

# Governing ecosystem adaptation: an investigation of governance network level adaptive capacity

By

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## Abstract

The impacts on ecosystems wrought by climate change have significant implications for the communities that steward ecosystems and depend on their services. Because ecosystems often span ownership boundaries, they are often managed by dispersed sets of public and private actors known as governance networks. Understanding the adaptive capacity of governance networks is a critical task if we are to understand the ways in which these ecosystem impacts might be mitigated; however, little research has examined adaptive capacity at the governance network level. Furthermore, most research on adaptive capacity seeks to evaluate it deductively across a framework of high-level indicators (e.g., social and financial capital), without attending to the underlying conditