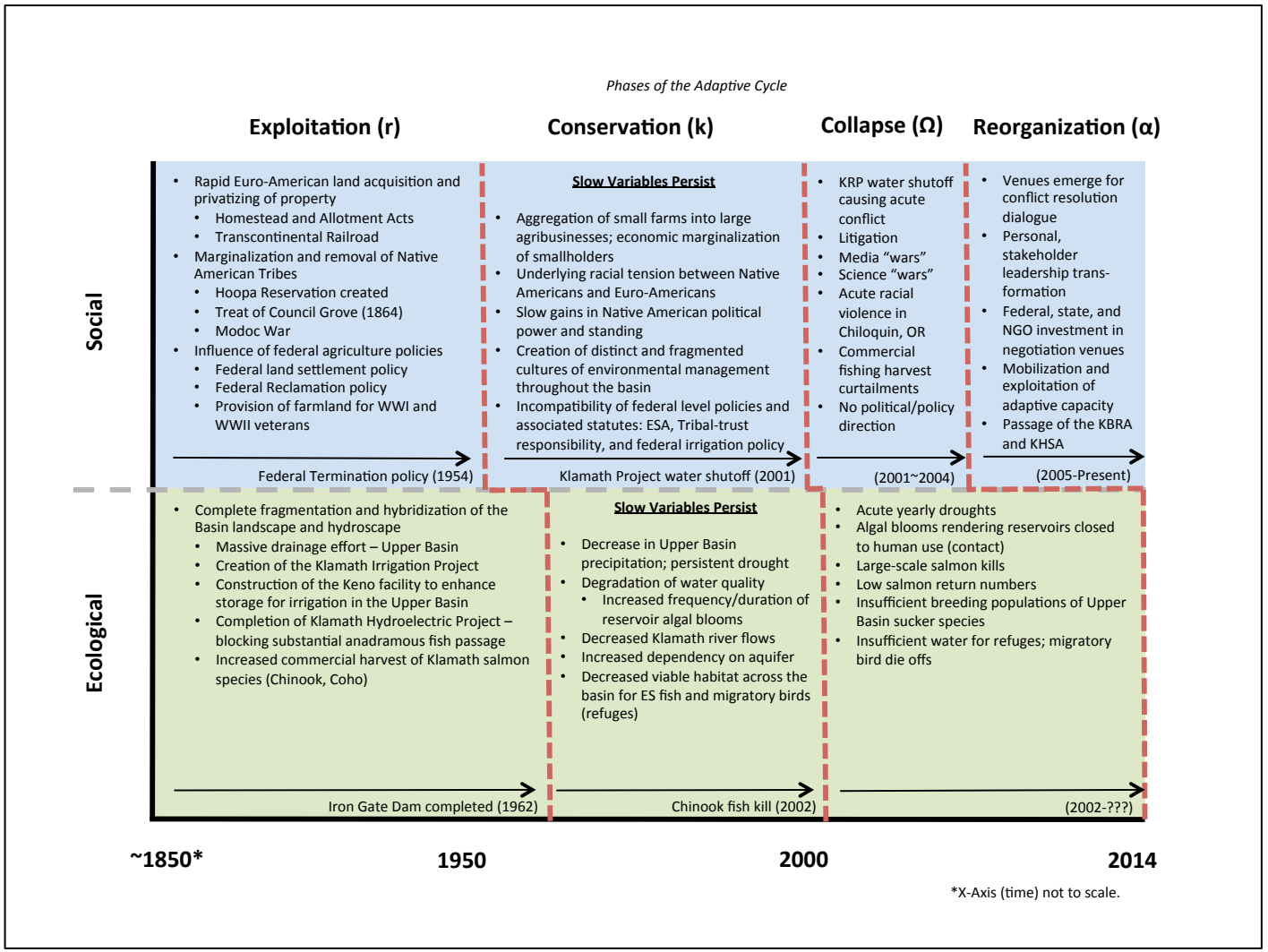

Figure 3.4. Historical narrative of the Klamath Basin social-ecological system as an adaptive cycle

3.3 Exploitation Phase (*r*): Accumulation and Extraction Leads to Fragmentation and Marginalization

The exploitation phase of the most recent iteration of the adaptive cycle in the Klamath River Basin encompasses Euro-American settlement of the basin, the swift extraction and exploitation of natural resources, the fragmentation and hybridization of hydrologic landscape processes, the institutionalization of a system of private property rights, and the forced marginalization of indigenous peoples. A detailed exploration of this phase aids in the identification of slow variables controlling the system—the potential of each for abrupt interaction with other variables building over time.

3.3.1 The Initial Formation of Modern Environmental Governance: Euro-American Contact, Marginalization of Native Peoples, and the Origins of Racial Tension in the Basin

The abundance of food sources in both the upper and lower Klamath Basin as well as the relatively mild climate of the majority of the basin, attracted permanent human residency around 11,000 years ago, and potentially earlier (Cressman 1956; NRC 2004). The first Native Americans adapted subsistence patterns and cultural beliefs in synchrony with the varied landscape features and resource abundance from the upper reaches of the basin to its coastal mouth. For example, the Hupa[21], Karuk, and Yurok peoples of the lower basin are known as "salmon people" while the Klamath, Modoc, and Yahooskin Snake of the upper basin were known as "peoples of the lake" and "peoples of the tule" (Most 2006, xxiii-xxxiv). The tribes of the Lower and Middle Klamath Basin, the Yurok and Hupa people (lower) and the Karuk and Shasta people (middle), were among the last Native peoples in the contiguous 48 American States to be contacted by Europeans due in part to the remoteness and ruggedness of the lower basin and the lack

[21] See Messier (2012) for legal and cultural distinctions between the terms "Hupa" and "Hoopa" or "Hoopa Valley Tribe." For the purposes of this dissertation, I use the term "Hupa" to refer to a culturally distinct band of Indians living along the Klamath River around the mouth of the Trinity River and toward the coastal mouth of the Klamath River. I use "Hoopa Valley" or "Hoopa Valley Tribe" to refer to members of the federally recognized Indian nation occupying the Hoopa Valley Indian Reservation located at the confluence of the Trinity and Klamath Rivers. Importantly, as Messier (2012, 129) notes "not all Hupa are Hoopa and not all Hoopa are Hupa."

of any beckoning account by early Euro-American trappers and explorers (Most 2006; Nelson 1988).

Despite the fertile soil in the upper basin and an enticing density of fur bearing mammals such as beaver, mink, and fisher in the lower basin, the relatively arid landscape of the upper basin and the steep, rugged character of the lower basin helped stave off full Euro-American settlement until the second half of the 19th century (NRC 2004). The first accounts of Euro-American explorers and trappers in Klamath Basin describe encounters with the "*maklak*" peoples around present day Upper Klamath Lake and Klamath marsh (Most 2006, 6 emphasis retained). Trapper-explorers such as Peter Skene Ogden were employed to trap beaver and other coveted furbearing animals, but according to personal historical accounts, trappers found little of interest in the upper basin (Most 2006). According to background research done for the 2004 National Academy of Sciences commissioned National Research Council (NRC) report on *Threatened and Endangered Fishes in the Klamath River Basin*, most written accounts depict the upper basin tribes as peaceful people during the early moments of contact. Klamath environmental historian Stephen Most (2006), writes of historical accounts revealing that tribes were quite helpful in showing early settlers and the first soldiers at Ft. Klamath how to harvest wild potatoes and other roots for survival during upper basin winters. Post Civil War, a combination of factors including the rapid settlement of the nearby Rogue Valley, the Applegate Trail (a spur of the Oregon Trail running through the basin), and the California Gold Rush, brought an abundance of white settlers to the upper basin and precipitated the founding of Linkville at the site of present day Klamath Falls in 1867 (Most 2006).

The NRC report (2004) and Most (2006) reference historical evidence that early relations between lower basin tribes and white settlers (particularly miners) were not as peaceful as early upper basin relations. The California gold rush attracted a frenzy of settlement and the Klamath Basin was not exempt. Gold mining techniques such as hydraulic mining and the use of mercury were immediately detrimental to salmon habitat and impacted native subsistence patterns (NRC 2004). Although treaties were negotiated between the U.S. government and Native American tribes of California, including the

Hupa, Karuk, and Yurok in 1851, in 1852 the U.S. Senate refused to ratify the treaties, culminating in violent protest throughout California including in the Lower Klamath Basin (NRC 2004, U.S. Senate 1994). Initially, only the Hupa people were successful in negotiating a treaty with the U.S. government (partially due to their geographic location and strategy of resistance), securing the Hoopa Valley Reservation at the confluence of the Trinity and Klamath Rivers in 1864 (NRC 2004). In 1891, an executive order signed by President Harrison joined a Yurok Reservation along the Klamath River (from the Hoopa Valley Reservation to the coastal mouth of the Klamath River) to the Hoopa Valley Reservation. The Karuk and the Shasta people did not fair so well. Both could never gain legal title to their original homelands or any contemporary legal hunting and fishing rights associated with either treaties or reservations. Today, only the Karuk are a tribe federally recognized by the U.S.

Social conflict also played a role in shaping the Upper Klamath landscape. Despite the earliest accounts of peaceful Indian-trapper relations in the upper basin, ongoing skirmishes developed between natives and settlers, the cause of which is not always discernible from the historical record. Indians attacked settlers and settlers retaliated, or vice versa; wagon trains were commonly attacked at a place called "bloody point" (also known as Modoc point) just south of present day Klamath Falls (Most 2006). But the most poignant and bloodiest of the conflicts in the Upper Klamath Basin was a conflict known as the Modoc War.

After the Treaty of Council Grove (U.S. 16 Stat. 707) was signed in 1864, the Klamath Indians, the Modoc, and various bands of Paiute and Shoshone were asked to live together in a greatly reduced territory north and east of Klamath Lake, near present day Chiloquin, OR (Most 2006). The Modoc were unhappy with this integrated reservation and wanted to return to their lands near Tule Lake. Eventually they did, to the dismay of Indian agents, the Army, and many local settlers.[22] By some accounts, once the Modoc returned to their homeland, there were no skirmishes and there is even evidence that they traded peacefully with local white settlers (Most 2006). However,

[22] Historians present two possible reasons while settlers were unhappy with the Modoc self-relocation: 1) general fear of natives who were "un-wrangled" onto reservations, or 2) the desire to farm the fertile land near Tule Lake themselves (Most 2006).

settlers, the Army, and Indian agents grew anxious of a group of Indians—with bloody past skirmishes attributed to their tribe—living outside of white containment. In addition, powerful overtones of the "Ghost Dance religion"—a sacred ceremony that some Native Americans of all tribes hoped may inspire a systematic and concentrated revolt against the white man—were springing up on reservations across the U.S[23] and there was evidence that a respected Ghost Dance leader was part of the Modoc Tribe living off the Klamath Reservation near Tule Lake (Most 2006).

Whether it was the fear of a bloody revolt, fear of the unknown, the desire to contain Indians, or a combination of these powerful forces, a group of soldiers from Ft. Klamath and some poorly trained militia members converged on two Modoc villages that straddled the Lost River early one morning to "ask" the Modoc people to return to their reservation. Broken accounts of the situation point to poor communication and subsequent armed conflict; the Modoc fled to a naturally guarded rock basin encampment south of Tule Lake, but along the way, Modoc warriors killed a group of white settlers (Most 2006). In retaliation, the army massed and attacked the Modoc frequently over the next several months. Although, the Modoc position was well defended, Captain Jack, the Modoc political leader, saw that the Modoc position would eventually crumble. He urged peace talks with the Army and Indian agents in order to negotiate for their own reservation, separate from that of the Klamath Tribes. While historians paint Captain Jack as a skilled negotiator, it seems that his tribe became unhappy with his tact and his willingness to openly negotiate with the enemy (Most 2006, *citing others*). He was publically humiliated and shamed into joining the critical mass of Modoc warriors committed to obtaining their right to land through armed conflict. Upon his next negotiation, he pulled a pistol from his clothes and shot a U.S. army officer dead. After a bloody battle and speculation of treasonous turncoating by some Modocs led to the capture of Captain Jack and other Modoc leaders, Jack and three other Modoc leaders were publically hung in Linkville. The remaining Modoc people, mostly women and children were moved back to the Klamath reservation, while potentially hostile Modocs were marched over 2,000 miles to reservations in the Oklahoma territory (Most 2006).

[23] The goals of the Ghost Dance are highly debated and it is unclear whether it was widely practiced or simply a radical occurrence within some tribes (Kehoe 2006).

While this may have been the end of wide Euro-Native American bloodshed in the Klamath, the unfairly resolved conflict planted a seed of racial discontent deep within the greater Upper Klamath Basin community that would persist the upper basin for the next century, exacerbated at various times such as the termination period in the 1950s and during the water conflict of 2001.[24] However, as I describe in Chapter 4, the acknowledgement of this historic racial tension may eventually have helped to create a window of opportunity for a necessary shift in environmental governance in the basin.

3.3.2 Extractive Governance: The Rise of Agriculture, Irrigation, and Hydropower

> Cultivators of the earth are the most virtuous and independent citizens.[25]
>
> -Thomas Jefferson

The concept of manifest destiny played a role in the Klamath as it did throughout the western U.S., encouraging westward expansion often under the myth that an agrarian lifestyle was affordable, available, and noble (Merk 1963). The Homestead Act of 1862 (Public Law 37-64) set precedent for distributing large tracts of land (1/4 sections; 160 acres) to potential family farmers and ranchers. The General Indian Allotment Act also known as the Dawes Act (no Public Law number, 24 Stat. 388-391) and subsequent amendments, under the explicit goal of assimilating Native Americans, broke up the vast Klamath reservation lands and allowed white small holders to fragment Native peoples through ownership and cultivation of former reservation lands (McDonnell 1991). With the availability abundant land in the upper basin came the construction of the first irrigation infrastructure in 1882 (EIS/EIR 2013; NRC 2004). The passage of the

[24] Direct evidence for this racial tension rising and persisting post-2001 is palpable in the following quote from an interview with an irrigation community leader in Klamath Falls: "And there was people in the community, I mean there are some people here that hate the Klamath Tribes, just some bad racial stuff that goes way back. And I would be in Albertson's with my son, my son's like 9 years old, and I would get confronted by people that didn't know what was going on up there, and just say 'you better not be cuttin' a deal where you are givin' those motherfuckers their land back'" (Interview E, 10 October 2012).

[25] A quote of unknown date found in *Jefferson Writings, Notes on the State of Virginia*, reprint in Library of America Series (1984, 301) edited by Merrill D. Peterson.

Newlands Act in 1902 and the authorization of the Klamath Irrigation Project in 1905 accelerated the exploitation of natural capital in the upper basin by facilitating the reclamation of swamps and lakes to increase irrigable acres. Over the next 20 years, intense drainage and construction of irrigation infrastructure continued in the upper basin under the auspice of the Klamath Reclamation Project, encouraging increased settlement and population growth (*see* timelines in the Draft EIS/EIR (2011) for dates and descriptions of individual irrigation developments). In addition, the arrival of railroads to the region increased the viability of extractive industries such as logging and mining spurring the need for electricity and encouraging the development of hydroelectricity, specifically in Siskiyou County, CA (Kramer 2003).

Early provision of hydroelectricity in the basin began in 1882 with a small diversion project and water wheel near Klamath Falls, OR. Over the next 30 years the majority of independent, small infrastructure projects were consolidated under the California-Oregon Power Company, which given its accumulated capital, borrowing potential, and the expanding demand, subsequently began construction of the first mainstem Klamath River hydroelectric dam in 1909 (Kramer 2003). Between the construction on this facility (Copco 1 dam), the reorganization of the company into COPCO in 1920, and the completion of Iron Gate dam in 1964, COPCO oversaw the consolidation of power generation and infrastructure projects throughout the region culminating in the licensing of 7 generation facilities by the Federal Energy Regulatory Commission (FERC) in 1956 under the KHP (FERC License No. 2082). Of these facilities, the Keno dam regulates the outflow of water from the upper basin into the mainstem Klamath River, and four power generation facilities (J.C. Boyle dam, Copco dams 1 and 2, and Iron Gate dam) fragment the river between Klamath Falls, OR and Yreka, CA, blocking passage of anadromous fish and creating large reservoirs (Draft EIS/EIR; PacifiCorp 2014).

The expansion of the KHP between 1920-1964 was due in part to a demand for power from regional population and farm growth, especially in the middle and upper portions of the basin between 1920-1930 (Table 3.1). After both world wars, the United States offered tracts of Project farmland to veterans returning from war as a ‘thank you’

opportunity for service. Parcels were freely available for soldiers by application after WWI, but only 86 plots of 160 acres or less were available for the over 2000 lottery applicants after WWII (The Oregon Encyclopedia 2014). This action essentially continued to publically recognize agriculture in the basin as a patriotic pursuit, and further institutionalized farming, ranching, and associated private property and associated water rights as a major controlling variable in the Klamath SES.

Table 3.1. Historic population estimates and percent change, Klamath Falls, OR and Yreka, CA

	Klamath Falls, OR		Yreka, CA	
Census	Population	%±	Population	%±
1890	364	—	1,100	—
1900	447	22.8	1,254	14.0
1910	2,758	517.0	1,134	-9.6
1920	4,801	74.1	1,277	12.6
1930	16,093	235.2	2,126	66.5
1940	16,497	2.5	2,485	16.9
1950	15,875	-3.8	3,227	29.9
1960	16,949	6.8	4,759	47.5
1970	15,775	-6.9	5,394	13.3
1980	16,661	5.6	5,916	9.7
1990	17,737	6.5	6,948	17.4
2000	19,462	9.7	7,290	4.9
2010	20,840	7.1	7,765	6.5

Source: U.S. Census Bureau "Subcounty population estimates" and Moffatt, R. 1996. *Population history of Western U.S. cities & towns.* Lanham: Scarecrow.

3.3.3 Final Marginalization: The Era of Termination

Ecologically, the exploitation phase of the Klamath adaptive cycle culminated with the completion of Iron Gate dam—the final major fragmentation of the Klamath River system. Socially however, the Klamath SES began to transition from a phase of exploitation to that of conservation only after federal Indian "termination" policy took its toll on the basin in the 1950s, eliminating the government-to-government relationship between tribes and the U.S. and claiming the majority of the land base of the basin's

tribes. It was this final marginalization of native Klamath peoples that solidified the entrenched status quo of Euro-American agriculture (farming, ranching, and commercial fishing) as the dominant political and economic drivers in the basin.

The termination era, especially for the Klamath Tribes of the Upper Klamath Basin, exacerbated race relations between Indians and non-Indians and further increased a socio-economic struggle that would surface again during the environmental governance transition of 2001-2010 (Most 2006). Termination was a U.S. policy of "terminating" the government-to-government relationship between federally recognized tribes by annulling treaty rights and in some cases liquidating tribal lands. The Klamath Tribes (Klamath, Modoc, and Yahooskin Snake) were one of the first U.S. tribes to feel the brunt of formalized termination policy. In 1954, the tribal council, after an overwhelming vote amongst tribal members in favor of termination, signed an agreement with the U.S. ceding all tribal lands and assets and giving up their legal status as an independent nation with respect to U.S. jurisdictional authority—in exchange for a cash settlement. The Klamath Termination Act (Public Law 83-587) provided each tribal member over the age of 18 a lump sum of $42,000 (Most 2006). Every tribal member born at the time but under 18 would have the money placed in a custodial trust until they were old enough (18) to legally receive it. In retrospect, the Klamath Termination Act was horrific for reasons even beyond the hegemonic assimilative mandate of Congress. In the face of extreme poverty on the reservation at the time, $42,000 per tribal member was a relative fortune. In his seminal research on termination and the effects on Native peoples, Walch (1983, 1189-1190) provides a description that most likely characterizes the experience of the Klamath Tribes:

> Most of the termination acts had scarcely taken effect when their flaws became apparent. Termination resulted in the sale of some former reservations, in whole or in part, which required relocation of the Indians living there. Indian education levels declined when relocation was imposed on many of the terminated Indians. Few Indians had the education and skills to obtain off-reservation employment or any desire or motivation to become integrated into a non-Indian society. Local citizens were similarly unwilling to employ or socialize with the Indians. At the same time that these Indians were losing revenues derived from tribal resources, they became liable for state income, property, and sales taxes. Terminated Indians were also no longer eligible for benefits from federal Indian programs. In this

> situation, few terminated Indians were able to support themselves for long, and many lost their homes and became welfare recipients.[26]

The settlement deal taken by the Klamath Tribes amounted to pennies on the dollar of what the Klamath Tribal lands were actually worth to the tribe economically, culturally, and with respect to their role in environmental governance of the basin. In the lower basin, a nebulous status of the tribal-federal relationship was a lingering result of the un-ratified treaties of 1851. The creation of the Hoopa Valley Reservation by treaty in 1864 and the conjoined Yurok Reservation by Executive Order in 1891 provided tribal access to salmon, both for subsistence and commercial purposes. However, a 1934 California statute banned commercial fishing on lower 20 miles of river and made possession of gill nets (a common technique used by Native fishers in the lower basin) a crime (Messier 2012). This law subsequently shut down Yurok and Hoopa Valley canneries causing economic devastation across the lower basin tribal communities (Messier 2012). In addition, it required that tribal fishers had to abide by state and federal recreational fishing regulations and license requirements even for subsistence fishing. This pit federal and state game officials against tribal members in a series of ongoing "salmon wars" that I will revisit in the next section in a discussion of the quest for certainty in tribal rights to access resources (Most 2006, 121-122).

The Klamath Tribes along with the Agua Caliente of the lands around Palm Springs, CA, were amongst the first tribes to be "terminated" (1954) and wide speculation exists that this is no coincidence—both tribes were rich in resources (Walch 1983). The Agua Caliente in valuable real estate and the Klamath in valuable old growth ponderosa pine timber resources. Not long after the United States took ownership of the former Klamath reservation lands and yielded management to the U.S. Forest Service, a campaign of extraction began in the forests of former reservation land (Most 2006). Although many tribal members were employed during this boom cycle in the timber industry, the profits went directly to the U.S. coffers and to those private corporations contracted to logging operations. In addition, the rate of harvest and the poor harvest

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[26] Further, local business owners attempted to garner as much settlement money as possible, in a series of riotous social interactions in the basin popularized in a historical fiction account by Rick Steber (2005) in *Buy the Chief a Cadillac*.

techniques of the period left little for future generations of foresters to manage (Interview I, 25 October 2012). At the time of the Klamath Termination Act, there were 2,133 tribal members and 862,662 acres of reservation land that, in the eyes of U.S. government, ceased to be Indian (Messier 2012; Walch 1983). There is considerable speculation that termination was another tool of extractive and exploitative environmental governance, much more than the rhetoric promoting assimilation as a better life for U.S. Native American tribes (McDonnell 1991; Walch 1983).

3.4 Conservation Phase (*k*): Environmental Governance for Agricultural Growth and Species Decline

From roughly the mid-20th century to the dawn of the 21st, the Klamath system displayed distinct characteristics of an SES in a phase of conservation. During the conservation phase, slow system variables control the SES trajectory and although characteristics of the exploitation phase still persist, less rapid exploitative change occurs than did in the previous phase. In addition, a system in conservation shows a remarkable amount of resilience to disturbance at first, but over time the interaction of slow controlling variables can increase the vulnerability of an SES to rapid change at the behest of disturbances, making it much more likely that the SES could slip into a state of collapse when perturbed (Gunderson and Holling 2002).

During this period in the Klamath, exploitation of resources continued to persist (although at a slower pace) with the incremental diking, draining and damming of the Upper Klamath surface hydrology, the decline of culturally and economically important fish species, and the fragmentation in resource management as federal, state, local, and tribal agencies became more compartmentalized and competed for jurisdiction, authority, and power over managing resources. Environmental governance in this phase can be characterized by the predominantly top-down approach of federal land and resource management agencies. However, a growing number of other voices, specifically tribes and environmental groups, began to contest this mode of governance. The post-WWII tribal movements, driven largely by thousands of Native Americans leaving their reservation for the first time and now returning, fueled attempts by the Klamath basin tribes to assert sovereignty and self-determination in their relationship with respect to

fisheries and other natural resources (Most 2006; Philip 2002). Emerging environmental regulation during this time period placed the importance of Klamath River salmon fishery in the context of commercial ocean fishing off the coasts of Oregon, Washington, and northern California. After the listing of the shortnose and Lost River suckers as "endangered" and the Coho salmon as "threatened" under the ESA, new priorities for water management became a reality for federal water managers and regulators alike. In addition and as a result of 1960s and 70s environmental legislation, litigious controls on the enforcement of these priorities were increasingly pursued by environmental groups. While still dominated by the top-down approach of federal resource management, at the end of the conservation period, overall environmental governance in the basin began to shift rapidly in response to both scientific uncertainty and litigation over management decisions. The intersection of this contested mode of governance with scientific uncertainty regarding the ecological effects of management decisions would eventually push the Klamath SES into a phase of release.

3.4.1 Contesting Governance I: The Quest of Lower Basin Tribes to Access Resources and Define Fishing Rights to the Klamath River

Despite the social turmoil and loss of legal identity that accompanied federal termination policy of the 1950s, tribes of the Klamath River Basin recognized the need to preserve their relationship to resources—water, fish, traditional food sources, and land—as a way to preserve cultural identity and build economic vitality into their communities. According to the Final EIS/EIR for *Klamath Facilities Removal* published in 2013, the tribes of the Klamath River Basin legally recognized in government-to-government relations with the U.S. are the Hoopa Valley Tribe, the Karuk Tribe, the Klamath Tribes, the Yurok Tribe, and the peoples of the Resigini Rancheria and the Quartz Valley Indian Reservation. In this Chapter's characterization of environmental governance in the basin, I deal mostly with the Hoopa Valley, Yurok, and Klamath Tribes for their roles as major players in shifting environmental governance in the basin. Indigenous struggles to gain access to resources as well as a seat at the tables of resource management and decision making can be separated into two concurrent tracks, and like many issues in the Klamath, they can be separated along the lines of the upper and lower basin.

Partially in response to the economic blow dealt to the communities of the Yurok Reservation by the 1934 California ban on commercial fishing in the Lower Klamath River (Messier 2012), the Yurok incorporated the Yurok Tribal Organization as a California non-profit in 1950 "to represent and promote the interests of all persons of Yurok ancestry, a group described as native to and resident of the Klamath River Basin, an area larger than the Addition" (*Short I* 1973, 958). This was the beginning of a strategic battle—public, political, and at times, violent—of the Yurok people to gain recognition of their traditional rights to fish the Lower Klamath River. The most famous of the struggles was best described by Messier (2012, 212):

> In 1957, two Yuroks, Emery Mattz and his younger brother Raymond, were tired of being chased by the State Fish and Game wardens because they continued to use gill nets for their subsistence fishing. They decided to do something about getting their fishing rights back. They went out with their gill nets and just waited to be arrested.

After almost a decade of arrests and court battles, the California Supreme Court ruled in 1966 that the Yuroks could fish the previously closed portion of the Klamath River (Messier 2012). However, the court failed to confront the legal status of gill netting as a traditional practice. This ruling did not stop California Fish and Game wardens from arresting tribal fishers for gill net use, so in 1969, when five gill nets belonging to Raymond Mattz were seized by a warden of California Department of Fish and Game (CDFG), Raymond and the Yurok Tribe dug their heels into the fight. The CDFG contended that the Yurok Reservation (a.k.a. the Klamath River Reservation) was not a reservation due to an Act of June 17, 1892 (U.S. 27 Stat. 52) that had terminated it, and therefore Indians were subject to CDFG regulations and licensing requirements. The U.S. Supreme Court heard the case in 1973, determined that Reservation was not terminated, and remanded the case to back to the lower court to rule on the use of gill nets (*Mattz v. Arnett* 1973). In 1975 the California Appeals Court affirmed that the Yurok could use gill nets, setting precedent for the first time since 1934 (*Arnett v. Five Gill Nets* 1975). However sweet the victory for Yuroks (and by extension of the gill net ruling, the Hoopa and Karuk), it was quickly tainted by a series of violent conflicts in 1978. After federal agencies closed the Klamath River and estuary to salmon fishing due

to concerns over low numbers of returning fish, armed federal agents were dispatched to the lower basin to enforce restrictions on fishing and arrest tribal members who continued to fish (Messier 2012, Most 2006). Historically, the conflict can serve to point out two observations about the status of environmental governance in the lower basin: 1) true governance of fishery resources had been retained by the federal (and by extension, the state) government; and 2) despite the mounting legal victories, tribes had not gained adequate access to resources, and thus a subsequent definition or quantification of their rights was needed if they were to reestablish a meaningful relationship with the Klamath salmon fishery.

According to Messier (2012, 300), in September 1991, the Assistant Secretary of Indian Affairs requested a legal opinion from the Solicitor of Interior regarding the fishing rights of the Hoopa Valley and Yurok Tribes. In October 1993, the Solicitor responded with the following opinion:

> when the United States set aside what are today the Hoopa Valley and Yurok Reservations, it reserved for the Indians of the reservations a federally protected right to the fishery resource sufficient to support a moderate standard of living. [He also concluded], however, that the entitlement of the Yurok and Hoopa Valley Tribes is limited to the moderate living standard or 50% of the harvest of the Klamath-Trinity basin salmon, whichever is less. Given the current depressed condition of the Klamath River basin fishery, and absent any agreement among the parties to the contrary, the Tribes are entitled to 50% of the harvest. (U.S. Solicitor 1993, 32)

The solicitor also acknowledged: 1) the importance of allowing tribal fishers to fish beyond the reservation in order to permit access to their allocation; and 2) the need to restore (although used the phrase "needs to be rebuilt") the Klamath River fishery (U.S. Solicitor 1993). This opinion was critical to restoring fishing rights to the people of the Hoopa Valley and Yurok Reservations. For the first time under the system of property and use rights enforced by the multilevel system of U.S. government, lower basin tribes *could quantify and thus protect* an amount of harvest they were entitled to. The Karuk, who had recently received federal recognition as a tribe (1979) and gained access to fish with traditional dipnets at an important cultural site known as Ishi Pishi Falls (1985), challenged to have rights to fish included under the 1993 Solicitor's opinion (Stercho 2006). They ultimately lost this challenge do to their lack of a physical reservation.

3.4.2 Contesting Governance II: The Klamath Tribes Fight for Treaty Rights and an Allocation of Water

Concurrently in the upper basin, the Klamath Tribes were engaged in a quest to achieve federal and state recognition of their treaty rights to "hunt and fish in usual and accustomed places." In the *Kimball* litigation, the 9th Circuit Court of Appeals, affirmed the right of tribal members to exercise their treaty hunting, trapping, and fishing rights without interference from state fish and game regulations and licensing requirements on the lands the former Klamath Reservation, including current U.S. national forest land and the private lands on which landowners have granted permission to the Klamath Indians wishing to hunt, trap, or fish (*Kimball I* 1974, *Kimball II* 1979).

At the same time, the Klamath Tribes knew that without suitable habitat and continued existence of culturally important species, their rights to hunt and fish would be rendered useless. Thus the Tribes embarked in a legal battle built upon legal precedent developed in *Winters v. the Unites States* (1908), which affirmed the establishment of "reserved" water rights when a reservation of rights is made by the U.S., such as in the creation of a reservation of land.[27] Like riparian rights in that they arise by virtue of land ownership alone, water in a "reserved" or "*Winters*" right does not have to be removed from the stream and put to beneficial use. Like appropriative rights, federal reserved rights have priority dates; most rights are dated from time of reservation creation, however some are explicit treaty rights dated to "time immemorial" and hold absolute priority (Thorson et al. 2006).

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[27] In *Winters*, the arguments of U.S. attorneys on behalf of the Blackfeet tribe that they did in fact have senior water rights to the Milk River based on earlier settlement and thus a prior date of right establishment even though settlement of non-Indians upstream was now diverting most of the river's water not leaving enough for the reservation downstream. Upstream, white irrigators claimed the entire flow during a drought based on appropriative rights under state law. Two alternative legal theories underpin this decision, either: 1) Indians has water rights predating white settlement that were preserved in their treaty with the US; or 2) the US effectively reserved water when the reservation was created, making it unavailable for later state appropriation. The first theory rests on the treaty power of the Constitution while the second theory rests on the federal government's property clause power of the public domain (which would allow for the possibility that non-Indians could hold superior water rights if settlement preceded creation of the reservation) (Doremus and Tarlock 2008).

Winters provided a base from which, theoretically, the Klamath Tribes (including the Hoopa and Yurok based on their establishment of a reservation) could challenge a priority date and quantification of water rights to Klamath River water, and then establish these rights for instream flow to preserve habitat and fish for hunting and fishing in "usual and accustomed places." Further, in *U.S. v. Adair* (1979), the 9th U.S. Circuit Court decided that, despite termination policy of the 1950s, the Klamath Termination Act preserved preexisting water rights associated with the original Klamath Reservation including the ability to assert these rights for instream flows (Benson 2002; Doremus and Tarlock 2003; 2008).

Thus federal Indian policy including the development of the U.S.-Tribal trust responsibility and its intersection with water law began to shape a change in the tides for the tribes of the Klamath Basin. Specifically, *Adair* was the beginning of the Klamath Tribes quest for quantification of water to assert specifically for the protection of culturally significant fish habitat in the upper basin and flows for the potential return of anadromous species from the lower basin. In addition, in 1976, the State of Oregon initiated an adjudication of the water rights in the Oregon portion of the Klamath basin—a special court was established to determine and hear contests to water rights in the basin. Through this process the Klamath Tribes had the opportunity to establish a quantification of their water rights with a priority date of "time immemorial." Although this process would take decades (and still not be finalized as of the release of the Klamath Agreements in 2010), it was part of the growing political power of the Klamath Tribes in the basin that would eventually lead to a shift in environmental governance.

3.4.3 Failed Environmental Governance: Degradation of Land and Water Quality

The depth of environmental legislation of the 1960a and 70s is evidence supporting the federal government's acknowledgement of widespread degradation of natural resources. Specifically in the Klamath, the influence of the Fishery Conservation and Management Act (1977, Public Law 94-265, *a.k.a.* The Magnuson-Stevens Act), Trinity River Basin Restoration Act (1984, Public Law 98-541), and the Klamath River Basin Fishery Resources Restoration Act (1986, Public Law 99-552) supported a clear

need for solutions to an increasing problem habitat loss and overall fishery decline. This decline cultivated a further governance response—the listing of two species of sucker fish as "endangered" in 1988 and the listing of the Coho salmon as "threatened" in 1996 under the ESA.

At the same time, the intensification of land use, including the 1964 Kuchel Act (Public Law 88-567) permitting farming on the Lower Klamath National Wildlife Refuge (NWR), led to an increase in nutrient runoff entering Upper and Lower Klamath Lake and eventually released down stream through the KHP reach (Zedonis et al. 2011). The persistent low, static flows (relative to historic seasonally variable flows) in the maintstem Klamath River through the KHP reach and combined with increased nutrient inputs, began to cause significant toxic algal blooms which increased in frequency and duration during the conservation phase (Draft EIS/EIR 2011; NRC 2004; Zedonis et al. 2011). Outbreaks of algal blooms often caused closures of reservoirs to human contact recreation, and increased the mortality rate for returning salmon species downstream of Iron Gate dam (Draft EIS/EIR 2011). Climatically, a non-stationary decrease in precipitation across the arid upper portions of the basin and increased variability around this mean caused acute droughts and placed significant pressure on established agriculture (NRC 2004). Upper basin farmers and ranchers initiated or increased groundwater pumping, taxing surrounding aquifers in order to maintain productivity levels in the face of increased droughts (Campbell 2013). Increasingly frequent and severe droughts as well as the decrease in water quality associated with increased nutrients, negatively affected culturally important fish species vis-á-vis a decrease volume and increase in temperature in both the upper basin lakes as well as downstream reaches of the Klamath River (NRC 2004; 2008). In addition to emerging consequences of this environmental degradation, it would be the culmination of the ESA and the evolution of Native American water law and the U.S.-Tribal trust responsibility that would create a social-ecological interaction forcing the Klamath SES into crisis and an eventual phase shift towards "release" or a collapse in environmental governance (Gunderson and Holling 2002).

3.4.4 Grinding Environmental Governance to a Halt

As I have traced through this Chapter, the origins of a collapse in environmental governance that took place in the Klamath SES in 2001 are not attributable to a single event, but instead to the confluence of a series of long slow-moving variables coalescing around the management and allocation of water resources. However, there are several events that set in motion a chain of rapidly-moving variables accelerating toward the intersection of slow-moving variables in 2001—namely the listing of the Lost River and shortnose sucker as endangered in 1988 and the Coho salmon as threatened in 1996. These actions introduced to water and resource management considerations in the Klamath (particularly to the operating plan of the federal Klamath Reclamation Project) what is arguably the most powerful force of U.S. environmental law, the ESA.

Prior to 2001 it was obvious to federal water and endangered species managers in the basin (namely NMFS, USBR, and USFWS), that operations of the Klamath Project and the management of endangered suckers and threatened Coho would eventually be in direct competition for water allocations, especially given the nebulous but emerging nature of the U.S.-Tribal trust responsibility to provide access to culturally important species. Thus at the request of federal agencies, the U.S. Department of Interior Regional Solicitor released an opinion in 1995 laying out the (potential) legal priority for water in the basin even though contested tribal claims were not yet decided or quantified by the Klamath Basin Adjudication (KBA) in the upper basin (U.S. Solicitor 1995; Benson 2002; Doremus and Tarlock 2003). This opinion essentially changed how the USBR looked at water allocations for the next five years between 1995-2000 (although it wasn't apparent in operations due to adequate water availability and undetermined flows and lake levels needed for threatened and endangered species). Messier (2012, 369) asserts that the Solicitor's Opinion forced the USBR "from being a master of its own fate, to being the servant of many masters." "In other words, USBR had plainly shifted the risk of a dry year from the fish and tribes to the irrigators and refuges" (Benson 2002, 220).

Project irrigators followed with a lawsuit, but the court ruled that irrigators' rights to Klamath Project water arose solely from their contractual repayment of infrastructure loans to the USBR and that all of the irrigators' repayment contracts contained clauses

stating that water delivery was "subject to water availability" (*Patterson I* 1998). Essentially, the court affirmed USBR's duty to protect endangered species and tribal water rights was greater than that of delivering water to the Project (Messier 2012).

In the meantime, the Department of Interior commissioned Dr. Thomas Hardy, a respected fisheries biologist and flow modeler from Utah State University to

> provide a comprehensive review of the historical and existing status of the anadromous fish, including the coho salmon, within the lower Klamath River (i.e., below Iron Gate Dam). ...Dr. Hardy was asked to make recommendations in two steps. The first step ('Phase I') was intended to supply initial recommendations for use in developing annual operations plans, while the second step of the study ('Phase II') was underway. ...Because necessary site-specific information for the Klamath River was not available at the time, Dr. Hardy conducted an extensive literature review of the historical and current status, as well as life history traits, of the Klamath River fishery. (*PCFFA I* 138 F.Supp.2d at 1232)

Phase I of the Hardy study was release in August 1999 (Messier 2012). Shortly thereafter, in spring 2000, the USBR released the Klamath Project Operations Plan (KPOP) indicating that the Project would release river flows lower than those recommended in the Hardy Phase I report (Hardy 1999; USBR 2000). Furthermore, the Bureau did not initiate consultation with NMFS under Section 7 of the ESA prior to releasing the Operations Plan as required by law (Public Law 93-205; USBR 2000). A caucus of environmental groups including PCFFA and Oregon Natural Resources Council (ONRC, *would later change their name to* "Oregon Wild") brought suit against Bureau for failure to consult under Section 7, forcing USBR to file for consultation on it's long-range operation plan (to be written for 2002-2012) but not for the yearly plan (now to be finished for 2001) (Messier 2012; *PCFFA I* 2001).

In early 2001, NMFS and USFWS released draft Biological Opinions (BiOps) indicating that the USBR interim operations plan would likely cause "jeopardy" to both listed species and the agencies recommend a series of Reasonable and Prudent Alternative measures (RPAs) to mitigate the "take" of species; RPAs included a minimum lake level (USFWS) and flow recommendations from the Hardy Phase I report (NMFS) that if followed given hydrologic forecasts of drought for the 2001 water year, would provide little to no water to the project (NMFS 2001; Public Law 93-205; USFWS 2001). The NMFS and USFWS filed their respective final BiOps in April 2001, and

accordingly, no water flowed to the project. Then, on April 3rd, 2001, the judge in *PCFFA I* (2001) released a final decision—confirming that no water would flow to the Klamath Project for the first time since it's inception in 1905.

There are a multitude of analyses written about what happened in the Klamath Basin during the spring and summer of 2001, and there is very little new information that my historical narrative of the Klamath SES as an adaptive cycle can add to this story. From a legal perspective, the intersection of the ESA and the operation of the federal Klamath Reclamation Project played out in a unique way, due to both the unique nature of contracts USBR holds with Project irrigators, and the competing nature of water needs for endangered suckers in the lake and threatened Coho in the river downstream (Benson 2002; Doremus and Tarlock 2003; Doremus and Tarlock 2008; Chaffin et al. *in review*). From a social perspective, 2001 was a flashpoint of rapidly growing new and reignited dormant tensions in the basin: the uncertainty of the continuance of agricultural livelihoods for upper basin irrigators and coastal commercial fishermen; tribes on the verge of gaining support to restore cultural resources exploited and degraded over the past 150 years; racial tensions between tribal and non-tribal communities; federal agency managers not sure from day-to-day which laws or policies would determine the aims and scope of their management efforts; and environmental advocates determined to see environmental justice for all species and degraded habitat in the basin. Not to be overshadowed, all of these issues flashed in a region of the country fractured by a historic undercurrent of mistrust of government—federal or otherwise.

Despite the analytical perspective applied to this time period, it is apparent that by April 2001 the Klamath SES had entered a period of release. The controlling variables of the system were too densely connected to one another, meaning that the failure of one would undoubtedly cause collapse in the entire system. In particular, governance of the basin's resources had become rigid and vulnerable to external disturbances and internal failures—both of which happened in 2001.

3.5 Release Phase (*Ω*): The Rotating Crisis Governs the Basin

The events of spring and summer 2001 represent a threshold of intersections between slow forcing factors, persisting over time, and growing in scale until colliding to render the system of environmental governance in the Klamath SES untenable. These factors were both social (racial and cultural tensions, the influence of conflicting bodies of public policy—agriculture, tribal trust, and endangered species policy—on water allocation, and the real economic threat to livelihoods) and ecological (drought and water available for suitable species habitat). As system actors began to jockey for position to define reorganization in environmental governance in the face of social and ecological instability, interactions led to further collapse.

The 2001 water curtailment on lands watered by the Klamath Reclamation Project brought to light deep tensions between whites and Native Americans. The water shutoff was a disturbance that revealed dark secrets of social relations in the basin; it brought to light an extreme mistrust of the federal government and a racial intolerance that fed the instability of governance in the system: staged protests, illegal routing of water around closed headgates, indifference of local law enforcement officials to offenses supporting the status quo, and racial violence (Barnard 2001a; 2001b; 2001c; 2001d; Milstein 2001a; Schoch and Bailey 2001). Many residents of tribal communities even felt threatened while interacting in public establishments, especially in the Upper Klamath Basin near the flashpoint of civil unrest in Klamath Falls, OR. The following passage characterizes some events and feelings of that time period:

> I remember after the 2001 water shutoff and everything that happened, it was tough for me to go to Klamath Falls. After those kids came up here and shot up the signs looking for some 'sucker lovin' Indians' with their shotguns[28]…. There was such a hole… letters to the editor, one after another, that was so anti-tribal, anti-fish, anti-federal agency folks. It was just… it almost set a tone that it was almost acceptable for these kids to come up and do this. They were duck hunting, had too much to drink, and came through Chiloquin and were shooting up signs. They were actually looking for 'sucker lovin' Indians,' one of the things they were shouting out. Yeah I mean, I can still see the school sign, over by the school. I can still see the shotgun pellets. The mailbox by our tribal hatchery up here, they

[28] For a detailed public description of this event, see *Associated Press* article by Jeff Barnard (10 September 2002) titled "Men apologize for shooting up town to intimidate Klamath Tribes."

> shot that with their shotguns. Those things were going on… Inidans were being… not given water in restaurants, all the non-Indian people were given water and Indians had to ask for water at their table. In Klamath Falls. I went down there, I was actually going to buy a trailer for one of our restoration projects from a trailer dealer down there. Walked in there and it said, 'the real sucker.' And it showed a not really accurate drawing of a Lost River sucker with a pacifier stuck in its mouth. And then 'here's your water sucker,' they had another sign where… there's a sucker in the creek, and so he [irrigator] was urinating in the creek. Those kinds of things are going on, I'm going, 'jeez.' We had the mock cavalry ride in to the headgates with the flags upsidown. I mean if that didn't send some kind of message to Indians that were there standing up for the fish. It was really ugly. And threats of violence. I actually had to kind of calm down some of our younger people when those kids shot up Chiloquin here. They were thinking, 'well, we ought to go drive down to Merrill and shoot that place up! But you know what would happen? We'd end up in jail because we're Indians. Nothin's gonna happen to these white guys.' You know, that kind of an attitude. Because they felt like such a disparity. Just the racial oppression. And that's the thing that kind of blew me away. I thought we'd gone past a lot of that… a lot of it was subsurface. (Interview O, 2 November 2012)

In addition, this social instability encouraged swift cross-scale interactions from outside the Klamath SES. Reminiscent of previous anti-government, public lands use protests since the 1970s, more than ten thousand protesters descended upon the Klamath Basin in 2001 to offer support for Project farmers in their plight against the federal government (Most 2006). At the same time, individuals from the highest levels of federal government (Secretary of Interior Gale Norton, Senior Advisor to the President Karl Rove, and Vice President Dick Cheney) became intimately involved in quelling conflict and social unrest in the basin, to the current speculation of journalists and scholars alike as to the legality of their involvement.[29] The social system was thrown into further disarray by the stagnation of resource management through lawsuits and entrenched

[29] The details of these federal official's involvement can be reviewed in the following publications: Doremus and Tarlock (2008) and Most (2006) discuss Gale Norton's involvement; Most (2006) also presents evidence of Karl Rove's several visits to the basin during this time period; and Gellman (2008) describes the involvement of Dick Cheney. There is significant speculation that Dick Cheney had acute interest in resolving the Klamath situation due to the nature of the political contests in the region and his desire to hold onto Republican Congressional seats. His biography by Barton Gellman (2008) further suggests that Cheney "fast tracked" the Klamath NRC report and had influence over the release of a controversial "preliminary report" which the outcome of which was eventually revised in a final report.

battles over the uncertainty in the best available scientific evidence on how to manage water and fish in the basin.

3.5.1 A Shift in Power from Agencies to Courts

Immediately following the water shut off of 2001, Project irrigators filed suit to enjoin the USBR from implementing the 2001 operating plan and instead release water to the project for the irrigation season (*Kandra* 2001). Twenty-seven attorneys were involved in the suit and not surprisingly, the list of litigants read like a "who's who" in the fight for water allocation in the basin. In late April, Judge Aiken read her ruling against all plaintiff claims in a strict interpretation of the ESA, but in a way that foreshadowed events yet to come in the basin:

> The law requires the protection of suckers and salmon as endangered and threatened species and as tribal trust resources, even if plaintiffs disagree with the manner in which the fish are protected or believe they inequitably bear the burden of such protection.
>
> The scarcity of water in the Klamath River Basin is a situation likely to reoccur. ...Continued litigation is not likely to assist in such a challenging endeavor. This court hopes and expects that the parties and other entities necessary to long-term solutions will continue to pursue alternatives to meet the needs of the Klamath River Basin. (*Kandra* 2001, 1211)

A wave of events followed, mostly unfolding in the geographic sphere of the upper basin, but with reverberating effects across all parties. First, Judge Aiken ordered the *Kandra* (2001) participants into mediation. However, Project irrigators and sympathizers from across the U.S. concurrently staged political protests (as described in the opening pages of Chapter 1) in the upper basin including the May 7th bucket brigade rally and multiple successful attempts to pry open the headgates of A canal, allowing water to flow to the Klamath Project (Barnard 2001a; 2001b; 2001c; 2001d; Milstein 2001a). The Klamath became a hot spot for scathing anti-government rhetoric, and not surprisingly, many national groups saw an opportunity to use this event as a pulpit to advance their own issues. Historian Stephen Most (2006, 236) describes one such synchronism of regional anti-government rhetoric mixed with outrage over recent events and support for Klamath irrigators:

> supporters of the Klamath Basin farmers in Elko, Nevada—near the site of the Jarbidge Shovel Bridage that had occurred the previous year—forged two metal buckets, each ten feet tall, to honor them. One was to be placed on Main Street in the town of Klamath Falls as an enduring symbol of the irrigators' protest. The other was to travel the country on a flatbed trailer to be filled with money, food, and supplies. A number of farmers needed this support. Not only did the loss of irrigation water in 2001 prevent them from planting that year's crop, but uncertainty about future water supplies made obtaining bank loans extremely difficult.[30]

In late July 2001, following a series of emotional public hearings in Klamath Falls convened by members of the House Committee on Natural Resources, Secretary of Interior Gale Norton announced in Portland that the USBR would release 75,000 acre-feet to Project irrigators (Doremus and Tarlock 2008; Messier 2012; Most 2006). According to interviews performed by Stephen Most (2006, 235), this was not enough and too late in the season for Project irrigators to grow grain and potatoes, but it did allow some irrigators to grow hay for livestock pasture.[31] Relief began to follow in the form of federal disaster relief, farm bill allocations, and emergency groundwater pumping (Campbell 2013), but irrigators steadfastly defended their position of public protest along the irrigation canals that (should) flow to the Klamath Project (Messier 2012; Most 2006). However, the events of September 11th, 2001 ended displays of civil disobedience in the basin (Milstein 2001b). Farmers went home and the community was united by the presence of threats at a larger-scale (Most 2006). Despite the overwhelming presence of libertarian views in the Klamath—the 'don't tread on me, keep government out of my business' crowd—Patriotism was, and in this author's opinion, "is" by no means in short supply in the Klamath Basin. However, the issues that brought the Klamath into the national spotlight (e.g. Jehl 2001) in 2001 would not fade quietly or be resolved by a single shift in resource management policy (Milstein 2001d). Despite the flow of federal financial relief to the basin during and after the 2001 growing season (Milstein 2001c),

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[30] One bucket still stands in front of the Klamath County Courthouse building in Klamath Falls, OR as a permanent memorial. I personally observed the other while traveling the Klamath Basin in 2011 to attend public hearings on the release of the Draft EIS/EIR for potential Klamath facilities removal as part of the KHSA and connected action, KBRA.

[31] Doremus and Tarlock (2008, p. 4) discuss Norton's discovery of an "accounting error" in Upper Klamath Lake storage levels, allowing an addition 70,000 acre-feet of deliveries to flow from the Project in early summer.

the intractable issues surrounding water allocation would instead persist as a "rotating crisis" that continued to cause harm to communities, resources, and livelihoods across the basin (Gosnell and Kelley 2010).

3.5.2 2002: Ecological Collapse and Science as Environmental Governance

In February 2002, a rapidly assembled Klamath NRC panel released a preliminary report reviewing the USFWS and NMFS 2001 BiOps, the reasonable and prudent alternatives (RPAs) therein, and the two 2001 BAs produced by the USBR and used as a basis for the BiOps (NRC 2004). The panel concluded that there was sufficient scientific and technical information to support all of the recommended measures (RPAs) listed in the BiOps, *except* higher lake levels (USFWS BiOp) and higher Klamath River flows (NMFS BiOp) (NRC 2002). It is uncertain why the NRC panel released a pre-publication draft of their larger report that was to review the scientific standard applied to the previous BiOps and BAs and make recommendations based on both short-term and long-term considerations, but there is significant speculation of political pressure from the highest levels of federal government (Doremus and Tarlock 2008, Gellman 2008).

The release of the interim report once again shifted the controlling variables of environmental governance in the basin. As Most (2006, 239) points out, "[t]he study allowed irrigators and their advocates to argue that the 2001 BiOps were 'junk science' and that the water cutoff was not justified." In response to the report, the USBR abandoned an altered approach taken in a new draft BA it had released in late 2001 (post-water shutoff), and fully embraced the NRC report as the "best available science" (Messier 2012). The subsequent release of their long-term KPOP (2002-2012) used the same approach that it had in the previous decade based on the interim conclusions of the NRC report, that there was not enough evidence to preclude the Project from deviating from lake levels and river flows used during operations from 1990-2000 (NRC 2002; USBR 2002). Furthermore, the USBR proposed that given the Project's proportion of land occupying the upper basin, it should only be required to provide an equivalent fraction of water (57%) to the lower river, the remainder to come from other sources in

the upper basin, mostly above Upper Klamath Lake—essentially pitting lake levels against river flows (Messier 2012; USBR 2002).

An early season prediction of sufficient water for both farmers and fish in 2002 quickly gave way to another dry year (Doremus and Tarlock 2008). However, unlike 2001, deliveries to the Project were not curtailed, but instead flows released to the Klamath River suffered as did lake levels under the KPOP 2002-2012, and despite two new BiOps by the USFWS and NMFS, both concluding "jeopardy" for listed species (USFWS 2002; NMFS 2002). Low water releases to the Lower Klamath River combined with drought conditions, created a low oxygen environment in the lower river (CDFG 2004). In addition, an early and higher than expected run of Fall Chinook salmon ascended the river, only to find crowded conditions in warm shallow pools below Iron Gate dam. The spread of disease fast and lethal and over four days in September 2002, at least 34,000 Chinook salmon died in the Klamath River below Iron Gate dam (CDFG 2004). The photographs, videos, and news stories relating this ecological tragedy were shocking; tribes and fisheries advocates used the rhetoric of devastation to further challenge the "science" imposed by the interim NRC report on Project operations and subsequent river flows (Egan 2002). Protesters even hauled dead fish from the Klamath to the steps of the department of Interior building in Washington, D.C. (Most 2006).

3.5.3 Exhausting Options for Control and a Shift Towards Reorganization

This point in the narrative of the environmental governance transition between 2001-2010 can best be described as chaotic, and perhaps as the height of the release phase. The post-2002 fish kill *PCFFA II* litigation was dead due to 'inconclusive science' and subsequent *PCFFA* challenges would have similar results.[32] The media wars and litigation had begun to exhaust the resources of Project irrigators and it became increasingly clear that the "best alternative to a negotiated solution" would not create a good situation for any party (Delli Priscoli and Wolf 2009). Even the federal government seemed to have thrown in the towel on providing solutions for the Klamath issues as

[32] See Messier (2012, 536-537) for a detailed summary of the ongoing *PCFFA* litigation.

evidenced by the expiration of the short-lived (18 months) Klamath River Basin Federal Working Group convened between 2002-2003 (Bush 2002; Messier 2012).

However, a series of collaborative venues started to emerge in the basin. Although at first these emergent venues were emotional, seemingly unproductive, and even hostile, they began to coalesce into a group of leaders representing key interests in the basin, with a recognition that the needs and desires of each interest group was tied to the needs and desires of every other. In a feature article published by *High Country News*, journalist Mark Jenkins (2008, 14) articulately summarized some of the earliest venues:

> After 2002, there were several attempts to talk about resolving the problems, but they went nowhere: The wounds were too raw. Sometime in the fall of 2004, however – after the farmers lost several key legal fights – things started to change. The Bureau of Reclamation had sponsored a series of several-day 'listening sessions' meant to initiate some kind of dialogue. It was a woo-woo, pass-the-talking-stick sort of deal that the farmers and Indians normally wouldn't be caught dead at. 'They were really painful,' says Troy Fletcher. 'It's hard to sit through two days of 'talk about your feelings,' It really sucked.' Yet as long as any one of the warring parties attended the sessions and spoke out, none of the others could afford to stay home.

The Upper Klamath Basin Working Group (UKBWG) created by U.S. Senator Mark Hatfield of Oregon in 1996, initially served as a point of traction, facilitating tours of upper basin restoration projects, and bringing disparate groups together, e.g. commercial fishermen touring the Klamath Project in 2003 (Barnard 2003; Darling 2003a; 2003d). An influx of different types of capacity also entered the basin during the end of the release phase, e.g. funding from the Oregon Watershed Enhancement Board (OWEB) applied for by the UKBWG and administered by the Klamath Basin Ecosystem Foundation (KBEF) to perform a complete watershed assessment of the upper basin (Messier 2012). The UKBWG was also responsible for a series of projects and meetings between established and emerging groups of similar interests in the basin, such as upper basin (off-project) ranchers and the Klamath Tribes who managed fisheries and habitat restoration projects adjacent to private ranch land on the headwaters tributaries of the basin such as the Sprague and Williamson Rivers (Darling 2003b; 2003c; 2003e). As an outgrowth of these informal meetings, two private ranchers and board members of the

Klamath Basin Rangeland Trust (KBRT), Jim Root and Kurt Thomas, organized a series of 7 meetings between the Klamath Tribes and private parties in the upper basin (Darling 2003f). The meetings are known around the basin as the "Root talks" (Interview V, 28 November 2012). These talks enhanced a shift towards reorganization through several loose accomplishments: 1) recognized an opportunity for traction around a potential settlement of contested water rights claims in the upper basin between private parties and the Klamath Tribes; 2) attracted the attention of the Department of Interior; and 3) suggested the need for much more inclusive talks (Darling 2003e; 2003f).

Despite ongoing litigation between conservation groups and the federal government (*PCFFA* litigation) and between Project irrigators and the federal government (*KID* litigation), the rhetoric of the 5th Annual Klamath Watershed Conference (*titled* "Communities, Resources & Restoration: Putting What We Know to Work") held in February 2004, expanded space for potential collaboration, but it also expanded the table significantly (Messier 2012, 566). The result was a series of basin-wide workshops between 2004-2005 organized and facilitated by Bob Chadwick, an expert facilitator and conflict mediator living in the basin (Messier 2012). According to Judith Messier[33] (2012, 598), "as a direct result of participation in the Chadwick workshops, people reached out not only to span boundaries, but also to move forward together to make real what they had envisioned together." The "Chadwick Sessions" as they became to be known around the basin, slowly attracted the full spectrum of interests from around the basin and included participation of federal agency representatives of significant leadership positions (Messier 2012, 580-581; Interview V, 28 November 2012; Interview B, 29 August 2012). Of the 28 litigants (groups) involved in the ongoing *KID* litigation, representatives for 22 of them attended at least one Chadwick Session (Messier 2012). Further, in March 2005 evolving as a need of the Chadwick Sessions, Chadwick organizers created an email listserve called "KlamathStakeholders" to be

[33] Messier (2012) is a critical source of information here: she personally participated in two of the five Chadwick workshops and her dissertation (cited here) is an analysis of Chadwick's process as an alternative approach to mainstream American conflict resolution. It is unclear whether or not Messier's time in the Klamath Basin was directly related to the ongoing water and resource conflicts.

hosted and maintained by the Oregon State University Extension Service—initially recording over 300 requests for subscription (Messier 2012, 579).

There is significant evidence that the Chadwick sessions began to close a period of governance collapse in the basin, signaling a phase shift towards reorganization in the Klamath SES. A move by basin stakeholders away from litigation and towards dialogue, along with the presence and buy-in of federal officials, at least appeared to have created space for a shift towards more collaborative governance. Gunderson and Holling (2002) employ the metaphor of a forest fire to describe the tenure of the release phase—the fire goes out when fuel is exhausted. So too did the height of crisis and conflict in the Klamath fizzle and fade as parties exhausted litigious venues and grew weary of the constant name calling and accusations in the press (Doremus and Tarlock 2008). Forces that would shape a new direction in environmental governance stabilized—if only momentarily—long enough to see that an opportunity for a different trajectory was emerging. It wasn't immediately apparent that this new trajectory was better, it was just different, and held greater potential.

3.6 Reorganization Phase (α): Exploiting Windows of Opportunity

The transition from release to reorganization that took place in the Klamath SES between 2005-2006 can only be described as messy, incremental, and uncertain. Only the original, eloquent description of this adaptive cycle phase shift by Gunderson and Holling (2002, 45) has the power to mirror what occurred in the Klamath during this period of transition.

> If the progress from r to K represents a prolonged period during which short-term predictability increases, the shift from Ω to α represents a sudden explosive increase in uncertainty. It is the phase where conditions might arise for formal chaotic behavior. This alteration between long periods of somewhat predictable behavior and short ones of chaotic behavior might result in systems periodically probing and testing limits. The process generates and maintains diversity—of, for example, species in ecosystems or functions in an organization. And that diversity "lies in waiting" to allow the system to respond adaptively to unexpected future external changes.

The reorganization phase is marked by unpredictability: resources and capital are highly available and unconstrained by prior combinations or associations (Gunderson and Holling 2002). The possibilities for recombination are endless and space for innovation opens. In the Klamath, the sea change of dialogue that began with the Root Talks and the Chadwick Sessions began to progress towards exploring options for multiparty solutions. As Olsson et al. (2006) describes, Klamath stakeholder were "preparing the system" for a reorganization in environmental governance. But the reorganization phase is not necessarily stable or robust. As potential grows so too does a system's resilience, but initially the system is weakly connected and vulnerable to external variability. However, this external variability can sometimes manifest as "windows of opportunity" for a recombination of system variables—like the inklings of collaborative dialogue in the Klamath—to "nucleate unexpected processes of growth" (Gunderson and Holling 2002, 46; Olsson et al. 2006).

3.6.1 The FERC Relicensing Process: A Window of Opportunity

Concurrent to the media wars pitting science as a weapon in the early 2000s, as well as concurrent to ongoing litigation over the BiOps, BAs, and damages from the 2001 water shutoff, PacifiCorp, the owner and operator of the KHP, was preparing for the expiration of their FERC operating license in 2006. In 2001, PacifiCorp started collecting comments from key interests in the basin—more specifically, those with interests in the KHP, not necessarily the ongoing water allocation issues. According to Barnard (2004), in 2002 the company also began a series of what would be over 200 meetings in the basin to discuss issues surround relicensing the KHP.

The expiration of PacifiCorp's FERC license and the subsequent relicensing process brought with it two key elements that would change the landscape of conflict in the basin and aid in the phase shift towards reorganization: 1) the expiration of very inexpensive power rates for irrigators on and around the Klamath Project; and 2) a potential process alternative to strict relicensing of the KHP, which could result in an agreement for the removal of the four major mainstem dams of the KHP (Spain 2007).

In 2003, PacifiCorp initiated a standard dam relicensing application with FERC, filing a Final License Application in 2004 (Draft EIS/EIR 2011; PacifiCorp 2004). Since the issuance of a FERC license constitutes a "major federal action," a relicensing application triggers the need for an Environmental Impact Statement under NEPA (Public Law 91-190) and a review of compliance with all relevant environmental laws including the ESA and CWA. With the conclusion of the Draft EIS in 2006, the NMFS and USFWS released drafts of mandatory prescriptions for fish passage to be required under a new KHP license that included the construction of fishways and changes in flow management[34] (NMFS/USFWS 2006; Spain 2007). Under the Energy Policy Act of 2005 (Public Law 109-58), PacifiCorp challenged these prescriptions in August 2006 in the first ever trial-type hearing under the new statute (Spain 2007). States, tribes, and conservation groups intervened on behalf of the mandatory prescriptions, while Siskiyou County, CA intervened on behalf of PacifiCorp's appeal concerned about the economic ramifications for whitewater rafting companies that operated between the J.C. Boyle and Copco 1 facilities (Spain 2007). The administrative law judge hearing the case ruled that federal agencies met their burden of proof (factual issues in dispute) regarding most of the mandatory prescriptions (*In the Matter of Klamath Hydroelectric Project, Docket* Number 2006-NMFS-0001, Sept. 27, 2006). During the hearing, NMFS, the state agencies of Oregon and California, all Klamath Basin tribes, several members of Congress, the Humboldt (CA) County Board of Supervisors, and multiple conservation organizations recommended full facilities removal, while the USFWS recommended mandatory fishways and passage at each mainstem dam (Spain 2007).

While concurrently challenging the NOAA/USFWS prescriptions, PacifiCorp initiated alternative settlement talks with basin stakeholders in 2005 under the assumption that the cost of constructing the prescribed mandatory fish passage outweighed the cost of

[34] Requirements under the Federal Power Act as amended in 2000 (16 U.S.C. § 811). Until further amendments to the Federal Power Act by the Energy Policy Act of 2005 (Public Law 109-58), the requirement by either NMFS or USFWS for fish passage was absolute and thus required as a condition of any future FERC license (*see* Spain 2007 for a thorough legal analysis).

potential dam removal achieved through a negotiated settlement.[35] According to Messier (2012) and confirmed by my own interviews in the basin, the group assembled for the last Chadwick Session in 2005 roughly morphed into the original group of stakeholders in the FERC settlement talks. As evidence that the form and venue of environmental governance and resource decision making in the basin had shifted, 22 of the 28 litigants involved in the ongoing *KID* litigation were parties in the initial settlement group (Messier 2012). However, in 2006 after several unproductive meetings, most of the stakeholders—still under the auspice of the FERC process—broke off from talks with PacifiCorp in order to address the greater issues plaguing the basin of which the KHP was a major part, but not the focus.

3.6.2 The Extended Caucus

This extension of the FERC process formed in 2006 came to be called the "Extended Caucus" (Interview B, 29 August 2012). From 2006-2008, the Extended Caucus met and negotiated extensively. A strict confidentiality agreement was signed by all participating parties due to the nature of the points negotiated (potential tribal water rights settlement in the upper basin, private dam and irrigation operation, etc.); the group was led by a series of de facto and professional facilitators, some hired, some emerging as natural leaders from within the group. The Extended Caucus consisted of four tribes (Hoopa Valley, Karuk, Klamath, and Yurok), Project and Off-Project irrigators, environmental and conservation groups, California, Oregon, and direct representatives of the federal government (Department of Interior and Department of Justice and associated agencies such as USFWS, NMFS, BIA, etc.). The process of negotiating and drafting a comprehensive agreement to address water and related resource governance issues in the basin was long, grueling, and tedious—multiple iterations of stakeholder representatives cycled through the meetings including fisheries biologists and hydrologic modelers from

[35] Publically confirmed in the release of the FERC Draft EIS (2006), which described partial dam removal as "far cheaper" than construction volitional fish passage (Spain 2007, 110). Further, in 2006 the California Energy Commission (CEC) released a study showing that removal of all four dams would be roughly $1M cheaper than retrofitting the dams for fish passage.

tribes, agencies, and the private sector (Interview B, 29 August 2012; *and subsequent interviews*).

In 2008, the Extended Caucus released to the public a draft of the Klamath Basin Restoration Agreement (KBRA), an attempt to settle tribal water rights claims and address overallocation of water in the upper basin through a myriad of measures such as the retirement of water rights (Barnard 2008; KBRA 2010). The agreement would provide some predictive certainty for water users in the basin based on an integrated forecasting schedule. In addition the agreement called for a significant amount of habitat restoration work in the basin. A pinnacle piece of the agreement, however, was its execution in coordination with a subsequent agreement (yet to be negotiated) between stakeholders (importantly including DOI and FERC) and PacifiCorp, to remove the four major facilities of the KHP by 2020 (KBRA 2010). Not all demands of the parties were met in the KBRA process, evidenced by the departure of the environmental groups Oregon Wild and WaterWatch of Oregon in 2007 and the North Coast Environmental Center (NEC) and Klamath Forest Alliance (KFA) in 2009 (Driscoll 2009; Jenkins 2008). These groups then joined 9 other groups as the "The Klamath Conservation Partners," coalescing around opposition to the agriculture on the Klamath National Wildlife Refuges (Messier 2012). After the release of the Draft KBRA in 2008, the Extended Caucus rejoined formal FERC negotiations with PacifiCorp and publically released a draft of the Klamath Hydroelectric Settlement Agreement in 2009 (KHSA 2010). In addition, in July 2009, the Oregon Legislature passed Senate Bill 76, establishing a trust to collect funds from PacifiCorp's rate-payer base to fund dam removal, a major step toward making the KBRA/KHSA (together the 'Klamath Agreements') a reality (Preusch and Sickinger 2009).

3.6.3 Lawyers, Fish, and Money: The Klamath Agreements

The Final Klamath Agreements, the KBRA and KHSA, were publically released in early January 2009 and were signed by non-federal parties[36] during a public ceremony

[36] Secretary of Interior, Ken Salazar, also signed the agreements publically on February 18th, 2010 according to Scott Learn (2010), a journalist for the Portland-based newspaper, *The Oregonian*. Of this, I have to assume one of two things: 1) this is in inaccurate report

held on February 18th, 2010 in Salem, OR (Learn 2010; Shevory 2010). However, federal parties such as the NMFS and the USFWS still required an authorization of Congress in order to bindingly participate as signatories in the Agreements. The Klamath Agreements represented a 180-degree change in approach to environmental governance as compared to that employed by stakeholder groups and resource management agencies in 2001. The Agreements were an approach to restoration of both the ecological *and social* aspects of the degraded Klamath SES. Among other things, the Agreements included the following approaches to major contested issues in the basin:

- *Fishery restoration*: The Agreements allocate $493 million to a fishery restoration program that includes a coordinated, interagency approach to habitat restoration for endangered suckers in the upper basin and Coho in the lower basin. In addition, the program includes a reintroduction plan for salmon above the current KHP, past the Keno dam facility and potentially into the upper basin for the first time since 1918, fulfilling a treaty obligation asserted by the Klamath Tribes (KBRA 2010).

- *Tribal water rights contests and water security for agriculture*: Provisions in the Agreements allow upper basin ranchers and farmers to deal with hydrologic variability through a stakeholder agreement each year based on modeling and flow predictions. Tribes agree not to pursue senior water rights claims against the Klamath Project irrigators as long as irrigators divert within the agreed amount each year. Built into the agreement are provisions for settling many (but not all) upper basin water contests between tribal and non-tribal water rights holders in the ongoing KBA process (KBRA 2010).

- *Degraded water quality*: The removal of four dams along the Klamath River will undoubtedly improve water quality (Draft EIS/EIR 2011; Zedonis et al. 2011). In addition, PacifiCorp agreed to finance $35M in interim water quality improvement and protection measures when the agreements are implemented. In the upper basin, the process in the KBRA for water use and agricultural land retirement, as well as riparian habitat restoration, will reduce diffuse non-point source nutrient additions to tributaries of Upper Klamath Lake (KBRA 2010).

- *Regional economic depression*: The Agreements could potentially create an estimated 4,600 additional temporary or permanent jobs in restoration,

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due to a misunderstanding of the legal involvement of the federal government's at this point (i.e. federal agencies, including those under Salazar's Department of Interior, need Congressional authorization to legally become parties to and bindingly participate in the agreement); or 2) my own misunderstanding of the legal meaning of Salazar's potential signature, or that he potentially signed the agreements for show.

agriculture, or recreation, and increase regional economic activity by at least $445 million. Additionally, the Agreements could create over 1,600 short term jobs based on dam removal and the associated mitigation or restoration (Draft EIS/EIR 2011).

- *Ongoing litigation*: The Agreements contain provisions that mandate parties use dispute resolution alternatives stipulated in the Agreements as opposed to litigation. In addition, the agreement calls upon signatories to *defend the Agreements* from other party litigation (KBRA 2010; KHSA 2010).

- *U.S.-Tribal trust responsibility*: The U.S. would receive from the Tribes guaranteed releases of legal claims for the historic mismanagement of trust resources, while each signatory Tribes receives substantial economic benefits as well as the culturally significant benefit of a robust, financed, fisheries restoration plan (KBRA 2010).

Superficially, the Klamath Agreements undoubtedly represent a monumental effort by a group of community leaders from across a geographically large basin, many of whom had previously spent the better part of decade directly fighting each other, either in court or in the media. However, a deeper look at the agreements and the negotiations that led to their signing reveals a highly contested process, controlled by savvy political actors, backdoor bargains, and a shadow networks and alliances. I am not dismissing the Klamath Agreements as a "flawed" political process, but instead, firmly asserting that they are *a product of a deeply political* process—the transition in environmental governance in the Klamath Basin. There is hope that a nuanced investigation of the politics of this transition can provide governance scholars with a better understanding of complex transitions in modern environmental governance, especially those that resemble shifts toward AG. This is the premise of Chapter 4.

3.7 Conclusion

Approaching the historic and contemporary social, economic, legal, and biophysical contexts of the Klamath Basin SES through the lens of the adaptive cycle allows one to explore the complexity of social and ecological interactions that have played out through the last century and a half. The narrative of exploitation, conservation, release, and reorganization adequately describes the trajectory of the basin

SES and helps to situate the interactive role of environmental governance within this timeline of change. The adaptive cycle metaphor also has some explanatory power—larger forces of adaptation and transformation underlay what appears to *only* be a narrative of colonization, accumulation, and marginalization of people and resources. But couching the Klamath SES in the adaptive cycle, while descriptive, also offers something rarely found in research on failures of environmental governance—hope.

The cyclical nature of the adaptive cycle creates conceptual space for the "next phase." What successes and challenges will accompany a transition in environmental governance during a phase of reorganization? Can a shift in goals, as well as a shift in approach such as that of AG, provide the tools for social and ecological restoration? Literature suggests that AG can be an emergent, hybrid governance approach employed to pursue normative social-ecological goals such as restoration, the sustainable use of resources, and/or the maintenance specific ecological functions like water quality (*see* Chapter 2). There is significant evidence that such a transition is afoot in the Klamath SES. In the next Chapter, I survey that evidence, pulling mostly from the later portion of the release phase and into reorganization. I discuss events, individual leadership, the formation of networks, and the infusion of capacity in the context of a new, emergent form of governance—one with a striking resemblance to the theoretical conceptions of AG.

4. CHAPTER 4. REALLOCATING RESOURCES, REBUILDING COMMUNITY: THE KLAMATH BASIN AGREEMENTS AS EVIDENCE OF A SHIFT TOWARDS ADAPTIVE GOVERNANCE?

So far in this dissertation, I have posited that given the nature and trajectory of resource extraction and consumption patterns on a global scale, environmental governance regimes may start to shift organically towards environmental governance that resembles AG in an effort to pursue normative goals such as "sustainability" or the sustainable use of natural resources (Cosens et al. 2014). But the current understanding of AG seems to still be rooted in theoretical developments inspired by a few (robust, but few) empirical examples of governance transitions (e.g. Olsson et al. 2004b; Österblom and Folke 2013). Therefore, I think it is essential for governance scholars to turn their attention to investigations of transitions in environmental governance in an effort to further identify examples that resemble a move toward theoretical AG. In this effort, researchers should focus on uncovering the drivers of such transitions and in some cases, the barriers that prevent transitions from progressing or even beginning. Increasing the general understanding of when and how AG emerges may increase the likelihood that AG can be fostered by scholars and practitioners if—*and only if*—it is determined that AG is truly a preferred form of environmental governance.

Accordingly, I spent the last chapter investigating an empirical example of a real-world transition in environmental governance taking place in the Klamath River Basin SES between 2001-2010. In order to fully understand the Klamath SES and its potential as an example of a transition towards AG, I explored the dynamic contexts of environmental governance in the basin along a trajectory of change over time represented by the metaphor of the adaptive cycle (Gunderson and Holling 2002). This approach has allowed us to see environmental governance in the Klamath as highly controlled by a set of social variables over the past century, under the almost exclusive goal of extraction and economic production. However, the more recent influence of cross-scale interactions—a change in values regarding environmental protection on a national scale and the rise in political power of locally displaced indigenous tribes—has introduced a new set of controlling variables that ground the gears of environmental governance to a halt. After a period of active release through the "purging" of built up of social and

ecological tension, a reorganization of governance was possible, one with a trajectory that seems to mirror that of theoretical AG. Thus the Klamath case provides a basis to explore the potential emergence of AG, *and* whether or not negotiated agreements such as the KBRA and KHSA, are likely tools for institutionalizing a transition towards AG in future SES governance contexts.

In this Chapter, I identify the presence or absence of previously identified components of AG through an investigation of the Klamath Basin governance transition from 2001-2010. Characterizing this transition in governance as a shift towards AG allows for an empirically informed investigation of AG components, and a subsequent discussion on the importance of each as a potential facilitator or inhibitor of transitions toward AG. In addition, this investigation provides a case to explore the political processes inherent in a transition towards AG, and comment on the inherent ability of AG to produce normative outcomes such as those associated with good governance, sustainability, and social and environmental justice.

4.1 Looking for Evidence of Adaptive Governance In the Klamath Basin

Applying the framework presented in Chapter 2 as a method for systematically identifying components of AG in empirical examples of governance transitions, I now turn to a more nuanced analysis of the narrative history of environmental governance outlined in Chapter 3. In the following sections, I outline evidence of affirmations and contradictions of the **emergence** of AG in the Klamath between 2001-2010 through the increased collaborative **participation** of key leaders and organizations, the formation of networks, the emergence of processes at a **bioregional** scale, significant **power shifts** amongst participants in governance and decision making, the development of a **culture of learning**, and the subsequent **institutionalization** of these shifts in norms and formal organization. The structure of this chapter can roughly be divided into two substantial parts interwoven together in a unified narrative. First, I use the chronology of environmental governance transition outlined in Chapter 3 to highlight important synchrony with the theoretical principles of AG and discuss potentially how evidence from the Klamath example can further inform AG theory. Second, I turn to a discussion

of the politics within the chronology of the Klamath environmental governance transition (macro, micro, and cross-scale) as a means for exploring the bridges and barriers to a full transition towards AG in the Klamath case. This exploration is critical—the politics of transitions toward AG have been fairly ignored in the literature, or mentioned briefly to describe the opening of windows of opportunity (Hahn et al. 2006; Olsson et al. 2004b; Olsson et al. 2006). However, politics *drove* the Klamath transition, especially during the reorganization phase while stakeholders "confidentially" hammered out the details of the Klamath Agreements. Without an assessment of this process, it would be difficult to accurately reflect back on the goals of AG in the Klamath, including whether or not negotiated agreements could be a tool of intervention for catalyzing AG in other SESs.

To accomplish both parts of this analysis, I turn to a qualitative analysis of data gathered in my case study approach to the Klamath. I employ institutional mapping and social network analysis (SNA) to analyze the organizational and institutional environments in the Klamath both at the start of the transition (crisis—2001) and the end of my case study period (comprehensive agreement—2010). The institutional mapping and organizational relationship qualifications for the SNA analysis is informed by a series of 38 semi-structured interviews performed between 2011-2014 with governance stakeholders in the basin. The majority of these interviews (n=31 or 82%) were with stakeholder group leadership—persons directly involved in the Extended Caucus negotiations over the KBRA and the subsequent FERC negotiations over the KHSA. To the best of my knowledge, this represents the first and most complete survey of participants in the Klamath confidential negotiations related to the FERC relicensing of the KHP. While I was not able to survey every individual involved in the negotiations due to the unwillingness of certain actors and the timeframe for completion of this dissertation, I do feel that I achieved relative "saturation" in responses to questions asked[37] regarding interviewee involvement in the process of negotiating the Klamath Agreements (Creswell 2007, 240). The analysis that follows relies on the technique of

[37] See Appendix A for a copy of the "semi-structured interview guide" created for approval by the Oregon State University Institutional Review Board (IRB), and which includes a list of questions asked during each interview. Number of questions asked was determined by relevance to particular interviewee and time available.

triangulating data, pinpointing multiple sources of evidence to support conclusions drawn from my qualitative approach to inquiry (Creswell 2007, Yin 2009). Thus I also rely on available documents in the public record, articles and opinions from local and national media sources, as well as more social media-based outlets such as organizational websites and Klamath issue-based blogs. My analysis of these data sources are reflected in the next sections, organized according to the framework for identifying AG as presented in Chapter 2.

4.2 Emergence: Hints of a Transition Toward Adaptive Governance in the Klamath Social-ecological System

The 2001 water curtailment to the Klamath Project, the subsequent civil disobedience and protests in Klamath Falls, the reversal of Project operations the following summer, and the September 2002 fish mortality event in the lower basin, were all signs that environmental governance in the Klamath SES had failed. Each community in the basin (tribes, irrigators, commercial fishermen, environmental advocacy groups) had constructed their own vision of a "desired state" which included a set of exclusive goals and outcomes for resource management. It wasn't that each community's goals didn't or couldn't align with the goals of another community, but instead, the perceived incompatibility apparent in the historic record was a direct result of a lack of engagement in this conversation between communities. A history of racial tension, environmental degradation, and the traditional bunkers of "us vs. them" conflict resolution techniques, further fueled the pursuit of zero-sum outcomes such as litigation and a vitriolic public rhetoric of blame (Newell 2002).

However, the stalemate in governance and the rotating crises affecting basin communities eventually enabled the emergence of characteristics of change. Chaos and disorganization followed crisis, but this eventually led key leaders to self-organize and pursue novel solutions to persistent resource problems. Basin leadership representing key stakeholder communities began to build trust amongst themselves and to a lesser extent, among federal agency partners (Interview H, 20 February 2013; Interview AA, 21 February 2013). As relationships between key stakeholder leadership grew stronger through trust and empathy, a network emerged that created space for a dialogue about

what each community wanted or needed to survive in the basin. Essentially, the conversation was started about what the desired state for the Klamath SES would or could look like, and additionally, how environmental governance could achieve that vision. This cascade of events—leaders emerging from crisis, building trust, forming networks, and organizing around a vision for the system—represents the foundation for AG (Folke et al. 2005; Österblom and Folke 2013).

4.2.1 Crisis, Chaos, and Self-Organization

Crisis and/or the perception of crisis has been shown to be a catalyst for transitions toward AG in multiple cases (Gunderson and Light 2006; Olsson et al. 2004b; Österblom and Folke 2013). Accordingly, crisis in the Klamath Basin was critical to igniting a shift in environmental governance. But crisis and perceptions of crisis took on different forms to different basin communities and at different times in the Klamath. Sure, on a national and potentially global scale, the events of 2001 is the single crisis that most people remember or associate with the Klamath Basin, but the critical role that crisis played in the Klamath was multiscalar, both spatially and temporally. Crises occurred at the scale of individuals, families, communities, and at the basin. Gosnell and Kelly (2010, 370) document the concept of the "rotating crisis" in the basin—water shortages first affecting irrigators, then fisheries (tribes/environmental groups), and then commercial fishermen via restrictions and closures in fishing seasons (Spain 2007). This idea is important, for it seems that it was not until a community had experienced the pain associated with an acute resource crisis that they were willing to engage in a conversation with communities they perceived as adversaries or competitors for resource use.

> And so, you also had a situation where… everybody has kinda felt some pain. I feel like the people who are still at the table, who are still on board… have been hurt. Somewhere. I don't know if we would have said that a few years ago... but, the reality is, the tribes haven't been catching the fish they want to catch, there are closures on the ocean for fishing based on weak stock management in Klamath River. We had water shut off here. (Interview G, 12 October 2012)

Crises in resource availability directly affecting livelihoods brought with them a certain amount of uncertainty that rattled basin communities. The first response was to fight. Clear evidence of this can be found in the legal record—*Kandra*, *Patterson*, *PCFFA*, etc. This became a fight not only for "rights" to physical quantities of water, but on a deeper level (often via public media), this became a fight for community, identity, livelihood, and the survival of culture.

> Overlaid on all of that was, and is today, the priority, the paramount need to protect our culture and our way of life. It was all about that. (Interview AA, 21 February 2012)

> …a lot of our activities were around protecting, enhancing, and promoting protection of our treaty rights. It's just essential to our culture and well-being, we recognize that. We've been here forever, we have all these close ties to the land. Many of us were raised to hunt and fish like my father taught me and there are members of the community, that's just their mindset. We're so closely tied to the land, the resources, and the uses of them. (Interview O, 2 November 2012)

During the fight for community survival, respective Klamath Basin communities heavily leveraged their resources, which included all forms of community capital: political, financial, and social (Pretty 2003). This process encouraged effective leaders from each community in the basin to lead the charge and fight to secure rights and resources for respective communities. Some leaders emerged by choice and some by the nature of the professional position they held (tribal elders, executive directors, city counselors, etc.). Either way, the events leading up to and including summer 2001 juxtaposed a set of key leaders in a fight for the governance of resources in the Klamath Basin. The names of these key leaders would become household over the next decade—and some names would become legendary.[38]

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[38] The leadership (individuals) involved in the Klamath environmental governance transition between 2001-2010 are a relatively small group, many of them are public figures, and virtually all of them have been quoted at one time or another in the media. In this way, it has been difficult to separate individual names from certain events in the Klamath. In cases where an individual's name is associated with an event and evidence of this association is pervasive in published accounts, I continue to use that association in this dissertation. A great example of this is the "Chadwick Sessions" organized by Bob Chadwick (Chapter 3). However, in an effort to maintain the required confidentiality of the interviews I conducted in the basin, I removed all personal identifying information

But the mark of leadership is not simply the ability to fight and win, but to tenaciously pursue the needs of your constituency through a variety of approaches, adapting where necessary to make progress in the face of stalemate. This is where leadership meets the chaos that emerges post-crisis in a governance transition. Effective leaders can be the embodiment of adaptive capacity during a governance transition (Gupta et al. 2010). During the chaotic jostling that followed crisis roughly between 2001-2004 in the Klamath, leadership of the various communities as well as leadership from agency stakeholders interacted in many forums—both civil and not. This interaction, while not necessarily explicit, represents the rapid exploration of possibilities that defines self-organization following a period of release (Gunderson and Holling 2002). Any number of potential combinations is possible, but without the capacity to explore re-combinations (via leadership), untenable environmental governance may persist in a state of turbulence, producing outcomes undesirable by the majority of affected communities and stakeholders.

4.2.2 Leadership and Trust-Building

Leadership in the face of chaos was also critical to exploring potential governance scenarios in the Klamath transition. Even before interviewing anyone in the basin I had heard the story of an "olive branch" extended from a tribal leader to the irrigation community, asking for a "ceasefire" between tribes and irrigators[39] in order to sit down and see if there was space to discuss potential solutions. Messier (2012, 593) was a participant at the particular Chadwick Session where this occurred, and she remembers it this way:

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from each excerpt of conversation I cite herein—with the exception of information indicating affiliation with a broad stakeholder group such as tribes or irrigators or commercial fishing or environmental groups.

[39] The Klamath Basin resource conflict has often been characterized as exclusively "famers vs. fish" (Jehl 2001), but that has served as a proxy for "non-Indian farmers vs. Indians" especially in the upper basin. Indeed during the period between 2001-2003, the rhetoric between these two (very broadly defined) stakeholder groups was the most poignant (Doremus and Tarlock 2008). Therefore, a ceasefire between these groups represented a major shift in the approach to conflict.

> At the Tulelake workshop, I remember it well – the moment when [tribal leader]… proposed that, in the light of the projection of drought for 2005, there be a 'ceasefire' between all parties in the Basin and that people work together to deal with the repercussions of a drought should it actually come to pass. There was a palpable hushed feeling in the room, which I interpreted as 'Did I just hear what I think I heard?' Well, yes we had.

Fortunately, I was also able to obtain a first hand account of the proposal, contextually situated in the importance of leadership to evolving environmental governance in the basin.

> You've got representatives, and you've got the community they represent. And I'm only as strong as the community I represent. [Opposing leaders are] only as strong as that. If we're having a conversation about how to bring people along and catastrophe happens, you lose your constituents. They're not able to catch up with it. They can be on board with what you're talking about, but blame, frustration, anger, those things are the first reactions—reasonable, valid—they're the visceral type of thing. And that's what happened. But what happened was, you know through the Chadwick stuff, whether Chadwick just wore me down or whatever… like you said the 'olive branch,' somebody must have told you what happened, right? I was like, 'I'm tired of this shit.' And I was talking to one of the Indians, and I go 'I want to say let's have a ceasefire and let's stand down, and I don't know where we'd go or what happens, but let's start talking.' And people on their side were like, 'that's a terrible trick you pulled on us! You want to talk about this now? How dare you do that?' I stumped 'em!
>
> And then for me! I mean, Tule Lake, I didn't even make it home, and people were already saying, '[He] lost it.' My guys! They didn't call *me* on the phone, they were calling other people. '[He] lost it. He agreed to sit down and work with these guys. What the hell?' So it was very ironic and funny. As an individual you have to be prepared, you have to be knowledgeable, you have to do your homework, you have to know what you're talking about, you should read every thing you can read, you should know the principles of negotiation, know the principles of problem solving, and all those things, but… good ideas that pop into your head on a moment's, or spontaneous, you gotta know when to roll with them. And a lot of people were like, 'you were very strategic.' I was like, 'oh no no, I wasn't strategic, I was just telling you what I thought at that moment.' And to their credit they go, 'holy shit. OK, let's think about it.' (Interview AA, 21 February 2013)

The olive branch event was alluded to by most individuals I interviewed (especially those present at the Tule Lake Chadwick Session, but also by many who were not and who only know the event by reputation) as a single moment that stemmed the

tides of chaos following the rotating crisis in the basin. Indeed, it was a pivotal moment of leadership that catalyzed a path forward—"I don't know where we'd go or what happens"—but a path forward none-the-less (Interview AA, *see above quote*). Although this was a critical moment of emerging leadership, key leaders in the basin had already played a major role in creating a path forward beyond adversarial conflict. In fact, the actions of key leaders had created the forum for this "ceasefire" proposal to coalesce, no matter how spontaneous the proposal itself had been. Leadership came from individuals like Bob Chadwick, Jim Root, and Kurt Thomas[40]—influential individuals with access to financial and social capital (respect amongst disparate communities) matched with skills[41] and a desire to avert further crises from degrading resources and fragmenting basin communities.

While there were few tangible outcomes from the Root Talks (also called the "Root-Thomas Talks" by Messier (2012, 522), and also known around the basin as the "Shilo Talks"), these talks (along with the early Chadwick Sessions) provided a venue for the release of "blame, frustration, [and] anger" that had captivated the rhetoric of community relations in the basin since 2001 (Interview AA, 21 February 2014). The importance of this release cannot be overstated:

> I know that different things happened between 1990 and 2000, [than between] 2000 and 2010. One of the things that was very different was that [in the period between 2001-2010] there were many forums in which people created emotional connections, you know, via either the display of anger, vulnerability… just sharing pain, sharing hope, I mean all that range of fuzzy stuff. I can tell you, I think we could be very objective and say virtually none of that happened in the prior 10 years, and quite a bit of that happened in the subsequent 10 years… and hmm, there's a hell of a lot more agreed to in the latter 10 years than there is in the prior 10 years. It's gotta be having an influence. (Interview B, 29 August 2012)

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[40] These names and the discussion forums they represent (organized) are significantly referenced in newspaper articles (e.g. Darling 2003e; 2003f; 2005), Messier (2012), and Most (2006), and thus can be considered public knowledge. I have not protected their individual identities when describing the discussion forums that were held between 2003-2005 and subsequently named after them.

[41] Bob Chadwick is a professional facilitator; see Messier (2012) for a thorough analysis of the facilitation techniques and alternative approach to conflict resolution he employed during the Chadwick Sessions.

The Chadwick talks in particular were significantly influential in releasing built up emotion among basin leaders and other stakeholders. Bob Chadwick took a different approach to conflict resolution: he listened, he facilitated dialogue, and most importantly, he created an atmosphere where *everyone*, at some point or another, would have to listen to everyone else.

> And so what Chadwick did was different though. They pulled [didn't use] poster boards, butcher paper… and he simply said, 'we're just going to talk with each other. And all you're gonna do is listen to this person who will talk to you and then repeat back what he said. Simplest stuff in the world, and it was f**king painful. I mean we're talking 75 people, 100 people. 'I'm talking to you, and let me tell you what my perspective is. Now repeat back what I said.' (Interview AA, 21 February 2014)

In analyzing the fine grain details of "how" a governance transition in the Klamath was catalyzed, it is important to note that Chadwick's approach was very personal in nature. He facilitated personal interactions as well as symbolic demonstrations of the emotions that were playing out in the workshops. He attempted to find ways to transcend the narratives created in other forums such as litigation and the media, as a way to reach a broader audience and ignite personal transformation. The following account of a federal agency manager's experience at the Chadwick Sessions is a perfect illustration:

> So, at this meeting Bob Chadwick says, '[agency manager], I want you to come up here.' So I get in the middle of the circle, right? I'm just an agency person. And he get's [tribal leader], brings [him] up. Then he gets one of the water users…. And he said, '[tribal leader] I want you to take [agency manager's] hand and [water user] I want you to take [agency manager's other] hand, now I want you guys to walk backwards, walk away from [agency manager].' And I'm like this right? And all these people are witnessing it and Bob says, '[agency manager], so how do you feel right now?'
>
> And I'm like, 'this is really, really uncomfortable. This is starting to hurt.' And his point in all of that weird demonstration was that it's not really about me, it's about them. Those two stakeholders having a dialogue, having a relationship, and figuring stuff out. That they were just using me, because that's all they have. They have these ESA biological opinions to litigate, but it never solves the problem. It doesn't recover the fish… that in and of itself does not create resilient communities. It doesn't. Coming up with durable, comprehensive solutions that

> everyone or the majority of the people can live with, that's what does it. …So that was his [Chadwick's] funny demonstration. (Interview H, 22 February 2014)

Despite how painful or uncomfortable it was, Chadwick's process created space for future dialogue. The process forced political and media adversaries to see each other as humans, with needs not only for themselves, but also for their families and their communities. Throughout the interviews I conducted in the basin, several of the key leaders of major stakeholder groups kept returning to the idea that "the other guy" was actually a lot like them. Beyond acre-feet and power rates, or habitat and instream flows, family, livelihood, spirituality, and community were the common denominators between most people in the basin, especially between the most aggressive and vocal foes up to that point: irrigators and tribes.

From the perspective of irrigators:

> And you know, so the meetings get done… so you're gonna go have a beer… oh 'hey' OK [they are too]… so then you start talking. Then you find out people got a lot more in common than you think. He's got kids playing sports, I got kids playing sports. A big deal for me—I don't know if it was for him—was [that] the people I work for are passionate about their community, their kids. They want their kids to come back and farm. Their culture and religion is real important in small rural farming communities. And you start talking to a guy like [tribal leader] and people he works for, having their kids come back and fish and do those kinds of things, that's really important. Their culture's really important. Small rural communities, it's like… they like to hunt and fish, we like to hunt and fish. It's like 'man, what are we fighting about, let's figure this out.' It's easy to say that, [but] it took years and it took a lot of beer…. (Interview G, 12 October 2012)

> …I also have a whole bunch of new relationships, I know a bunch of people that, 20 years ago, I'd a never talked to 'em. I never wanted to be in the same room with them—they're kind of interesting! They do stuff different. You know? So the world—my world is different. I can now go down to the mouth of the river, which I was a couple weeks ago cause I was invited down. I watched them fish. I got to go for a boat ride. I got to eat the fish. Sit on the shoreline and had a visit with Tribal Elders. It was fun. Nice beautiful day, beautiful river, it was great. I couldn't have done that ten years ago. And now you can do that. Here locally, just the idea that I can walk into that Tribal building and talk to someone I know and I'm treated with respect, not fear, but rather treated with respect. And they too can come down here and have dinner in my home and we don't always agree on a lot of things, but we can have a conversation about it. (Interview F, 11 October 2012)

From the perspective of tribes:

> …[A]t the end of the day, I will tell you that we've got far more in common with the irrigators than we do with the federal government. Far more in common. We're spiritual people. The river is so important to us, it's who we are, it's our culture. They're spiritual people. They're good people. But, as long as I'm lobbing bombs at them, and they're lobbing bombs at us in the media, it's just like fighting a war with drones. You don't see the damage, you don't see the fallout. If you spent time to—and this is where, adaptive government or whatever—there's no governmental principles if you don't have a personal relationship with those who have different views. They won't work. Because you won't be able to have any give or take, compromise, gains. What's important to me—'hey dude, this is really important, can you work with me on it?' Well that don't happen over there in the media, and that don't even happen if you're at a meeting with microphones across the table. That don't happen at the Secretary of Interior's office, but it can happen with somebody that you respect and you know because you trust them and you understand that they're a family man or woman, trying to make a living and that type of thing. That's way different. And that's a foundation for a discussion. (Interview AA, 21 February 2014)

While I use this quote to demonstrate evidence that the Chadwick Sessions and prior forums were critical to transforming the nature of the relationships between stakeholder leaders in the basin from adversarial to a more respectful familiarity, the quote represents another very important undercurrent surfacing during this time period: the idea that resource management (and by extension, environmental governance) could and should be decided amongst *users* of a resource. Many stakeholders in the basin did not view the federal (or state) government and their agency representatives as stakeholders in the basin's resource issues. Some federal representatives even agreed to a certain extent. Recall the dialogue quoted above by the federal agency manager who was "pulled apart" by the tribal leader and the water user: "…it's not really about me, it's about them. Those two stakeholders having a dialogue, having a relationship, and figuring stuff out" (Interview H, 20 February 2013). The importance of this point is simple: a collaborative, civil dialogue among conflicting resource users in the basin was empowering. Local leaders began to see the potential for a way past crisis and harm to each other's communities, despite the presence of what seemed to be rigid statutes and uncompromising regulation. This single intangible point in time, a moment of hope you could call it, is key evidence of the emergence of AG. A vision arose in the basin for a

governance structure completely different than what was currently in place. But this vision was not simply of a shift toward more voices at the table, but instead it was a vision to *move the table* from D.C. to the Klamath Basin.

4.2.3 Emergence through the Identification of a Desired State

A shift towards AG can emerge as grassroots, bottom-up self-organization among resource users both at the individual and organizational level (Burnner et al. 2005). The directive for change can be crisis-driven, but ultimately boils down to untenable resource management scenarios, and the articulation of alternative scenarios, contrary to the status quo. Emergent leadership during this period is critical for exploring the capacity for trust building and network formation through the forging of key personal relationships across boundaries of the political, social, and economic conflicts that come with intractable issues of environmental governance (Folke et al. 2005; Olsson et al. 2004b; Hahn et al. 2006).

There is significant evidence of the emergence of these characteristics in the Klamath SES between 2003-2005. Visionary leaders established venues for a broad gathering of key basin stakeholders, and although this initially morphed into a purely emotional release, that purging allow for relationships to develop that would underpin future substantive discussions. Additionally, the emergence of AG is recognizable by the coalescence of stakeholders around a vision of a desired state for the SES—goals for a new environmental governance moving forward. In reviewing Messier's (2012, 594) analysis of written responses to facilitated questions during the Chadwick sessions, it is apparent that a set of goals for the Klamath SES was emerging out of the chaos of 2001-2002.

> The entire basin will come together to work as one, to gain entire community support to use for political strength and power for immediate and long term planning and results for community improvements, water development, fish habitat and restorations.

The vision for these goals—a desired state for environmental governance—would then serve as point of synergy, attracting almost a full-participation of basin stakeholders and

mobilizing the cumulative capacity of the basin to craft a new approach to environmental governance. Evidence of this can be found in the explicit goals of the KBRA:

> The Agreement is intended to result in effective and durable solutions which: (i) restore and sustain natural production and provide for Full Participation in Harvest Opportunities of Fish Species throughout the Klamath Basin; (ii) establish reliable water and power supplies which sustain agricultural uses and communities and National Wildlife Refuges; (iii) contribute to the public welfare and the sustainability of all Klamath Basin communities through these and other measures provided herein to resolve the disputes described in Section 1.2. (KBRA 2010, Sec. 1.3)

4.3 A Window of Opportunity for Participation at the Bioregional Scale

The Chadwick Sessions catalyzed another key feature of emergent AG: participation. In the literature synthesized to arrive at key components of AG (Chapter 2), most scholars refer to participation or "public participation" as a relationship between governmental and non-governmental stakeholders in the context of resource management (Huitema et al. 2009). This is a much different definition of public participation than might be expected without this background. I retain that definition throughout this chapter in my discussion of the participation of Klamath non-governmental stakeholder groups and their respective leaders as "participants" in environmental governance, but I will visit a more broadly conceived "public participation" in Chapter 5.

Participation of a broad spectrum of legitimate interests in a transition towards AG has been shown to be more conducive to institutional change (Clark and Clarke 2011; Olsson et al. 2004b) for the simple reason that the more interests left out, the increased chance of derailment of a collaborative effort by excluded (whether intentional or not) interests (Walker and Hurley 2004). I also recognize that there are issues with broad, sweeping participation and the representation of all interests. Challenges arise from the unwieldiness of large groups, the power dynamics that emerge within, and the potential for some groups to be under represented due to an unfair lack of access to the forum. However, in the context of AG—the literature suggests that the more complete the table, the more likely AG will continue to develop and institutionalize (e.g. Folke et al. 2005). While the collaborative conservation and natural resource planning literature has been critiqued for an insistence on consensus in collaboration (*see* Innes 2004 for a review of

critiques), AG does not require consensus. Instead it requires a range and diversity of *meaningful* participation—an idea I will return to shortly (Huitema et al. 2009).

An increase in the sheer size and breadth of participation in environmental governance in the Klamath between 2001-2010 is evident in the record of participants attending the Chadwick sessions in 2004-2005 (Table 4.1 and 4.2) and in the final signatories on the KBRA and KHSA (Table 4.3). Many of the final signatories on the Klamath Agreements were involved in governance of the basin in 2001—but through participation in adversarial litigation (*Kandra* 2001). This shift in participation also marks a shift in approach to governance.

Table 4.1. Locations, dates, and attendance at the Chadwick Sessions, 2004-2005

				Distribution of participants at each workshop	
Location	Dates	Position in watershed	Total attendance at workshop	Attended only 1 workshop	Attended more than 1 workshop
Somes Bar, CA	July 14-16, 2004	Lower	40	8	32
Scott Valley, CA	Nov 10-12, 2004	Middle	42	11	31
Klamath, CA	Feb 2-4, 2005	Lower	72	27	45
Tulelake, CA	Mar 16-18, 2005	Upper	90	24	66
Chiloquin, OR	June 28-30, 2005	Upper	82	26	56

Source: Based on Table 14.1 in Messier (2012, 580). Messier collected this data first hand from organizers of the Chadwick Sessions.

Table 4.2. Affiliations of Chadwick Session participants, 2004-2005

	Chadwick Session participant affiliation[a]											
Location	EO	Feds	State	NGO	Tribes	KRP	Off-Proj	Local	Comm	Citizens	Univ	PC
Somes Bar, CA	1	5	3	1	4	2	3	10	1	4	5	1
Scott Valley, CA	1	8	4	4		1	7	6	1	3	6	1
Klamath, CA		7	6	4	20	1	3	10	2	8	11	
Tulelake, CA	3	19	5	3	15	10	6	11	2	8	7	1
Chiloquin, OR	5	22	2	5	10	6	6	8	1	10	6	1

Source: Based on Table 14.1 in Messier (2012, 580). Messier collected this data first hand from organizers of the Chadwick Sessions.

[a]Affiliations: EO=elected officials; Feds=federal agencies; State=state/county agencies; NGO=environmental and conservation organizations; KRP=Project agriculture; Off-Proj=Off-project or non-Project related agriculture; Local=locally-oriented organizations; Comm=commercial fishers; Citizens=concerned citizens-at-large; Univ=university and Extension; PC=PacifiCorp

Table 4.3. List of signatories on the Klamath Agreements, 2010

Agencies and Organizations participating in some or all of the KBRA/KHSA negotiations	Signed KBRA	Signed KHSA	Did Not Sign KBRA/KHSA
U.S. Department of Interior (BIA, BLM, BOR, FWS)	n/a[a]	X	
U.S. Department of Commerce (NMFS)	n/a[a]	X	
U.S. Department of Agriculture (USFS)	n/a[a]	n/a	
State of California[b]			
California Department of Fish and Game	X	X	
California Natural Resources Agency	X	X	
State of Oregon	X	X	
Oregon Department of Environmental Quality	X	X	
Oregon Department of Fish and Wildlife	X	X	
Oregon Water Resources Department	X	X	
PacifiCorp	n/a	X	
Tribes			
Hoopa Valley Tribe			X
Karuk Tribe	X	X	
Klamath Tribes	X	X	
Yurok Tribe	X	X	
Counties			
Del Norte County, California			X
Humboldt County, California	X	X	
Klamath County, Oregon	X	X	
Siskiyou County, California			X
Parties Related to Klamath Reclamation Project (25)[c]	X (23)	X (2)	
Upper Klamath Water Users Association	X	X	
Klamath Off-Project Water Users Association			X
Environmental and Conservation NGOs			
American Rivers	X		
California Trout	X		
Institute for Fisheries Resources	X		
Klamath Forest Alliance			X
North Coast Environmental Center			X
Northern CA Council Federation of Fly Fishers	X		
Oregon Wild			X
Pacific Coast Federation of Fishermen's Assns.	X		
Salmon River Restoration Council	X		
Trout Unlimited	X		
WaterWatch of Oregon			X

Source: KBRA (2010); KHSA (2010)

[a]Federal agencies involved in the KBRA negotiations must be authorized by Congress to become parties to the Agreement

[b]Governor Arnold Schwarzenegger signed on behalf of the CA Natural Resources Agency instead of on behalf of the State of California

[c]This category includes 25 parties associated with the Project including irrigation districts and the KWUA

The scope of participation in the Klamath governance transition also determined what Huitema et al. (2009) termed a "bioregional scale" approach. As mentioned in Chapter 2, the bioregional scale is similar to a "problemshed"—a spatial and temporal scale unaware of political and jurisdictional boundaries, but instead bounded by the nature of the environmental problems to be governed (Molinga et al. 2007; USBR 2014). Participation in governing, managing, or negotiating an approach to governance of a particular set of environmental issues leads to a set of relevant interests represented by actors, networks, and organizations, which in turn influences the breadth of the "bioregion" governed by a particular approach like AG. This framing is important when analyzing transitions in environmental governance like what occurred in the Klamath. Understanding both the scale of environmental problems as well as the actors and relationships (including individual and organizational), helps frame the best "fit" between governance governed, and allowing for expansion spatially or socially where necessary to achieve goals of governance. However, a high level of participation (even cooperation and collaboration) and the determination of a relevant bioregional approach to a transition in governance is often not enough to ensure that an actual transition takes place.

4.3.1 The FERC Process as a Window of Opportunity

If the Chadwick Sessions were in any way an effort to "prepare the system for change," they were sure timed correctly. Sometime in 2005, after the final Chadwick Session in Chiloquin, OR June 28-30, PacifiCorp—owner of the four mainstem Klamath dams, J.C. Boyle, Copco 1, 2, and Iron Gate—initiated an alternative to traditional relicensing under FERC, which mandated that PacifiCorp to:

> Facilitate greater participation by and improve communication among the potential applicant, resource agencies, Indian tribes, the public and Commission staff in a flexible pre-filing consultation process tailored to the circumstances of each case (CFR 18 § 4.34(i)(2)(ii); [and]
>
> Promote cooperative efforts by the potential applicant and interested entities and encourage them to share information about resource impacts and mitigation and enhancement proposals and to narrow any areas of disagreement and reach agreement or settlement of the issues raised by the hydropower proposal…. (CFR 18 § 4.34(i)(2)(iv)

PacifiCorp had initiated the traditional FERC relicensing process for the KHP in 2000, beginning a formal dam relicensing application in 2003, and filing a final application in 2004 (Draft EIS/EIR 2011; PacifiCorp 2014). In the meantime, PacifiCorp had done their due diligence investigating the full scope of options available to them with regard to dam relicensing, including the potential hurdles which included a water quality certification by the California North Coast Regional Water Quality Control Board (NCRWQCB) under the CWA, and the likely addition of volitional fish passage at three of the four mainstem dams (and significant improvements to the fishways at J.C. Boyle) (Spain 2007). Although their FERC license to operate the KHP didn't expire until 2006, there is little doubt that PacifiCorp knew the legal ramifications as well as the financial consequences of traditional relicensing—it was highly likely that the NMFS and USFWS would require adequate fish passage at all four dams, and it was also likely (but at this point not publically confirmed) that this construction would cost more than decommissioning the dams. There is also little doubt that PacifiCorp was aware of the highly contested nature of water use in the basin at the time, and there is speculation that PacifiCorp engaged this conflict head on, hoping to use stakeholder disagreement in the FERC alternative relicensing process to stall the inevitable. As long as PacifiCorp was involved in a settlement negotiation under the FERC alternative relicensing procedures, they received a yearly extension to their current license until a time when either the alternative process was settled, or PacifiCorp chose to return to traditional relicensing.[42]

Despite the potential motives of PacifiCorp in entering alternative settlement talks with tribes and other stakeholder groups, the initiation of the alternative FERC process represents a key "window of opportunity" in the narrative of transforming environmental governance in the basin. Olsson et al. (2006) describe windows of opportunity as essential to transforming governance and advancing a shift towards AG. Windows of opportunity allow built up capacity to be deployed in pursuit of relatively rapid change. Emotionally purged, united, and cautiously pursing new, potential relationships post-Chadwick Sessions, key leaders of basin stakeholder communities and

[42] For perspective, PacifiCorp operates in California, Oregon, Washington, Idaho, Wyoming, and Utah as Pacific Power and Rocky Mountain Power, generates over 10,500 megawatts, and serves roughly 1.8 million customers (PacifiCorp 2014).

resource agencies were primed to deploy their newly generated capacity in the FERC forum. The FERC alternative relicensing process was a window of opportunity for an inclusive venue and substantial funding for process.[43] In addition, the initial entrance into the FERC alternative process may have itself been a uniting element as many stakeholder groups came to see PacifiCorp as a common enemy. Irrigation interests challenged PacifiCorp's unwillingness to renew a contract for lower-than-market power rates, environmental groups and tribes saw PacifiCorp's dams as the single biggest threat to salmon restoration and improvements in water quality, and federal agencies were faced with PacifiCorp's insistence on cheaper, sub-par methods for addressing the threatened Coho.

> And so at the same time [after the Chadwick Sessions] then you get the whole FERC relicensing process… a stack of dominos I don't know how many high. But you know, that it was all kind of coming together and the parties decided that they're all pissed off at PacifiCorp! They had a lot in common actually, as a coalition, and so they decided to work together, against PacifiCorp, right, during the licensing process to see what they could get out of it, to see if they could resolve some of their long-standing conflicts. (Interview H, 20 February 2013)

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[43] It is unclear who *exactly* funded the years of alternative relicensing negotiations between 2006-2009 due to the confidential nature of the process itself. Information gathered from interviews has confirmed that initially PacifiCorp hired a facilitation group, which failed miserably. The PacifiCorp hired facilitators followed the stakeholders into the Extended Caucus period, but were removed by consensus. Steve Thompson, at the time the Regional Director for the USFWS Region 8, then served as the de-facto facilitator as part of his role as a federal agency appointee. Most of the stakeholder groups such as tribes, environmental and conservation organizations, KWUA, counties, and agencies absorbed much of the cost of travel to and participation in official settlement meetings, but the federal government under the auspice of the FERC process did foot the bill for much of the negotiations. In addition, large conservation-based NGOs such as American Rivers and Cal Trout paid for a significant portion of later facilitation and drafting of the Agreements either directly or through compensation of their lead attorney who was pivotal in the final drafting of the Agreements. Smaller organizations without deep pockets such as the Upper Klamath Water Users Association (UKWUA), relied on grants from organizations such as Sustainable Northwest (SNW), a regional capacity-building organization focused on locally led conservation and restoration initiatives that promote sustainable rural economies. While I wish I could trace the funding accurately during this time period, information gathered throughout the interview process did not suggest any unusual funding mechanisms that were relevant to my search for evidence of AG. Financial capital seemed to come from diverse sources and was critical to maintaining the capacity for negotiations (Interviews).

> FERC wasn't the enemy; the forum was an opportunity. We were fighting against PacifiCorp. Not fighting, we wanted the dams out. There were two things going on here: one is the company and the FERC process; and one is the water issues, fish restoration, stability for farmers, stability for fishing communities. They moved on parallel tracks until the transected at FERC, the FERC negotiations. (Interview AA, 21 February 2013)

During the initial phases of the alternative FERC relicensing forum (2005), PacifiCorp continued to pursue the traditional relicensing application they had filed with FERC in 2004. In March 2006, the NMFS submitted to FERC their recommendations for relicensing the KHP based on their analysis of the best measures to restore threatened Klamath Coho: full or at least partial decommissioning of the KHP dams (NMFS 2006). While the NMFS cannot compel FERC to require project removal, they (along with USFWS) can require mandatory fish passage for endangered or threatened species under amendments to the Federal Power Act (Spain 2007). And that's exactly what they did. After a trial-type hearing in September 2006, an administrative law judge sided with NMFS and the USFWS on all mandatory fish passage prescriptions, citing that the "trap and haul" alternative method proposed by the company was inferior in the recovery of salmon despite its economic advantage (KHP 2006; *In the matter of*…; Spain 2007). This decision, combined with two economic analyses,[44] appeared to be the end of the KHP (CEC 2006; FERC 2007). But there is significant speculation amongst stakeholders involved in this process that PacifiCorp was preparing for this inevitable outcome all along.[45]

During the contest and trial hearing over the mandatory fish prescriptions, PacifiCorp was holding talks with basin stakeholders including tribes, environmental and conservation groups, Project irrigators, off-project irrigators, county officials, state and

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[44] First, FERC released a Draft EIS in late 2006 showing that partial dam removal would be cheaper than construction of mandatory fish passage at two of the four KHP facilities (FERC 2007). Additionally, a report by the California Energy Commission (CEC) stating that a four-dam decommissioning option would be around $101M cheaper than a four-dam fish passage retrofit (CEC 2006).

[45] Obviously it is difficult to obtain evidence of this both in written record and in interviews with current PacifiCorp employees. The evidence I can present here is recorded verbal speculation from many non-PacifiCorp-employed interviewees.

federal fisheries and land managers, commercial fishing advocates—the majority[46] of interest groups with a stake in the Klamath River. Sometime during 2006—likely after FERC trial hearing on volitional fish passage—PacifiCorp "left the room" of the alternative relicensing talks and allowed basin stakeholders to use the venue to pursue solutions to problems they were facing, e.g. contests to lake and river flow levels to determine water for salmon, water for suckers, and water for agriculture. PacifiCorp agreed to reenter talks regarding their interest in the KHP after the other issues in the basin had been negotiated by the parties. These subsequent negotiations (still under the auspice of FERC alternative relicensing proceedings) and the group negotiating, came to be known as the "Extended Caucus." During interviews with stakeholder and agency leadership, an interesting nuance emerged when interviewees recalled this moment in the narrative. Many referred to the temporary exit of PacifiCorp as "kicking out PacifiCorp."

> Basically, at some point it got to, 'PacifiCorp, you just go home for a while. We're just going to talk about all these other issues.' (Interview X, 29 November 2012)

> I mean it's ironic right? PacifiCorp doesn't want to take the dams out, they're the reason we all got together, and then we kicked them out of the room for a couple years and said, 'you know, we gotta talk about water.' (Interview G, 11 October 2012)

This type of rhetoric speaks to the level of engagement and empowerment felt by the stakeholder group entering into the period of the Extended Caucus. According to the chronological description of key events provide by one interviewee,

> a driving set of stakeholders goes into the FERC process and says, 'we think that we have a something here.' That this 'something' relates to water issues, restoration issues, economic issues, and is sort of independent but around the narrow scope of relicensing, and we need to break off and just talk about those issues in-depth, before we can really figure out whether we can come back to you, PacifiCorp, and provide you something workable. (Interview B, 29 August 2012)

[46] I say "majority" here because the whitewater rafting outfitters operating on the Wild and Scenic designated section of the Klamath River below J.C. Boyle dam were not invited or allowed in these confidential FERC negotiations despite their obvious economic interest (Interviews). The BLM, as the permitting agency for these whitewater operations, represented the outfitters in the FERC hearings on mandatory fish passage prescriptions, but lost on claims of severe economic impact to commercial whitewater operations (NMFS 2006; Spain 2007).

And yet a different characterization also speaks to the motivations of PacifiCorp, who at any time could ultimately terminate the process in favor of traditional relicensing.

> PacifiCorp always wanted some sort of settlement. FERC encourages settlements, they like settlements. They don't like to order people to do anything. So they were looking at a settlement. And then at some point, all these other issues kept coming up, all these water issues, and PacifiCorp says, 'that's not our game. We don't know anything—why don't you guys go off and solve these problems and then come back and talk to us about the dams.' So at some point we switched from a PacifiCorp organized, PacifiCorp facilitated group, to… not PacifiCorp, they're out of the room, and all the others working together. (Interview U, 27 November 2012)

Despite how the initiation of the Extended Caucus is framed, the FERC alternative to traditional relicensing process was a window of opportunity for a transition in environmental governance because it morphed into a venue for stakeholders to investigate the heart of the environmental (and social) problems plaguing the basin. Yes, venues such as this had been attempted in the basin prior (Messier 2012), but the FERC process offered two important pieces to the puzzle: 1) capacity; and 2) confidentiality. Because the alternative FERC process was ultimately a federal process (18 CFR 4.34(i)), there was a significant amount of financial, logistical, leadership, and authoritative capacity available in this venue. Representatives from the Department of Interior, recognizing the unique (and political) opportunity to address or even "solve" many of the basin's problems (mainly the opportunity to address tribal trust responsibilities, politically powerful Project irrigators, and ESA concerns all at once), brought with them the resources of "interests from the highest levels of federal government" (Interview AA, 21 February 2013; Interview AJ 27 February 2014). In addition, a strict confidentiality agreement signed amongst the parties prior to the negotiation allowed federal agency managers and scientists to discuss potential options for Project compliance with the ESA outside of the arena of formal consultation. The guise of confidentiality allowed the non-federal parties to discuss possible compromises with other parties without having to immediately answer to their constituent groups. Several interviewees cited this as a key

reason why the Extended Caucus immediately had more traction than previous attempts at a basin-wide negotiation.

> I think the only way we could have come to an agreement was in private. PacifiCorp wasn't going to discuss information about how their dam was making electricity if it wasn't protected by a confidentiality agreement. The farmers weren't going to say, 'we can live with x water' and we sure as hell weren't going to say 'we could live with x water' if we were going to read about it in the paper tomorrow. So I think the deal could only be negotiated in the under the pretext of the confidentiality agreement. (Interview AB, 21 February 2012)

> There had to be confidentiality or, I don't think it would have happened. Because people would not have felt comfortable talking about scenarios of taking dams out or settling water right disputes. You know, if you just throw out that kind of stuff, and contextually it goes out, out of context, goes out there… you can't have somebody coming back and saying, 'well, the irrigators said yes to taking dams out' before you've even investigated what the options were there. So there was, there needed to be some kind of a safety, you know, people to feel like they weren't gonna just get clobbered when they, when somebody left that meeting saying, 'oh, guess what so-and-so said?' (Interview G, 12 October 2012)

One interviewee provided a much more nuanced description of why confidentiality was necessary:

> [T]here is an interplay that I've seen in Klamath and I think it would make… most American's hair rise on the back of their necks. It sounds awful, and it goes something like this: you're able to show yourself, to be real, to consider alternatives, in safe spaces. And the more you're pushed into the public space, and the more you were trying to take a step between where the public is and where you think they ought to be, the less you can show. (Interview B, 29 August 2012)

Confidentiality allowed tactics of negotiation and conflict resolution to play out in the Extended Caucus. The immediate result of this process was an increase in informal discussions amongst various combinations of party leaders and the subsequent formation of "shadow networks" of communication outside the formal arena of the Extended Caucus meetings (Olsson et al. 2006).

4.3.2 The Importance of Informal Networks and Communication During the Period of KBRA and KHSA Negotiation

Olsson et al. (2006) argues that the formation of informal governance networks or "shadow networks" is a self-organizing process in recognition of the need for a change in

approach to SES governance, generally resulting from a resource crisis. The emergence of one or more shadow networks is a key indicator of the emergence of AG (Folke et al. 2005; Huitema et al. 2009). In 1999, Lance Gunderson published a seminal description of the importance of shadow networks to a transition towards more flexible environmental governance and management scenarios[47] apt to deal with uncertainty and complexity:

> In cases of successful adaptive assessment and management, an informal network seems always to emerge. That network of participants places emphasis on political independence, out of the fray of regulation and implementation, places where formal networks and many planning processes fail. The informal, out of the fray, shadow groups seem to be where new ideas arise and flourish. It is these "skunkworks" who explore flexible opportunities for resolving resource issues, devise alternative designs and tests of policy, and create ways to foster social learning. How to develop and foster shadow networks is a challenge for most inwardly looking North American land management agencies.

The Extended Caucus brought about the formation and subsequent rearrangement of informal networks of communication and trust within the larger formal process of negotiation. For example, an "environmental caucus" was formed of environmental- and conservation-oriented NGOs engaged in the negotiations that held a variety of foci on environmental protection, restoration, and/or increased access to resources via conservation efforts. This caucus morphed quickly into a network for communication, information sharing, and strategy building. The groups in this network of environmental NGOs included large, national and regional organizations such as American Rivers, Trout Unlimited, The Nature Conservancy, and California-based Friends of the River, and small, more locally-oriented organizations like Oregon Wild, WaterWatch of Oregon, and the Salmon River Restoration Council (SRRC). Informal communication through networks also developed under a variety of circumstances depending on the issue or sub-issue under negotiation in the formal Extended Caucus settings. Upper basin

[47] At this point in time, Gunderson (1999) referred to flexible environmental governance able to deal with complexity and uncertainty, as "Adaptive Environmental Assessment and Management" (AEAM). I would argue that today, Dr. Gunderson would agree that his concept has influenced and involved through various conceptions of governance to, at least partially, find a home in AG (L. Gunderson, personal correspondence 9 December 2013).

interests including The Klamath Tribes and the Klamath Water Users Association (KWUA) were involved in one network, while solely tribal groups were allied in another. Many interviewees spoke of these communication- and trust-networks as "factions" or "player groups." Interviewees described that it was within these "skunkworks" that real progress was made, real negotiations took place, and *real* goals for environmental governance were developed.

I openly asked each interviewee who participated in the KBRA and KHSA negotiations how important they thought the informal communication through networks was to reaching an overall agreement for a new direction in environmental governance in the basin. Most initial answers to this question came fast and with very few words. "Informal communications were everything" (Interview F, 11 October 2012). Many expanded on their importance:

> Across this basin, the information communication is so much more important than the formal. Because it's the informal communication that has continued through the years and through broken situations… it's critical (Interview V, 28 October 2012).

One interviewee even indulged my interest in informal communications as part of the environmental governance mechanisms interacting in the Klamath SES.

> I think that if you want to set an activity in motion in the Klamath Basin, you can set it in motion by finding an agreement amongst like six people. And those six people then participate or influence enough forums that those forums, formal governance, start to exhibit what you want to set in motion. …And I looked at some governance things [happening in the Klamath] and thought, hmm, informal governance may be some of these non-existent forums. [Project irrigator] knows that he can call [tribal leader] almost any day of the week and they can go have coffee and then they can pull their staffs together. But that's not quite formal governance yet. And then they can sort of do some stuff that then still needs to be arbiter-decided upon and finalized more in a formal structure whether it be the KBCC or even the courts to the extent that we could call the courts governance—we probably can't by some definitions. That's kind of where I'm at. There's this relationship base at the bottom amongst among key leaders [in the basin]. And I'm convinced—and I may be totally wrong—if you can affect key leadership, you can do a whole heck of a lot more than if you're just trying to move the public in general without having dealt with key leaders, or if you're trying to get certain outcomes out of formal governance (Interview B, 29 August 2012).

This description has an uncanny resemblance to the theoretical descriptions of the initial emergence of AG, e.g. the cascade of individual leaders forming networks and influencing organizations as presented by both Olsson et al. (2006) and Österblom and Folke (2013).

4.3.3 Informal Networks and the Institutional Landscape

While interviewing participants in the Extended Caucus (group working toward the KBRA) and the KHSA negotiations that followed (including the re-addition of PacifiCorp), I attempted to collect enough information to describe and "map" the communication relationships between major players in the negotiations. This proved to be very difficult because of the seriousness of the confidentiality agreements still in place at the time I conducted interviews and the unwillingness of interviewees to identify particular individuals with whom they communicated, relied on for information, or trusted (however, interviewees were not shy when describing relationships between "organizations" as proxies for the individuals negotiating on their behalf). In an effort to demonstrate a change in network structure as a result of the emerging characteristics of AG in the basin, I instead turned to the public relationships between organizational actors in the basin. For example, Figure 4.1 shows a "map" of the organizational network(s) in the basin during 2001.[48] The relationships between organizational actors in this figure represent real, legitimate organizational connections that can be documented in the public record. Relationships depicted in Figure 4.1 by links (connecting lines in the map) between nodes (organizations) could represent a statutory obligation (e.g. USBR's requirement to consult with the NMFS and USFWS), a jurisdictional hierarchy (e.g. Modoc County is connected to California, which is then connected to the U.S. federal

[48] This "map" is a type of sociogram pioneered by the sociologist Jacob Moreno (1934). The particular sociograms displayed as figures in this Chapter were created using the computer software NetDraw as part of the greater UCINET social network analysis software package (Borgatti et al. 2002). It is important to note that the social network maps (a more contemporary reference) displayed in Figures 4.1-4.3 and in Figure 4.6 depict non-directional, complete networks. This indicates that a relationship between nodes is non-descript (without flow from one to another) and information about the network was gathered *a priori*, compiled from research on the organizations involved in environmental governance in the Klamath from 2001-2010.

government), membership in another organization (such as tribes connected to the Klamath River Intertribal Fish and Water Commission (KRITFWC)), and/or a funding link such as a grant between organizations. Conversely, there is an absence of ties between organizations in this figure where negative relations exist, e.g. there are no ties between adversaries in the *Kandra* litigation ongoing during this time period, but there are ties among plaintiffs and among defendants (and their respective interveners).

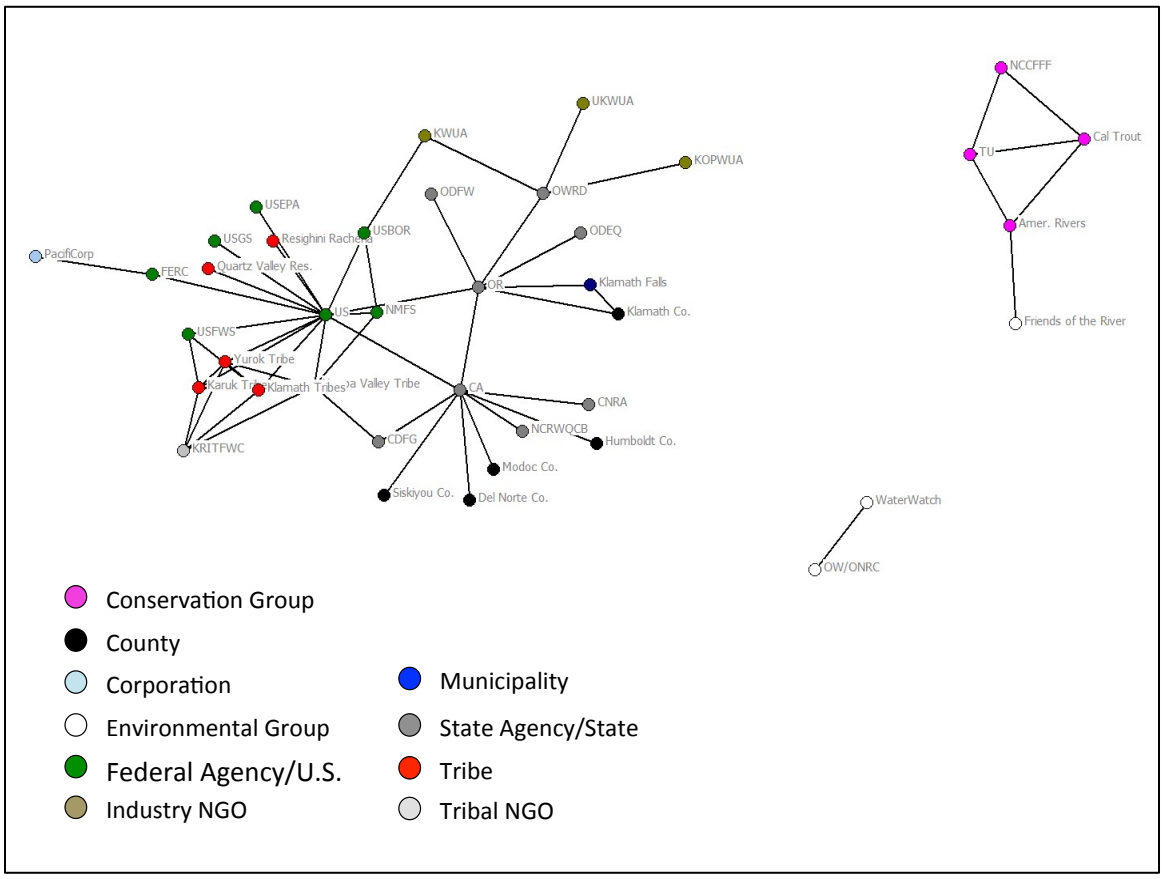

Figure 4.1. A network map of formal organizational relationships in the Klamath Basin governance transition circa 2001

When compared to similar network maps for the time periods of release (Figure 4.2, 2002-2004) and reorganization (Figure 4.3, 2005-2009) in the basin, a change in network structure is apparent. The social network maps in Figures 4.1-4.3 were created using a computerized multivariate approach called a general linear algorithm (GLA) that mathematically arranges nodes in space so that nodes are closer to each other if the

"degrees of separation" between nodes are small, and nodes are farther away if they are large (based on the distance of "travel" between nodes through established connections or ties). Additionally, GLA positions more connected nodes in towards the center of the resultant network graphs (Borgatti et al. 2002). In this way, these social network maps can be used to infer information about the position of specific nodes (in this case, organizations) relative to the entire network. For example, examining Figures 4.1 through 4.3 as a temporal trajectory, it is easy to see that in 2001, the organizational network of Klamath environmental governance was dominated by a top-down structure in which the federal government and the states of California and Oregon were the most connected, most centralized nodes in the network. During the chaotic, conflict-driven period between 2002-2004, the federal government remained centralized in the network because the institutional relationships emanating from this level of government (mostly statutory/legal) were the only processes that remained fairly static. Between 2005-2006, some key organizational relationships including shared funding by the environmental caucus in the initial FERC negotiations started to connect disparate segments of the Klamath organizational network and created a picture of the shift in governance that was taking place in the shadows. Of particular notice is the movement in Figure 4.3 of the Tribes and the KWUA towards the center of the network, displacing the federal government slightly to the side. At the same time, however, all three groups have a relatively high degree of connections and are centrally located in the network. This mirrors the narrative of power and influence developing at this time between the federal government, the Project irrigators, and the tribes, specifically the Klamath Tribes and the Yurok Tribe.

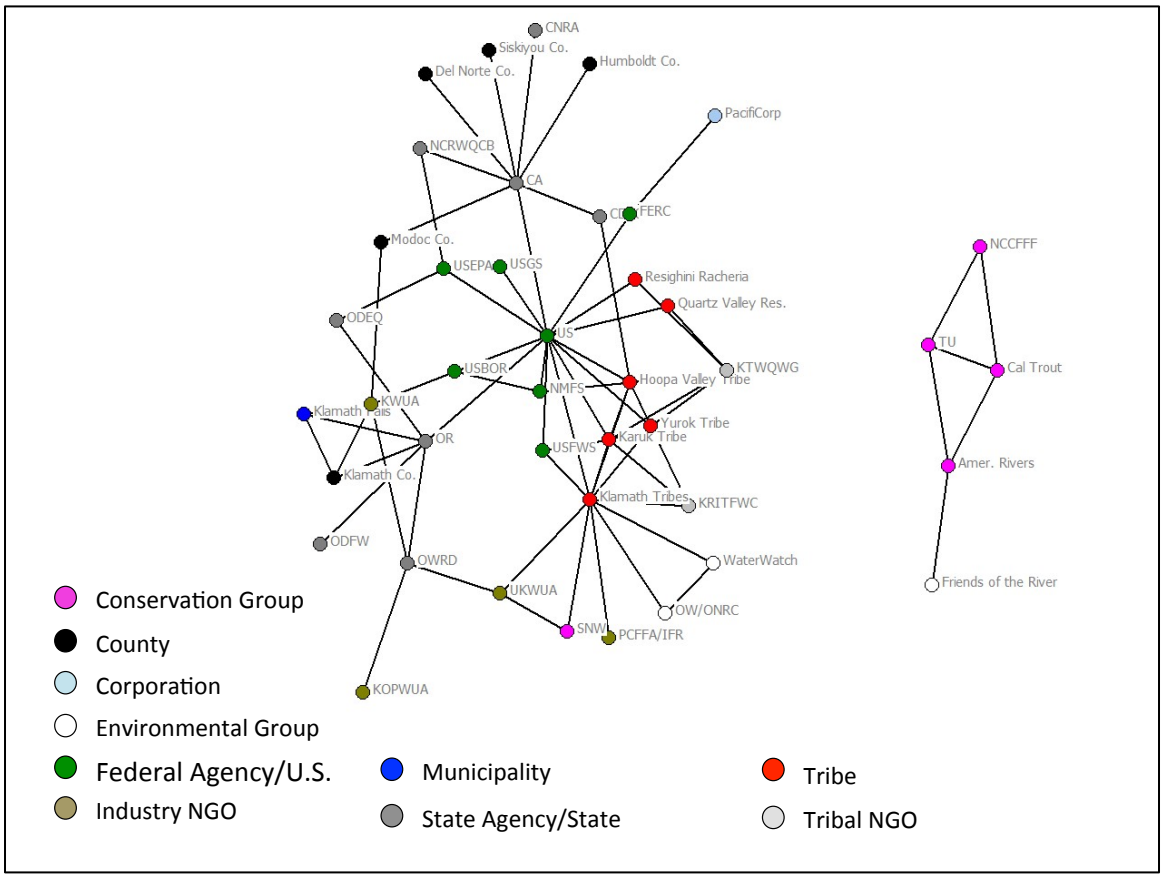

Figure 4.2. A network map of formal organizational relationships in the Klamath Basin governance transition circa 2002-2004

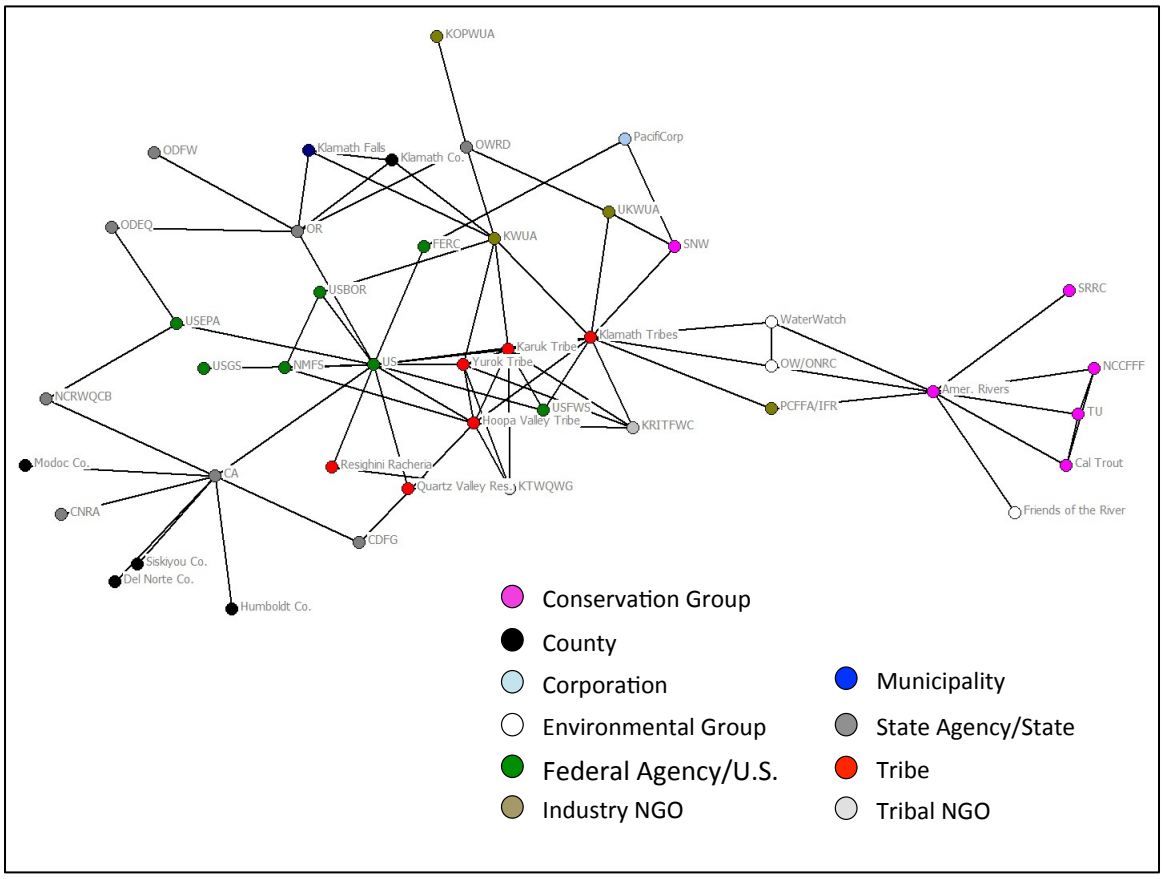

Figure 4.3. A network map of formal organizational relationships in the Klamath Basin governance transition circa 2005-2006

4.4 Building Resilience in Governance: The Klamath Agreements as Institutionalized Adaptive Governance?

Although not every stakeholder group involved in the FERC alternative relicensing negotiations signed the Klamath Agreements in 2010 (*see* Table 4.3 and discussion in Section 4.6.2), the majority of groups did. The outcome was a set of agreements that outline a comprehensive plan for governing resources in the basin. The agreements, if implemented, appear similar to the concepts of AG and thus have created the potential for institutionalizing a degree of AG emergent in the Klamath Basin.

4.4.1 Institutional Change

The Klamath Agreements are thorough, complicated, and long (including appendices, the KBRA is 369 pages, while the KHSA registers a measly 234 pages). The two agreements were crafted to be executed in tandem and they do not function without each other. Beyond the thick, legal text that exudes from every page, the KHSA details the process for transfer and removal of hydroelectric facilities from PacifiCorp, while the KBRA outlines two major programs: a fisheries restoration, recovery, and reintroduction program; and a water resources program. Each program contains sub-programs, funding mechanisms, implementation plans, and detailed descriptions for coordination amongst the myriad of resource management agencies involved in each program (KBRA 2010; KHSA 2010). The programs themselves represent an attempt to institutionalize two important aspects of AG discussed in Chapter 2: redundancy and polycentriciy. In order for AG to be flexible in the face of uncertainty and disturbance, the structure of the approach is to spread and coordinate power and responsibility across the existing system of multilevel governance, which in this case, is a hierarchical system of government agencies from local, tribal, state, and federal levels.

To illustrate the approach the Klamath Agreements takes to coordination amongst agencies, I created a flow chart or institutional map of the Water Resources Program put forth in the KBRA (Figure 4.4). The figure depicts the connectivity between organizations involved in implementing the Water Resource Program with the actual components of the program. Links represent reporting requirements (from organization to organization) or involvement or responsibility for implementation per the KBRA (from organization to program component). Redundancy is apparent: reporting and coordination responsibilities flow across federal, state , and tribal agencies, as well as among collaborative management entities created in the Agreements. To further illustrate this, I used Figure 4.4 to create a directional social network map of the KBRA water resources program (Figure 4.5). Figure 4.5 depicts the direction of required coordination elements amongst agencies and entities participating in the Water Resource Program of the KBRA. Using tools available in NetDraw software, I increased the size of nodes in the network according to the number of ties connected to each node. As a result, the

biggest nodes in the network are those that have the highest degree of connection. In figure 4.5, the largest nodes are the program elements of the Water Resources Program, and are highly connected to a range of state, federal, and NGO organizations. The high degree of connectivity to each program element is indicative of the high degree of multilevel coordination built in to this program—institutionalizing a polycentric and redundant approach to environmental governance.

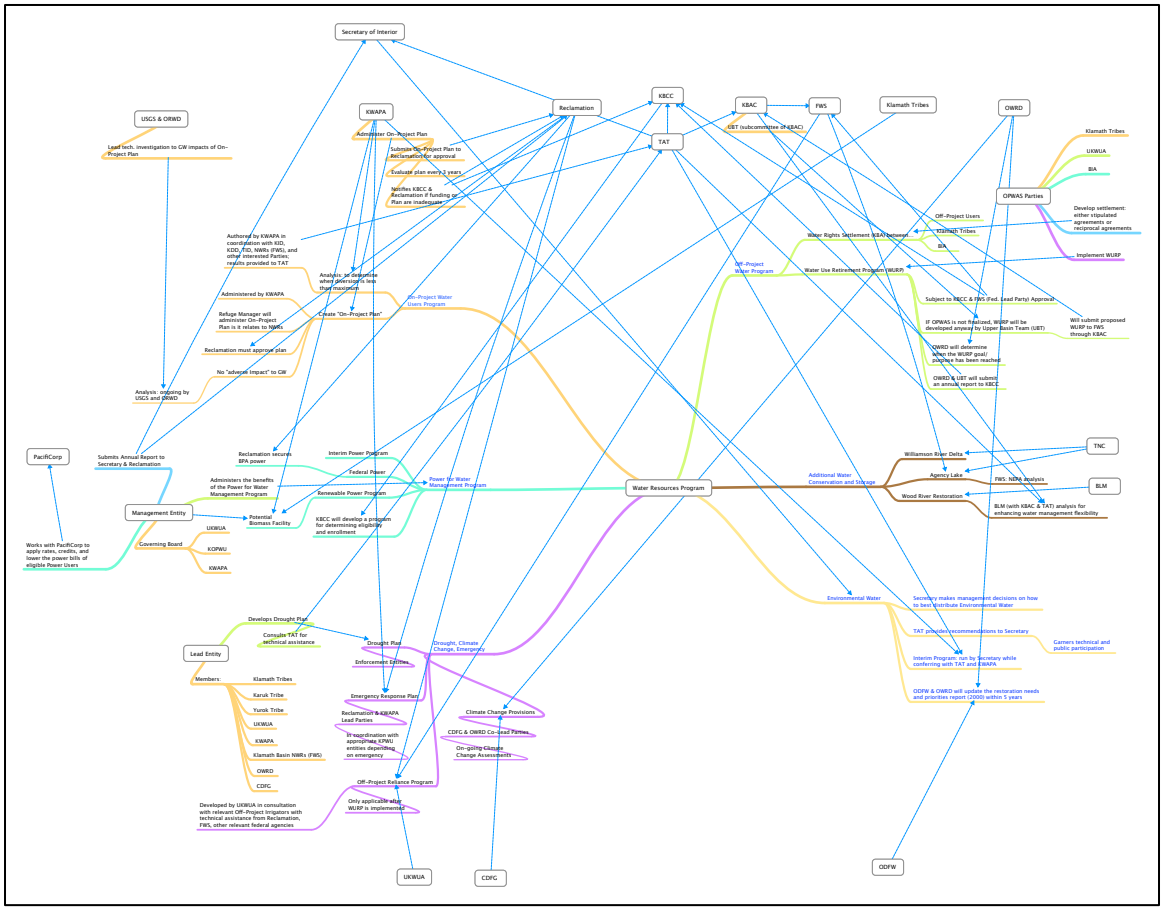

Figure 4.4. An institutional map of the reporting, coordination, and implementation responsibilities pertaining to the water resources program of the Klamath Basin Restoration Agreement (KBRA)

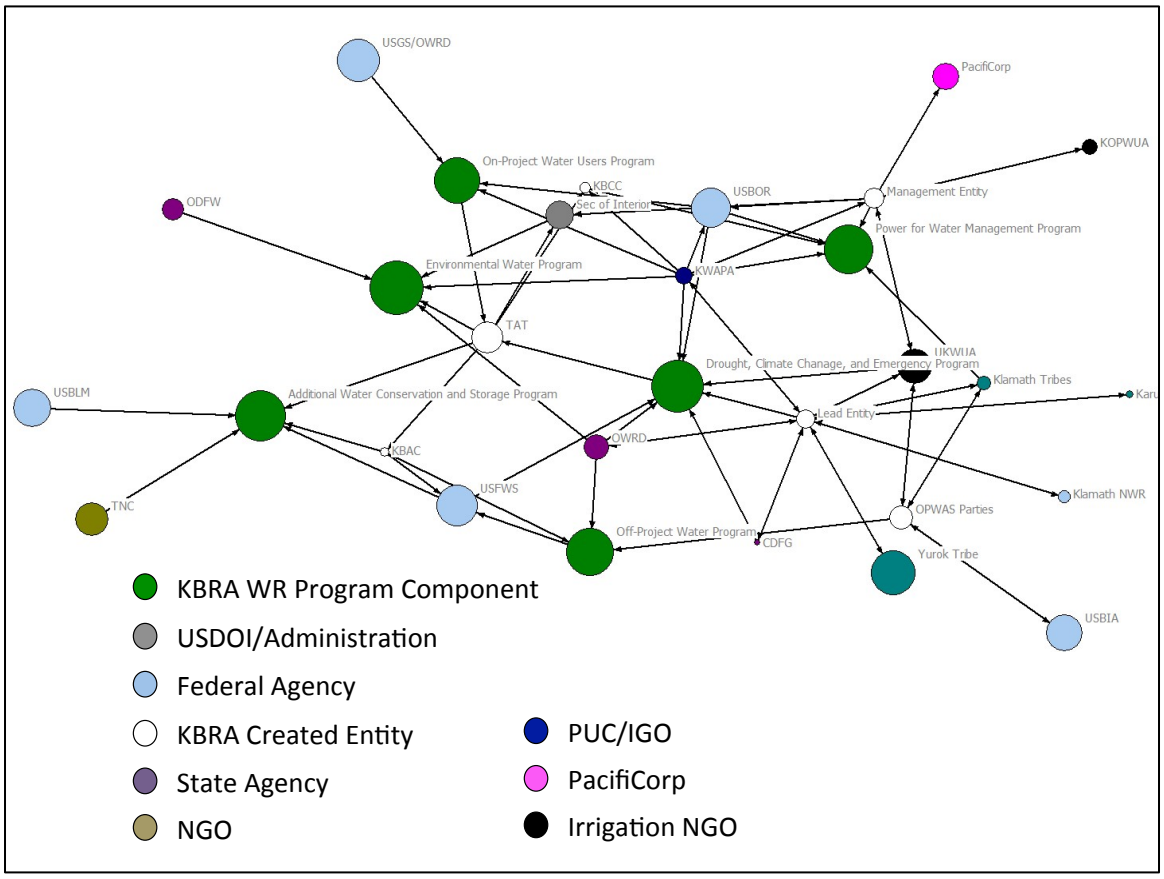

Figure 4.5. A network map of the reporting, coordination, and implementation responsibilities pertaining to the water resources program of the Klamath Basin Restoration Agreement (KBRA)

What is most striking about the agreements is their explicit attempt to institutionalize the shift in governance and communication networks that took place during the Extended Caucus negotiations between 2006-2009. The agreements contain the provision for the creation of four formal entities: two of which are FACA groups (Klamath Basin Advisory Council and Technical Advisory Team), groups chartered under the Federal Advisory Committee Act (Public Law, 92-463); and two which are not (Klamath Basin Coordinating Council and Upper Basin Team) (KBRA 2010). The group most relevant to this analysis is the Klamath Basin Coordinating Council (KBCC). The KBCC is made up of representatives from signatory parties (Table 4.4). The KBCC has general oversight and administration over the implementation of the Klamath Agreements including the ability to make decisions and establish protocols and function in a dispute

resolution role (KBRA 2010). The KBCC's stated purpose is to "promote continued collaboration, cooperation, coordination, and consultation among Parties and others as elements of the Agreements are implemented… [and] will serve as a primary forum for public involvement in implementation of the Agreement" (KBRA 2010, D.3). Decision-making in the KBCC is by super-majority (3/4 of voting members present) and the roles and responsibilities of the KBCC are as follows:

> The KBCC shall serve as an oversight forum to foster efficient and effective implementation of the Agreement, including tracking and reporting action progress, solving problems, establishing protocols and procedures, providing approvals, making decisions, resolving general issues within and among programs, promoting collaboration and coordination among groups and Klamath Basin partners, providing input to assist with prioritization of program projects, concertedly and cooperatively seeking grants and other funding for priority projects, reporting program expenditures, and developing an annual workplan. The KBCC (of which all members shall be deemed to be Disputing Parties) shall provide the forum for dispute resolution as described in Section 6 of the Agreement when issues cannot be resolved at lower scales within programs, subgroups, or among Disputing Parties. (KBRA 2010, D.4)

The makeup of the KBCC membership is a mirror image of the interests collaborating to create the Agreements themselves, specifically the KBRA. The KBCC, while no legal authority is bestowed upon them even with Congressional authorization of the Agreements, represents an explicit attempt to formalize the *informal* governance network that developed during the negotiation of the Klamath Agreements. It is an attempt to formalize the influence of this network, and specifically, to bring local resource user and cultural interests legitimately into the fold of resource governance in the basin (note that nine voting members represent governments or government agencies and nine voting members represent tribes or local resource user interest groups and conservation groups). The KBCC is an attempt to achieve Olsson's (2004b; 2006) final phase of transforming environmental governance, building resilience in AG.

Table 4.4. The makeup of the Klamath Basin Coordinating Council

Parties	Representation	Member Interests[a]
Dept of Interior	1	BIA, BLM, USBR, USFWS
Dept of Agriculture	1	USFS
Dept of Commerce	1	NMFS
State of Oregon	1	ODEQ, ODFW, OWRD
State of California	1	CDFG
Klamath Tribes	1	
Yurok Tribe	1	
Karuk Tribe	1	
Del Norte County	1	
Klamath County	1	
Siskiyou County	1	
Humboldt County	1	
Parties related to KRP[b]	2	
Off-Project representative[c]	1	
Conservation/Env groups	2	
Commercial fishing industry	1	
Total	18	

Source: Based on Appendix Table D.1 (KBRA 2010, D-3).

[a]Member interests are subject to change for Parties related to the KRP, Off-Project representative, Conservation/Env groups, and the Commerical fishing industry, if new parties petition to be signatories to the Agreements

[b]One representative from KWAPA and one from KWUA or such other Party related to the Klamath Reclamation Project as KWUA may designate. The Klamath Reclamation Project designation may be changed by a majority of the Parties who are Parties related to the Klamath Reclamation Project as identified in Section 1.1.1 of the Agreement.

[c]Off-Project Signatory Parties will select one representative. If these Parties are not able to agree, the KBCC or KBAC, as applicable, will select a representative from nominees from each Off-Project signatory Party.

In addition, the KBRA also creates the Klamath Basin Advisory Committee (KBAC) to be chartered in accordance with FACA. The role of KBAC is to provide advice and recommendations to Federal Agency Parties regarding the implementation of the Klamath Agreements (KBRA 2010). The makeup of the KBAC mirrors that of the KBCC, but decision-making (process of advising) is by consensus if possible with a provision for majority and minor reports when consensus is not possible. Both the KBCC and KBAC meetings are open to the public, but under FACA, KBAC meetings

are required to solicit and integrate public participation to the extent possible (KBRA 2010).

4.4.2 A Culture of Learning: What about Adaptive Management in the Klamath?

A third important group created in the KBRA is that of the Technical Advisory Team (TAT). The TAT is a sub-committee of the KBAC and thus subject to FACA and will pursue a charter accordingly (KBRA 2010). "The TAT shall consist of the Parties with interest, expertise or authority in water management, water quality, or fish management and with the ability to contribute to restoring and maintaining the health of the waters of the Klamath Basin and the Fish Species" (KBRA 2010, D.9). The TAT is an attempt to formalize the *informal* network of technical staff—fisheries biologists, hydrologists, water quality specialists, etc.—that coalesced during the drafting of the Klamath Agreements. In addition, the TAT's responsibility is to provide *real-time* analysis and subsequent recommendations for water management in the Klamath Basin under the agreements. On top of annual reporting and advising requirements, the TAT will meet twice per month during the water season (end of February to end of September) to review hydrologic and biological data (including new information from forecasts, monitoring, and presentation from basin water and fisheries managers) to provide analysis and recommendations for action that integrate the best available science for a basin-wide perspective on water management. The TAT *enables* adaptive management under the Klamath Agreements. The critical question moving forward (beyond that of whether the Agreements will be Congressionally authorized), is whether resource management agencies and other managers in the basin will *use* the capacity and recommendations of the TAT to make better decisions, or to implement new actions as experiments to achieve more desirable results—completing the cycle of adaptive management.

Whether or not adaptive management is realized in the basin under the agreements, this new approach to governance has created a structure for a culture of learning to emerge—and I would argue, already has. Figure 4.6 depicts a social network map of organizational relationships in the basin proposed under the Klamath Agreements.

Although hypothetical, the power of this visual representation is in its description of the reorganization of institutional actors in the basin. The entities created in the KBRA become the centralized, most connected nodes in the network. They become hubs of information and connecting organizations from different levels of government and across the geographical space of the basin. Knowing the qualitative descriptions of these entities, it is also easy to see that science and knowledge generation is central to the governance network (centralized position of the TAT). Hypothetically, this should allow for rapid and widespread dispersal of information as well as a collecting point for information. If parties to the Agreements participate in these governance structures and use the organizational relationships prescribed in the KBRA and KHSA to extend the collaborative dialogues started in the negotiation process, the Klamath Agreements have likely produced a plan for developing a robust culture of learning that will become part of the fabric of environmental governance in the basin.

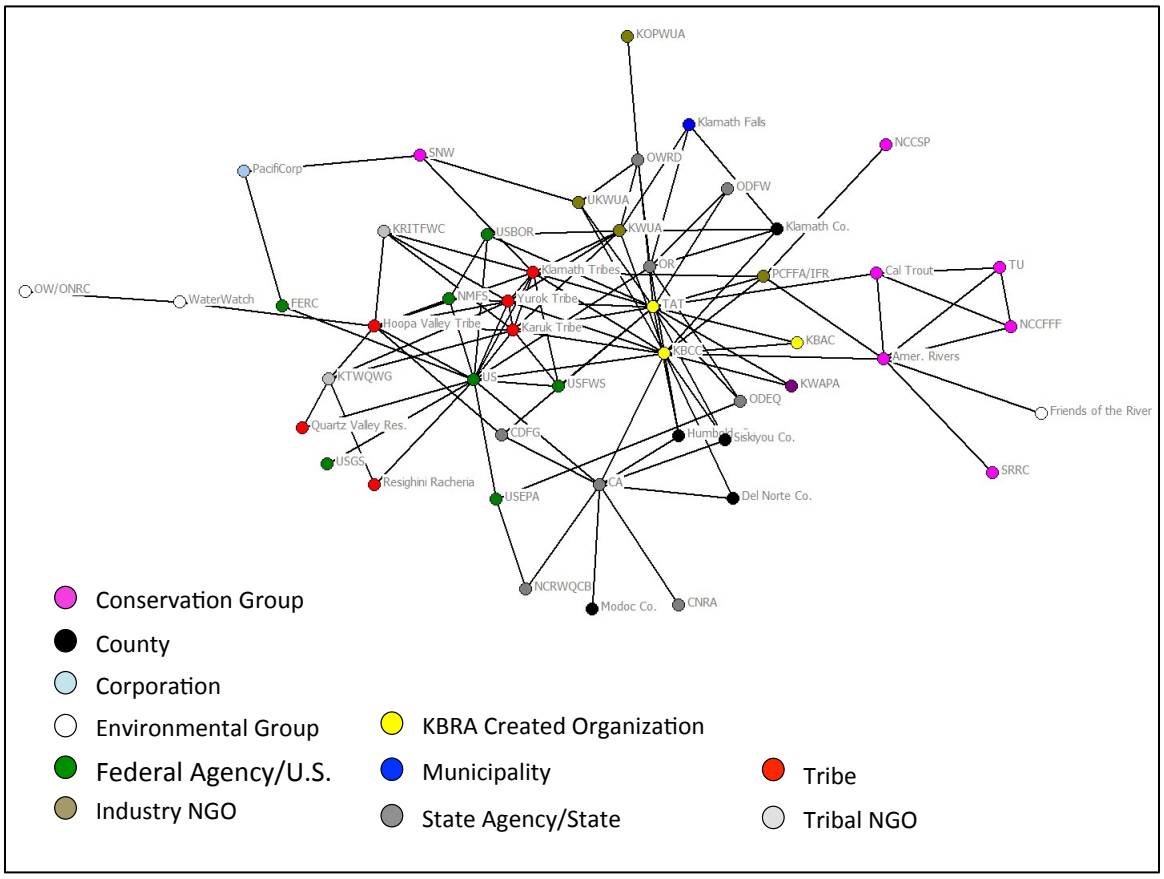

Figure 4.6. A network map of potential organizational relationships under the implementation of the Klamath Agreements

4.5 The Political Ecology of Adaptive Governance

> These are fundamental questions of governance that apply at the ecosystem, large-landscape level, and I think they are starting to apply… but they go into this axis you're describing, Brian, of politics. That politics and perhaps some of the limitations of our system itself are starting to… they moderate the pace at which we can expect change, perhaps in a healthy way. Perhaps it is very healthy that we cannot implement this KBRA as quickly as we would like to. Perhaps that slowness is very good for us. But I certainly wake up in the middle of the night and think, 'gosh, going slow could eventually cost me the Chinook. Going slow could eventually cost me 300-400 farming families when it doesn't need to.' (Interview B, 29 August 2012)

So far in this Chapter, I have presented substantial evidence that the governance transition taking place in the Klamath basin between 2001-2010 indeed resembles a

theoretical development towards AG. Beginning around 2004, an emergence of leadership in the basin allowed for self-organization of social capital and organizational capacity to establish informal networks for increased trust building and communication. A locally led, grassroots organization of community leaders matched with resources and capacity from federal agency managers and administration officials, combined under the opportune venue of alternative FERC relicensing, to craft a plan for shifting environmental governance towards a more flexible, inclusive form to accommodate the needs of basin communities while complying with all relevant laws.

But is that the whole story? Build a collaboration, and all relevant stakeholders will join, work hard, figure out a compromise, and willfully transition environmental governance towards AG? Not likely. Although I assert that the Klamath Agreements are product of a transformation towards AG, the Agreements are not evidence that AG is permanently situated in the basin. In fact, the Agreements are now subject to a political process that at the time of writing this is not finalized, but instead has entered another phase in an ongoing saga of shifting environmental governance in the basin (*see* Chapter 5). But not only are these "plans" for institutionalizing AG (the Agreements) subject to a political process, they *represent* a deeply political process taking place in the basin throughout the transition in environmental governance. It is in this way that a transition towards AG is inherently political; AG can be one of many outcomes of shifting power relations between governance actors and organizations on the stage of negotiations over rights and access to natural resources such as water and fish.

In this section I use evidence from semi-structured interviews, public documents, and popular media to trace the role of power in the Klamath Basin from the FERC negotiations to the signing of the Agreements. The purpose of this refection is two-fold. First, I describe the political nature of the negotiating process that led to the Agreements to demonstrate that a transition towards AG is inherently a political process, and that associated outcomes are a product of power structures active during that transition. Thus, governance scholars and practitioners need to be acutely aware of power when designing governance strategies (like the Klamath Agreements) to resemble the principles of AG in an effort to more adequately address uncertainty and complexity in SESs. Second, this

review of power relations allows for a deeper analysis of the Agreements themselves as an attempt to institutionalize a transition towards AG. For example, how do the social processes of negotiating access to resources align with the goals of ecological restoration in the Klamath?

4.5.1 Motivations, Power Shifts, and Iron Triangles

A major component in the framework for uncovering evidence of AG in transitions in environmental governance is that of "power shifts," of which, there were several that significantly impacted the Klamath Agreements. One major shift began well before 2001 but continued through 2001 and into the Extended Caucus with increasing certainty: a shift in political power in the upper basin from the Project irrigators *to* The Klamath Tribes.

Since the *Kimball* legislation of the 70s, through the *Adair* litigation, and into the KBA process that continued through 2010, the Klamath Tribes have pursued legal rights to hunt and fish in "usual and accustomed places" (at the minimum, historic reservation boundaries) as well as pursued a quantification of water rights in the upper basin to assert for instream aquatic habitat—ensuring their ability to hunt and fish in usual and accustomed places. For the most part, the changing nature of Native American law in the U.S. over the past five or so decades has been on their side (Colby et al. 2005; Wilkinson 2000). The listing of the Lost River and shortnose sucker in 1988 combined the favorable sway of tribal water law with the "hammer" of the ESA, creating a legal and political force with the ability to challenge the status quo of water use and resource management in the basin. And that is just what happened. Combined with a similar force emanating from the lower basin—tribal fishing rights and the ESA—tribes, in coordination with the litigious forces of environmental groups, were able to force down the hammer of the ESA on the Klamath Project resulting in the events of 2001. The ensuing water shutoff to the project was a demonstration of political force that verified a shift in power from Project irrigators to tribal interests in the basin. Roughly stated, this display of a power shift in the basin also captured the undivided attention of relevant stakeholders in the basin.

However, it doesn't mean that Project irrigators had completely lost their political clout in a shift towards tribes holding the upper hand. Klamath irrigators had friends in high places and were an important Republican constituency for the newly established Bush Administration (2001) and the recently elected (1999) Republican Representative from Oregon, Greg Walden. Irrigators had a century of rural irrigation and agricultural policy on their side and a general sympathy from the Administration. As a result—and it will be hard to ever definitively prove these speculations—political forces seemed to start working for the Project irrigators mid-summer 2001 through fall 2002. Secretary of Interior Gale Norton announced the discovery of an "error" in calculating upper basin water storage (Doremus and Tarlock 2008), an NRC Committee was organized and deployed to the Klamath in record time (Gellman 2008), and in the most interesting turn of events, the Committee released a draft report early, just in enough time to influence the Project operating plan moving forward into summer 2002 (Doremus and Tarlock 2008; Most 2006; NRC 2002). Dick Cheney, Karl Rove, and President Bush himself—there is substantial evidence that they were all "very interested in resolving" the Klamath situation (Becker and Gellman 2007; Doremus and Tarlock 2008; Gellman 2008; Messier 2012; Most 2006).

But a shift in power back to the status quo was never completed. In a sudden turn of events in September 2002, the 30,000 plus fall-run Chinook salmon washing up on the banks of the Klamath River along the Yurok Reservation captivated the Klamath narrative and overshadowed the political play of "farmers vs. fish" employ by Project irrigators. For the next two years, it seemed that the Administration threw in the towel on the Klamath. It was a volatile standoff between tribes and irrigators, both of which the Administration had important ties to: legally to the tribes, and politically to the irrigators. Hence the collapse of social relations in the basin from 2002-2004. Enter the Chadwick talks. Then enter the FERC alternative settlement talks. As potential traction was established through these two processes, the Administration returned.

> So then you basically had the Bush administration use the FERC process and the confidentiality of the FERC process to start to negotiate with people there, and it *did* include a lot of people in the litigation on the ESA [*PCFFA* challenges]… on flow issues, lake level issues, farming on the refuge issues, all these other issues. And what the administration saw is, you got all these—you got the tribes, the

> conservation groups desperate for this dam removal, and the tribes wanting other things too for their economies and things like that. And we got this group and the administration and Cheney and everyone is going to try to find a way to stabilize their economy and basically try to get their water priority back. And you got this adjudication coming down that pretty soon the Klamath Tribes are going to have their rights quantified, their 'time immemorial' their the most senior and… it's not only an ESA problem for the irrigators, it's a problem that the tribal water is first and that's for the lake and for the rivers in the upper basin and that kind of thing. So I think they [Bush Administration] just saw this as an opportunity to now get back to what they hadn't been able to deliver by manipulating the science.
>
> ...And we were taken in the hall by the attorneys of the Project irrigators who said, 'you know, we can just make a call to the White House, if things aren't going the way we want.' I guess, he was trying to say, 'therefore you should do what we say.' But it was basically, 'if you guys want dams out, you gotta play ball with us on this other stuff.'
>
> …See and then the other thing they got was, we were beating the crap out of them in the media on the fish kill stuff, manipulating science, and doing all these bad things, and once we got in the negotiations… they had this period, as long as everyone's in there, no one's out bashing the administration anymore. So it really worked really well for them. And as I said, they were running the show, in part for the irrigators, and trying to come to some water deal they had out there and other stuff, but using the leverage of the dam removal to get conservation groups to agree to a water deal that was something that they otherwise never would have agreed to. (Interview X, 29 November 2012)

There is no doubt that the Bush Administration wanted to appease the Project irrigators for political reasons (Interviews). But there is also very little doubt that they recognized the legal responsibility to work on behalf of the Klamath Tribes and Yurok Tribe to address tribal trust liability.

The ceasefire in the media engineered at the end of the Chadwick Sessions in 2005 had served as a significant point of trust building between tribes and irrigators, and the Administration used that to their advantage to address their needs from both parties. When interviewees were asked to cite "who had the most power in the confidential negotiations that led to the KBRA," I only received three different answers from all 38

informants: tribes, Project irrigators, and the federal government (Department of Interior and Justice representing the Administration).[49]

> The irrigators had the most power. And obviously… it was obvious that the irrigators had the most power because they had the ear of the White House, and that was dictated to the resource agencies, what to do. And then the tribes, you know, it was very clear that the federal government did want to satisfy some of the desires of the tribes and so, particularly the Yurok and the Klamath [Tribes]. The Karuk didn't have a lot of leverage, but they did have a lot of eagerness it seemed, to make a deal. Mainly, because they didn't have a federal fishing right, they don't have a reservation; they're in a really bad position. (Interview I, 25 October 2012)

Tribes (mainly the Klamath Tribes and Yurok Tribe), Project irrigators, and representatives from the federal government formed two significant sides of an "iron triangle" built to dictate public policy options.[50] At the time, it was inevitable for parties to imagine that given a well-crafted agreement with broad support throughout the basin and public constituencies, that Congressional support would eventually be achieved.

Another piece of evidence that adds to speculation that the Administration played a heavy hand in influencing the outcomes of the KBRA (and by extension the KHSA) negotiations was the appointment[51] of Steve Thompson as facilitator for the Extended Caucus negotiations after a consensus was reached by the settlement group to "fire" the mediation group hired by PacifiCorp. At the time, Steve was the regional director for the USFWS Region 8, an appointed position through the Bush Administration. The overwhelming majority of interviewees affirmed that Steve was vital to the negotiation

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[49] See Appendix C for the placement of this question in the "semi-structured interview guide" used during interviews for this research. Also note that the answers to this question reported here only pertain to the Extended Caucus negotiations that led to the KBRA. Interviewees noted that in the KHSA negotiations, PacifiCorp had the most power.

[50] The concept of an "iron triangle" is a theory of American political thought. The triangle is between bureaucracy, Congress, and interest groups (Gais et al. 1984).

[51] Interview point to this as either a process of group consensus, due to either to Steve's universally accepted leadership and aptitude for facilitate, or in part, to having no better option that was this inexpensive, i.e. Steve was compensated in this role as part of his current position as a Regional Director for the USFWS.

process.[52] He was a deft facilitator and a skilled mediator between interests at a complicated table. However, as the agreements drew to a close, the Administration became uneasy with such close ties to the drafting of the Klamath Agreements (especially after threat of a potential violation of the Federal Advisory Committee Act, *see* below), and replaced Steve with Ed Sheets,[53] a professional mediator and facilitator, with funding from the Department of Interior (Interview Y, 21 February 2012; Interview X, 29 November 2012).

4.5.2 Marginalization of Interests

According to conflict resolution literature, parties' initial approach to the Extended Caucus negotiations represent the "hot tub approach" as referenced by Delli Priscoli and Moore (1985, in Delli Priscoli and Wolf 2009, 43). One stakeholder representative that participated in the process also characterized this stage as the "Christmas tree" approach—everybody got a chance to put their desires on the Christmas tree for all to see (Interview O, 2 November 2012). However, there were limited "gifts" (e.g. water and related resources) to go around, and the trick became how distribute resources and keep everyone at the table who held potential to legitimately and forcefully oppose a final agreement. This proved to be another job for the swift tactics of political maneuvering, and two environmental-based NGOs, Oregon Wild and WaterWatch of Oregon, both part of the "NGO caucus" within the negotiation process, ultimate felt the brunt of this process.

Oregon Wild had established a record of litigation in the Klamath (previously under the name Oregon Natural Resources Council, ONRC) that was well known among federal agencies, Project irrigators, and the Klamath Tribes (Messier 2012). Lawsuits were their chosen tactic to assert conservation interests and protect public trust resources.

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[52] It is interesting to note that after he departed from his facilitation role in the Klamath negotiations, Steve Thompson retired from the USFWS and went to work for the Bechtel Corporation, a U.S.-owned defense contractor and developer of large energy and water infrastructure around the world (http://www.bechtel.com/). Bechtel was the contractor overseeing the privatization of water in Bolivia that prompted a reaction of social unrest, protest, and ultimately civilian death in April 2000 (Perreault 2008).

[53] A public record of Ed Sheets' involvement in the Klamath is available at: http://www.edsheets.com/Klamathdocs.html (last accessed 28 April 2014).

WaterWatch had a similar strategy and had been involved in several previous dam removal efforts in Oregon (Savage Rapids and Gold Ray dams on the Rogue River removed in 2009 and 2010, respectively). At the Extended Caucus table, Oregon Wild and WaterWatch were very interested in dam removal, but were also very interested in maintaining habitat in the Klamath Basin NWRs through securing adequate water for the refuges, and if possible, ending or reducing lease-land farming practices on the refuge operated by Klamath Project irrigators under the provisions of the Kuchel Act. Their argument was that commercial operations on the *public* NWRs were against the purpose of the refuge system and thus a breach in the public trust. These two groups also very much opposed any renewal or restructuring of a power subsidy to Project irrigators and the few off-project irrigators who benefited from a 50-year contract for significantly reduced electricity rates struck with CopCo (now PacifiCorp) which expired in 2006. One NGO representative explained the situation to me like this:

> So, you know some guy in the Rogue Valley is growing alfalfa and he's gotta sell his alfalfa to the same people that his neighbor over on the other side of the hill is selling to, in the Klamath, but the guy in the Klamath just happens to have this major subsidy for no apparent reason other than political clout. And it just was unfair and it really just rubbed people the wrong way, including, there was a whole bunch of farmers down in Siskiyou County who really didn't like the fact that their competitors over the hill there in Tule Lake were getting these power subsides. And they used to joke, 'oh yeah, we drive pickups to work and those guys fly airplanes.' They had a lot more money because pumping costs are big part of what you have to pay for, depending on the crop, it can cost quite a bit. (Interview I, 25 October 2012)

Power subsidies were a major demand of Project irrigators and lease-land farming seemed to be "off the table" as something *non-negotiable* in this venue.[54] Oregon Wild and WaterWatch were willing to consider alternatives where power subsidies existed and lease-land farming was phased out, but they wanted commensurate environmental reparations for damages caused by both practices to the public trust.

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[54] It is ironic that something was "off the table" in the KBRA negotiations, given the comprehensive nature of the issues negotiated. However, it is true that the fight to remove commercial farming from Tule Lake and Lower Klamath NWR needed to be taken up with the Kuchel Act and the reauthorization of "purposes" for the Klamath NWR Complex (Interview W, 28 November 2012).

> So, the way it came down on the refuges on our side was, we were like 'OK, if you want the power rate, that's fine, but let's figure out what would have happened if we didn't have the power rate, and the benefit to the environment and get those anyway. So you guys get your thing, and we get our thing.' (Interview I, 25 October 2012)

And although both organizations described lease-land farming *as not* the main reason for an eventual split between Oregon Wild, WaterWatch and the rest of the settlement group, every conversation I had with representatives from either organization tended to end up this way:

> You want us to support a power subsidy we think is not efficient, that isn't in the public interest, but you want it… we need to have a compromise here, you need to get off the refuges so we can have refuges restored. This happens to be a lakebed, it's publically-owned land that's a lakebed in a basin that doesn't have enough water storage. We can get natural water storage back here. Get off the refuges.' (Interview I, 25 October 2012)

Oregon Wild and WaterWatch had pitted themselves against a major player in the room, Project irrigators, who were well allied with the Klamath Tribes, the Bush Administration representatives, and by extension, the Yurok and the Karuk Tribes. But the problem, it seems, was that the environmental NGOs didn't have anything to bargain with. There was nothing they could offer the Project irrigators that the irrigators couldn't secure for themselves with the other parties in the room.

As a result, sometime during 2007 each party was presented with a document called the "framework for settlement" (supposedly drafted by the tribes and irrigators) containing a list of terms that each party had to agree to in order to proceed with settlement negotiations. One of those conditions was to "support lease-land farming on the Klamath NWRs"[55] (Interviews). Those parties unwilling to sign the framework were then asked to leave the process. This marked the departure of Oregon Wild and WaterWatch from the Extended Caucus. Oregon Wild followed up with a letter (March 6th, 2007) to the participating federal agencies threatening suit under violation of FACA.

[55] While many interviewees privy to the negotiations talked about this document, I was never able to obtain a copy due to the confidentiality agreement. This is understandable, and instead, I reconstructed most of the terms through information gained in the interview process.

This communication is referenced in the following statement made by Oregon Wild to the Extended Caucus (which they now called the 'Settlement Negotiation Group' or 'Settlement Group') later that spring (probably late April):

> To Members of the PacifiCorp Klamath Project Settlement Negotiation Group (the 'Group'):
>
> As you are aware, by letter dated March 6, 2007, Oregon Wild advised the U.S. Fish and Wildlife Service and the National Marine Fisheries Service that Oregon Wild was concerned that the Extended Caucus (all members of the Group except PacifiCorp), may have been led into a potential violation of the Federal Advisory Committee Act ('FACA'), 5 U.S.C. App. II. Certain members of the Extended Caucus, apparently encouraged by representatives of the Bush administration, were advancing a 'settlement framework' that included provisions purporting to resolve regulatory and public policy matters far beyond those properly addressed as part of the FERC proceeding. These areas include, among others, management of tens of thousands of acres of National Wildlife Refuge lands, flow management as part of the federal Klamath Irrigation Project, and regulatory assurances that may be prescribed as components of upcoming biological opinions and/or incidental take statements for salmon, bull trout, and suckers. This 'settlement framework' was being advanced despite the absence of consensus among all members of the Group. (Undated Communication from Steve Pedery, Conservation Director, Oregon Wild *on file with author*)

The letter goes on to claim that on April 6th, 2007, Oregon Wild (and by extension, WaterWatch) received an email from the USFWS informing them "that all federal agencies were withdrawing from the Extended Caucus, but would encourage 'stakeholder' parties to continue to the next phase of settlement" (Undated Communication, *see above*). Then, "five minutes later we get a call [from Yurok, Karuk, and KWUA attorneys] following up on that email saying, 'we're forming the process under our agency and you guys are excluded'" (Interview I, 25 October 2012). Neither Oregon Wild nor WaterWatch of Oregon has yet to file suit under FACA.

Oregon Wild and WatchWatch were victims of strong power relations present in the Extended Caucus, but also of a poor negotiating position, and a lack of internal and external support for their minority position. The triumvirate of the tribes, irrigators, and the Administration was able to split the environmental and conservation NGO caucus by convincing major national players like American Rivers and Trout Unlimited to sign the "framework for settlement" in order to achieve their big picture prize, which was

ultimately the removal of the four mainstem Klamath River dams (Interview X, 29 November 2012). The question raised here is, was the public trust marginalized by the exclusion of Oregon Wild and WaterWatch? The exclusion of these groups alludes to another point I have trouble reconciling in this political analysis of a governance transition in the basin, but I find interesting enough to point out here: *none* of the representative for either Oregon Wild or WaterWatch of Oregon were at the time, or ever had been, residents of the Klamath Basin. There is evidence of a strong, politically pursued undercurrent that ran through the negotiations: settlement was about getting *what was needed for community survival in the basin, by those who would physically live with the consequences of an agreement*.

4.6 A Brief Reflection on the Current State of the Klamath Agreements

The public signing of the Klamath Agreements by non-federal parties[56] was marked by triumphant accolades from all levels of the system of multilevel governance acting upon the Klamath SES (Learn 2010; Shevory 2010). Never before had such a diverse group of stakeholders with competing interests in resource use and protection publically aligned in such a collaborative manner.

However, the celebratory aura of the signing ceremony did not last long. The marginalization of a few interest groups during the negotiation process created a public voice of opposition that mounted a force of resistance against the momentum for institutionalizing this new approach to governance built with the Agreements. There was some opposition from the Hoopa Valley Tribe based on a perceived inadequacy of flows allocated to the Klamath River to protect salmonid habitat (Masten 2012; Schlosser 2011), but the most vocal and acrimonious opposition came from a group of upper basin, off-project ranchers and farmers (Shevory 2010). This group mobilized a public rhetoric of patriotism, fear, and distrust of the federal government in order to sway public opinion against the Klamath Agreements. Conversations in Klamath Falls turned from "what are these Agreements" and "what do they do for the community," to "the federal government is removing dams that our grandfathers built, raising our power rates, and giving land

[56] This pertains to the KBRA only; the Department of Interior (on behalf of the BLM, USBR, and USFWS) and NMFS signed the KHSA (KBRA 2010; KHSA 2010).

back to the Indians!"[57] Upper Basin opposition coopted the momentum of the Tea Party in order to garner political support in local elections both in Klamath County, OR and in Siskiyou County, CA. In Klamath County, the County Commissioners (2 out of 3) who supported the Agreements lost their jobs in the fall 2012 elections (Interview J, 25 October 2012). In Siskiyou County, a ballet measure in 2010 to oppose the Agreements passed with over 80% of the vote (Juillerat 2010), and petition for a similar vote followed in Klamath County in 2012.

In reality, there was little that opposing individuals, organizations, or even the Counties could do to legally oppose the Agreements, but politically, this dissent created a maelstrom of often false information that deterred any would be sponsors of the Congressional legislation necessary to authorize the participation of federal agencies (KBRA) and render the Agreements binding. Even so, the U.S. Department of the Interior pushed forward on the steps necessary to eventually carry out the terms of the Agreement. As soon as the draft KHSA was released in 2009, federal and state agencies initiated and coordinated a series of studies to inform a comprehensive Environmental Impact Statement (EIS) as required under NEPA[58] for the potential federal action of removing facilities of the KHP. A draft of the resulting document (over 1,300 pages of environmental and socio-economic study) was released for public comment in 2011 and was followed by a series of public hearings.[59] The hearings were meant to gather public comment on the scope of the EIS/EIR process, but they became a sounding board for anti-KBRA, anti-dam removal, and anti-Native American sentiment—much to the

[57] Although the statements in quotation in this sentence cannot be attributed to a specific interview, they represent my experience as an intermittent participant observer in the Klamath Basin between 2011-2013. Evidence of this rhetoric can be found in the breadth and depth of op-eds published in the *Klamath Falls Herald and News* since the release of public drafts of the Agreements in 2008 (KBRA) and 2009 (KHSA), as well as on the websites of organizations and individuals opposed to the Agreements (e.g. http://klamblog.blogspot.com; http://klamathbucketbrigade.org).

[58] Simultaneously, an Environmental Impact Report (EIR) was required under California's Environmental Quality Act (CEQA), a state-level equivalent of NEPA. The resulting document is referred to as an EIS/EIR (*see* Draft EIS/EIR 2011; EIS/EIR 2013).

[59] I participated in three of six public hearings held in the Klamath Basin during the fall of 2011 (Klamath Falls, OR; Chiloquin, OR; Yreka, CA). What I observed during these hearings can best be characterized as a public display of confusion, fear, and to some extent, racism.

frustration of government facilitators. In the minority at these meetings were three "less heard" voices: Native Americans, citizens who supported dam removal for the potential it held for water quality and aquatic habitat restoration, and those who had been privy to the negotiation of the Klamath Agreements. During these hearings, it became glaringly apparent to these constituencies that the Agreements were too much for the public at large to handle—over five hundred pages of complicated legal text and over 1,300 pages of technical analysis—without experiencing the process of trust building, collaborative learning, and in some cases, personal transformation that informed the Agreement process.

To me, this is also the realization of a significant barrier to adapting or transforming environmental governance towards AG. The rate of change in the public sphere is slow, and potentially not on the time-scale needed to affect governance transitions towards forms of environmental governance more likely to adapt to a changing global climate at nested geographic scales. The processes needed to affect public acceptance of a shift in environmental governance also inspires speculation on the usefulness of negotiated agreements for institutionalizing transitions toward AG. While the Klamath Agreements contain a framework for comprehensive and flexible governance of natural resources and communities in the Klamath SES, they (and the associated processes analyzed in Chapter 4) are useless if blocked by political and ideological barriers.

The strong opposition from some agricultural communities in the upper basin was also tied to the belief (as well as self-chosen ignorance) that the Klamath Basin Adjudication Court would not find a significant water right for the Klamath Tribes and quantify it as such, rendering many of these opposing ranchers and farmers as junior water rights holders to the Tribes. However, in early 2013, the court released findings that the Klamath Tribes did in fact have senior rights to much of the water in the headwaters tributaries of the upper basin with a priority date of "time immemorial" (OWRD 2013). As another dry year mounted in the Klamath Basin, this finding was put to the test in June 2013. The Klamath Tribes "called" on the water that was rightfully theirs, asserting their rights so that water would remain as instream flow providing habitat

for endangered suckers. OWRD water masters issued notices of irrigation curtailment and closed headgates. There was outcry from some of the off-project irrigation community, especially those already opposed to the Klamath Agreements. However, the outcry was *nothing* like the protests of 2001.

The explanation here is two-fold. First, political support was fading for the upper basin opposition to the Klamath Agreements. This faction had alienated themselves with ultra-conservative rhetoric with undertones of racial intolerance towards the Klamath Tribes. In addition, the political clout of the pro-Agreement irrigation faction in the Klamath (including Project irrigators) was much greater. Secondly, this was the first time that these ranchers and farmers had felt a water shutoff. They were not affected in 2001 because they held the most senior water rights in the basin at the time, senior to the project, and senior to the Tribes because their rights had not yet been quantified in the KBA process. In summer 2013, the tables turned. In mid-July, yet another round of Congressional hearings were held in Washington D.C. Oregon Senators and Representative were determined to find a way to make the Klamath Agreements more salient, with a slimmer budget and the inclusion of *all* upper basin interests (Learn 2013). By late summer 2013, many of the leaders of the Agreement opposition were involved in another series of negotiations with upper basin parties to the KBRA supported by a Governor's (OR) task force. By November 2013, a supplemental Agreement was released—the Upper Klamath Basin Comprehensive Agreement (UKBCA)—as a companion to both the KBRA and thus the KHSA. The Agreement was signed publically on April 18th, 2014 (AP 2014).

In the meantime, the KBCC had met regularly for three years and implemented processes of the Agreement that were applicable and fundable without Congressional authorization. The processes that led to the Agreements had in some ways, institutionalized AG in the basin through a change in network structure and communication among leaders in environmental governance, at all levels of government, community, and interests groups. As evidence, for the first time in the Klamath Basin, a *coordinated* biological opinion was drafted by officials of both the NMFS and USFWS—a rare feat nationally, let alone in the Klamath Basin where the two agencies have a

history marked by poor communication and mutual distrust (Interview W, 28 November 2012; Interview AI, 19 February 2014).

4.7 Conclusion

I close Chapter 4 with a dichotomy. On one hand, the emergence of AG in the Klamath Basin SES has led to a series of Agreements (a plan) for institutionalizing specific characteristics of AG that promote flexibility and resilience in governance given a guarantee of future uncertainty, disturbance, and change. On the other hand, the process of creating those plans was highly political, heavily influenced by hegemonic power relations between actors, and resulted in marginalization of some important interests during the transition in environmental governance. This is where the details of a governance transition towards AG become unclear. If the emergence of AG is a process more likely to produce desired social and ecological outcomes in complex SESs, the questions then become *who* determines the outcomes and *what* do those outcomes represent? The analysis in this Chapter clearly suggests the emergence and (beginnings of) institutionalization of AG in the Klamath Basin SES, but it also describes the political nature of this emergence. In the Klamath governance transition, political forces mediated a vision for a desired state to be pursued through AG. This idea sets the stage for a broader theoretical discussion of the role of politics and power in the emergence and institutionalization of AG, and is the focus of Chapter 5.

5. CONCLUSION

> The Klamath Basin is a bioregion, but its story is more than local. Because water, fish, and other gifts of nature are vitally important for people who live there, because different ways of living on Earth clash there, because it is a breeding ground for myths an a testing ground for conflict resolution, and because the outcomes of the bioregion's conflicts have consequences beyond its boundaries, the Basin's story needs to be told within the larger contexts of American and world history. (Most 2006, x)

The recent governance transformation in the Klamath has ramifications far beyond the watershed boundary that delineates the basin. The Klamath context sheds considerable light on a nascent form of environmental governance touted by scholars as appropriate to contend with the high levels of complexity and uncertainty that accompany contemporary environmental issues such as vast environmental degradation and impending global climate change (e.g., Brunner et al. 2005; Folke et al. 2005). This analysis of AG in the Klamath Basin represents an important empirical example as well as a timely addition to the scholarly record. As large-scale resource conflicts resulting from increasing degradation of and demand on limited resources such as water continue to emerge, groups of actors will continue to seek out new modes of environmental governance, i.e., processes for allocating scarce resources, resolving conflict, and pursuing a desired state of SESs. The spectrum of hybrid approaches pursued by these groups of actors represent a transformation toward AG, and as such, research exploring the drivers, barriers, and bridges to this transformation is critical.

In Chapter 1 (and greatly expanded in Chapter 2), I outline three major gaps in the current literature on AG. First, published empirical explorations of AG are limited. AG concepts emanate from three, often overlapping bodies of literature: collective action research such as the work inspired by Elinor Ostrom (e.g., Dietz et al. 2003), research on collaborative conservation often from a political science or natural resource management standpoint (e.g., Brunner et al. 2005), and studies of social-ecological resilience heavily influenced by ecological theory (e.g., Folke et al. 2005). The lack of a common framework (and sometimes a common discourse) between these three literatures has limited the scale and scope of empirical examples of AG and as a result, theoretical

conceptions of AG have greatly surpassed the collection of accompanying empirical evidence. Thus there is a need to cultivate empirical studies to "ground truth" theoretical conceptions of AG by specifically looking for evidence of key processes and structures considered essential to AG.

Second, there is a lack of any real, robust discussion of power and politics as it relates to transformations toward AG. This oversight stems from the disproportionate recent influence of resilience scholars on AG, and the critique mirrors a similar critique leveled at resilience theory itself (e.g., Davidson 2010; Beymer-Farris et al. 2012; Welsh 2012). According to Horborg (2001) and quoted by Paulson et al. (2003, 209), power is "a social relation built on an asymmetrical distribution of resources and risks." Politics "is understood as the practices and processes through which power, in its multiple forms, is wielded and negotiated" (Paulson et al. 2003, 209). Turner (2013, 5) even refers to governance as "the myriad of ways in which power is exercised within society." Thus power and politics are inherent factors shaping environmental governance—the process of resolving tradeoffs in allocating resources and risks. Politics shape transitions to new forms of governance such as AG, and power relations explicitly determine resultant governance arrangements including resultant interactions among institutions, actors, networks, and organizations that create and reinforce specific social and ecological outcomes. Without an explicit recognition and analysis of these interactions, AG scholarship lacks a critical lens to interrogate the context of governance transitions and evaluate the potential for AG to attain explicit goals such as a more desirable state of system function, sustainable resource use, and the principles of good governance that promote social and environmental justice, among other things.

Last, there is no common framework and methodology to explore, analyze, and compare empirical examples of AG. The absence of a common analytic framework for AG can be attributed to a lack of conceptual coherence amongst the progress of theoretical discourse and the promise of AG as a means to promote desired social-ecological outcomes. Some authors use AG to mean different things—AG is often employed synonymously with other concepts such as adaptive management or adaptive comanagement. While not as much a gap and more of a confusion or conflation in the

literature, misperceptions of AG are important to address, and so a task of clarification served as the natural starting point for this dissertation.

In Chapter 2, I trace the development of AG through the literature and provide organization and clarity to the myriad of concepts, criteria, and components posited as AG. In the process I present AG as a transformation in environmental governance along a trajectory from an undesirable SES state often marked by severe ecological degradation, resource conflict, and crisis, towards a more desirable system state (*see* Figure 2.2). There are two key periods or processes of change along the trajectory toward AG: emergence and institutionalization. Emergence is defined by a cascading self-organization of individuals, networks, and organizations during which adaptive capacity of the governance system is strengthened by collective knowledge generation, trust building through networks, increased social learning, and the key leadership of individuals and organizations. However, the emergence of AG cannot be fully realized without some evidence of lasting institutional change, e.g. the formalization of networks into governance organizations, altered or reformed laws or rules, or successfully challenged myths evidenced by changed perceptions and social norms. Any degree of institutional change (or "institutionalization") represents the second major process of AG if that institutionalization moves the governance system closer to the desired social-ecological state of function. In addition, windows of opportunity (disruptions that serve as bridges to institutionalization) such as funding mechanisms, political elections, natural disasters, etc., are critical to linking emergent AG with the process of AG institutionalization. In addition to this clarification of process and newly defined terminology presented in Chapter 2, I also present a targeted series of mixed methods (including ethnographic techniques, institutional mapping, and social network analysis) necessary for comparing and analyzing empirical examples of AG (Tables 2.2-2.3) that I subsequently used to explore the Klamath case in Chapter 4.

Given a refined definition of AG and a fresh methodological framework targeted at uncovering evidence of AG, I sought to determine *how an empirical case study of a transition in environmental governance in the Klamath Basin further informs the*

theoretical understanding of AG. Specifically, I aimed to answer the following research questions in an attempt to bridge the identified gaps in the literature:

> *To what degree are the Klamath Agreements evidence of a transition toward AG in the Klamath bioregion, based on the current conceptualization of AG in scholarship?*
>
> *What can an analysis of environmental governance in the Klamath Basin conceptually framed by political ecology illuminate about the role of power and politics in transitions toward AG?*
>
> *Are there lessons from the Klamath case relevant to promoting transformations to AG in other geographic contexts, e.g., fostering conditions for emergence and/or supporting institutionalization of AG?*

5.1 Research Implications

My analysis of the Klamath Basin case study yields the following findings relative to the questions guiding this research:

A suite of mixed qualitative methods reveals the Klamath Agreements as evidence of a transition towards AG in the Klamath bioregion. This broad finding essentially captures two key elements: 1) the Klamath governance transition indeed reflects current conceptualizations of AG and thus can and should be further analyzed to contribute to AG theory; and 2) a unique combination of analytical methods can be employed to observe, document, and compare empirical examples of transformations toward AG. Empirical investigations using a targeted methodological framework for identifying specific AG criteria can reveal important SES dynamics that describe the self-organizing process of AG emergence, exploitation of windows of opportunity, and the range of institutional change that can result.

First, the governance transition in the Klamath Basin between 2001 and 2010 remarkably mirrors the trajectory and narrative of a transition toward AG. After a period of acute resource crisis amongst communities of resources users between 2001-2002, the basin slid into a period of reorganization, allowing the evolution of necessary conditions for the *emergence* of AG. It was during this period that communities of resources users exhausted zero-sum avenues of conflict resolution, and subsequently, key leaders arose to

build trust between previously conflicting constituencies. This self-organization, or what Olsson et al. (2006) terms "preparing the system for change" continued through events such as the Chadwick Sessions, which provided an important venue to address the legacy of social conflict, and as a result, strengthen budding trust between resource user groups and further the development of important networks that would serve to guide a future shift in resource governance.

As the processes of emergence became ripe in the Klamath Basin, the newly formed networks of governance actors were adequately prepared to take advantage of windows of opportunity such as the FERC alternative relicensing proceedings of the Klamath Hydroelectric Project. The FERC process, and the associated financial, logistical, legal, and leadership capacity associated with the process, became a vehicle to connect the self-organized emergence of AG with tangible outcomes that represent a degree of institutionalizing AG. For example, the FERC alternative relicensing procedures yielded the Klamath Agreements, a formal document (binding amongst non-federal parties) that articulates a vision of a desired state and outlines a plan, including a complicated series of management decisions, to achieve that desired state. The charter and activity of organizations such as the Klamath Basin Coordinating Council (KBCC) and the Technical Advisory Team (TAT) are evidence that to a degree, the transition toward AG has been formally institutionalized at the bioregional scale of Klamath Basin. Informally, a normative shift away from the use of media and litigation as adversarial conflict, and instead towards an environment of communication, shared identity, and transparent goals, is further evidence that institutionalization of AG has occurred in the basin.

Discovery of the resemblance of the Klamath narrative to the theoretical conceptions of AG was made possible by a unique combination of qualitative and quantitative methods. In an environmental governance transition like the Klamath example, an exploration of context, legacy conditions, and embedded social-ecological relationships is necessary in order to construct an accurate and complete narrative of transformation, and thus qualitative methods such as semi-structured interviews and participant observation are rightly employed. However, the complexity of empirical

examples such as the Klamath, and the need to observe and record potential cases of AG in a manner that is consistent and comparable requires additional measures that are both qualitative and quantitative in nature. To achieve this, I employed and combined two analytical methods in Chapter 4: institutional mapping and social network analysis. Mapping of the relationship between communities of resource users, governments, agencies, and interest groups in the basin was a conceptual exercise in analyzing the relative power and influence of particular actors groups and organizations and subsequently qualifying relationships based on flows of resources and information or the relative affect of institutions on groups. Extracting these relationships from the institutional mapping exercise at different time periods along the transitory trajectory of Klamath governance, I created a series of social network maps that provided a comparable quantification of the network of governance relationships in the Basin throughout the transition in governance. The network maps presented in Chapter 4 depict a formal change in governance relationships in the basin over time and suggest the occurrence of a transformation toward AG. Further informed by qualitative research, this methodology could be employed to capture change in informal relationships among networks of governance actors and/or organizations as well the formal relationships investigated here. In addition (and as suggested in Figures 4.5 and 4.6), this combined methodology can be used to predict whether new or proposed governance arrangements, such as those proposed in the Klamath Agreements, reflect the network structure and institutional relationships suggested by theoretical scholarship on AG.

Political forces act upon AG processes to influence specific governance outcomes that have the potential to reinforce ecological degradation and social marginalization in terms of access to resources. The inherent danger of transformations toward AG is that associated governance outcomes (including but not limited to: new governance arrangements and organizations, devolution of power or comanagement responsibilities, changed informal rules or norms, and a host of environmental quality improvements or degradations) may not reflect the best solutions for governing a SES because of the influence of powerful political actors, networks, or

organizations, potentially coopting the processes of a transformation to AG. The analytical approach of political ecology offers a necessary compliment to research investigations of AG transformations that are framed in literatures more focused on governance, resilience thinking, and/or collaborative conservation. A political ecology approach helps researchers to explicitly identify winners and losers, both as social groups and ecological processes, through the analysis of feedbacks between the two in the process of transforming governance, i.e., (re-) allocating resources, services, and/or environmental improvements.

The introduction of political ecology as an additional perspective provides an avenue to address the normative commitments inherent in a transformation toward AG. Political ecology provides a critical lens to ask questions such as: for who is the desired state most beneficial? What groups or interests are absent in the renegotiation of resources and risk allocation inherent in an environmental governance transition? Why are these groups absent and what does their absence suggest about the legitimacy of AG processes? A political ecology approach also allows the researcher to employ a more nuanced approach to uncovering the root drivers of governance change, for example, what specific power relations have facilitated the degree of AG institutionalization in the Klamath identified in this research (*see* Section 4.6), and subsequently, have these power relations led to a shift in governance that is unjust or reinforces a trajectory of environmental degradation?

In the Klamath, historical contexts and a failure in modern environmental governance led to a self-organizing process that determined a different approach to environmental governance was needed, one that pursued a new, more desirable state of social-ecological interaction in the Klamath SES. The articulation of this desired state is described in the Agreements themselves as "effective and durable solutions" (KBRA 2010, Sec. 1.3), as well as described by those who continue to participate in processes associated with this governance transition. The guiding principles of the Klamath Agreements, and by extension a transition towards AG, represent:

Peace on the River. (Interview G, 11 October 2012)

> Decency and civility. …It's about survival. Survival of people, culture, the environment… this place. (Interview V, 28 November 2012)
>
> The economic and social stability of the Klamath Basin. (Interview O, 2 November 2012)
>
> A desire to maintain functioning livelihoods *and* ecosystems in the Basin. (Interview B, 29 August 2012)

However, once this general idealized approach was pursued, it was a series of power shifts, political relationships, and the underlying influence of an informal shadow network that directed the processes of emergent governance and ultimately determined the fine details of the desired state to be pursued through AG. In this way, power and politics shaping the transition in environmental governance also determined the scope and scale of emerging AG—who (or what groups) was at the table negotiating a new approach to environmental governance, who stayed at the table, and what geographical and temporal bounds were placed on the resultant vision for a desired state for the SES. Power and influence, emanating from legal, economic, and cultural sources including indigenous sovereignty, determined the ability of parities to negotiate a plan for institutionalizing AG, ultimately determining each group's role in that plan. Thus politics, and the cross-scale influences inherent in a SES nested within a highly capitalized nation and a complex political economy, directly shaped the vision for the "desired state" to be pursued under an AG approach. These relationships are central to the changing governance trajectory and must be central to any analysis of AG.

Counter to many cases of study under the auspice of political ecology, this recognition doesn't immediately lead to the conclusion that the Klamath Agreements were corrupted by the larger-scale forces of capitalism and will inevitably lead to further social and environmental degradation. On the contrary, the political forces acting upon the transition in environmental governance in the Klamath SES helped shape a governance plan for basin-wide habitat restoration, improvements in water quality, reintroduction of species, social reparations, and shared resource allocations across a set of disparate communities. Thus, the political economic influences shaping goals of AG are mediated by the emergent processes of AG itself. In the Klamath SES, resource users

coopted a political process in an effort to balance economic, social, and cultural demands on a finite biophysical system. What resulted was the emergence, and to some degree, the institutionalization of AG, with goals aimed at reversing the environmental degradation and social marginalization that has occurred over the past century and a half.

Thus the additional lens of political ecology overlaid on environmental governance research is an important check on the balance of embedded power relations that shape transformations toward AG. The scalpel of political ecology presents an opportunity to dissect causation behind the AG emergence and institutionalization, exposing the potential need for intervention in real world governance transitions to ensure social and environmental justice. In addition, political ecology offers a pulpit of critique from which to determine the relationship between the processes of AG and the normative values of AG goals and outcomes, i.e., are transformations toward AG inherently pathways toward good governance or do they potentially reinforce unequal power relations that lead to environmental degradation and unjust access to resources?

The most pressing work to be done with regard to AG is to determine how to 1) foster conditions that allow emergence of AG, and 2) support institutionalization of AG across the current range of approaches to environmental governance. While the self-organizing process of emergence is not something that can be legislated for or mandated, it is an essential piece of a transformation toward AG. In this dissertation, I implicitly poses a series of questions potentially useful for environmental managers, political leadership, and groups of stakeholders involved in or reflecting upon intractable resource conflicts like that of the Klamath Basin (circa 2001). Answering the following questions can serve as a starting point to prepare a SES for the potential emergence of AG: is there a common definition of the environmental problem at hand? If not, where does a lack of understanding or communication lay amongst stakeholders, interests groups, and government representatives, and what opportunities exist for group learning to explore different ways of knowing the problem? Is the problem or resource crisis poignant enough to encourage a transformation in environmental governance? Who or what groups of people lack capacity to participate in a governance transition? Is any

group over- or underrepresented? Which governance interests have the most power and how is that power used to influence a transition in governance? Who or what has the potential to block or negatively influence a self-organized governance transition? What informal interactions can be fostered to link otherwise conflicting actors, networks, or organizations?

Once AG has begun the process of emergence in a SES, the questions then turn toward how to institutionalize AG, i.e., how to change institutions, legitimize governance networks, and create new governance organizations. What are the barriers and bridges for institutionalizing AG amongst different contexts of established governance—where or what are the most fruitful windows of opportunity? Where are specific changes in legal frameworks necessary to open up policy space and allow a degree of flexibility for potential innovation (e.g. Garmestani and Benson 2013)? The Klamath case highlights the promise of negotiated settlements (specifically Indian water rights settlements and alternative FERC relicensing proceedings) as a mechanism for institutionalizing AG, but are there other targeted interventions or legal reforms beyond negotiated agreements that can be pursued to enhance governance transformations (at least in the specific context of the U.S.)?

One thing is absolutely clear in this analysis of the Klamath case, the trajectory of AG processes—emergence to institutionalization—could not have occurred without the capacity presented in major windows of opportunity and through other cross-scale interactions. For example, the momentum achieved in the basin after the Chadwick talks stalled until a venue arose (FERC relicensing) that provided the financial, logistical, and leadership capacity necessary to facilitate learning and trust-building among geographically and social diverse actor groups with a history of conflict. In a broader sense both spatially and temporally, the tribes would not have been such a major force in shaping the governance transition in the basin if it had not been for the larger-scale recognition of Indian water rights established by U.S. court decisions such as the 1974 Boldt Decision (Chaffin et al. *in review*; Gosnell and Kelly 2010). From the local level, without the leadership of individuals like Bob Chadwick, the process of emergence, trust-

building, network formation, and the increase in social learning may have stalled or taken a different trajectory altogether.

Issues arising from the use and protection of natural resources constitute the most intractable problems of environmental governance—complicated by historic legacies of marginalization and modern constraints of the highly politicized capitalist state. This raises the question of how we as a society choose to prepare future natural resource managers and environmental governance professionals to tackle these complex scenarios. Governance leadership in the Klamath, for example, had to be extremely skilled individual actors—big thinkers, exceptional communicators and facilitators, and extremely precise political operatives—with networks rooted in local identity, but spanning regionally and nationally in order to garner vital capacity and legitimacy. Thus, pursuing (or even enduring) a transformation toward AG is not for the faint of heart. A common theme that emerged from interviews among Klamath governance practitioners was that of pain. Every community in the Klamath felt pain during some period in the transition, and most continue to experience it in cycles relative to other groups' gain or increasing environmental degradation. However, the leadership of Klamath communities continues to charge forward, pursuing a transformation toward AG (without explicitly recognizing it) because of the promise that new governance arrangements offer for the holistic good of the basin and its communities. Even though as of this writing the Klamath Agreements have not yet been authorized and funded by Congress, there has been a transformation in the basin, evidenced in this dissertation by the identification of the processes of emergence and a degree of institutionalization of AG. This trajectory is now embedded in the social memory of the basin, and while there may be further crises, collapse, and reorganizations, the overall process of a transformation towards AG will likely persist.

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APPENDICES

Appendix A

Interview Guide**:** ***Adaptive Governance and Landscape-Scale Water Resources Settlement: An Assessment of the Klamath Basin Restoration Agreements***

Introduction

- Introduce yourself.
- Remind interviewee about the study and its purpose: to assess the approach of the Klamath Agreements (and negotiation process) including potential management innovations, when considering the complex environmental conflicts in the Klamath Basin involving water resources, endangered species, and diverse economic and cultural interests.
- Obtain oral consent following procedure outlined in "Oral Consent Document."
- Provide a brief overview of the main topics you will cover:
    a. The motivations and drivers behind the KBRA/KHSA (including the negotiation and drafting of the agreements): what antecedent factors in the relationship between Klamath Basin communities and natural resources such as water quality & quantity, agriculture, and fisheries necessitated this process?
    b. The KBRA/KHSA as functional agreements: is there evidence that the terms of the Klamath Agreements mirror the academic principles of adaptive governance including flexible institutions, provisions for adaptive management, increased public participation, and a river basin approach to management?
    c. Perceptions of power and politics in the KBRA/KHSA: were there dominant forces that shaped the negotiations and subsequent agreements?

General/Background

1. Simply put, the KBRA/KHSA negotiation and drafting took an extraordinary amount of time and effort on the part of interested stakeholders and others involved in the process. What do you perceive as the important factors that *motivated* this process?
    a. Did specific resource management strategies in the Klamath prior to the agreements need to change? Why or why not?
    b. Were there other important factors that created the space or need for the KBRA/KHSA process?

Governance, Power, and Politics in the KBRA

2. What do you feel are the guiding principles behind the KBRA?
3. Is the KBRA flexible?
    a. What is most/least flexible about the agreement?
    b. Are there any parts of the agreement that you foresee becoming a legal/jurisdictional problem due to either a lack of flexibility or too much flexibility?
4. What do you see as the major goal(s) of or reasons behind the creation of the Klamath Basin Coordinating Council (KBCC) in the KBRA?
    a. In your opinion, will the KBCC have enough autonomy and authority to accomplish its goals or carry out its intended function?
    b. Will the KBCC influence the Klamath Basin as a whole or will its direction have limitations (i.e., geographic, physical, jurisdiction, etc)?
5. Were there any informal means of communication or cooperation that emerged among disparate groups during the KBRA process?
    a. Was there informal communication or cooperation among disparate groups prior to the KBRA process?
    b. Are any informal means of communication addressed in the KBRA? Were they strengthened or weakened in the KBRA process or final agreement?
6. Do you feel that the opinions, needs, and desires of the public(s) in the Klamath Basin were adequately represented in the KBRA process?
    a. If not, who was left out and why?
    b. Who (or what groups) influenced the negotiation process the most? How/why?
    c. If implemented today, do you feel that the KBRA/KHSA marginalizes any group or party in particular?
7. Do you feel that there will be meaningful public participation in requirements of KBRA if the agreement is Congressionally authorized and funded? Why or why not?
8. In your opinion, what were the major concessions made in the negotiations?
    a. Why do you think these concessions were made?
    b. Were they pivotal to reaching the current agreement? Why or why not?
    c. Did any person or group compromise more than others?
9. Is there evidence that longstanding ideologies of participants have changed as a result of the KBRA process? Is there evidence against this?

Optional Adaptive Management Questions (chose from either #10 or #11 based on background)

10. In your own words, define adaptive management?
    a. How do you see adaptive management operationalized in the KBRA?
    b. Do you see any roadblocks to using adaptive management to implement the goals of the KBRA?
    c. Do you feel this concept will assist/detract from the overall goals of the Agreements?
11. The KBRA includes many provisions for monitoring water resources management (quality and quantity improvements), habitat restoration, and fisheries reintroduction. Do you feel that the KBRA has adequate provisions to integrate the results from monitoring into future resource management direction?
    a. If so, explain how you envision this working?
    b. If not, is this a problem and how could it be addressed?

Concluding Questions

12. Are there any other relevant topics related to the Klamath Basin in general or specific to the KBRA process that we haven't covered that you'd like to discuss?
    a. In your opinion, what's the most important thing I need to know about the KBRA process or final agreements?
13. Can you suggest other people who were involved in or have intimate knowledge of the KBRA negotiation and drafting process that I might interview?
    a. Those who share similar opinions to yours?
    b. Those whose opinions may differ significantly from yours?

If I have time…

14. In your opinion/own words, describe the KBRA process and final agreement in terms of success or failure in creating a livable, just, agreement for the people and environmental systems of the Klamath Basin.
15. How do you personally feel about the process and the outcome at this moment?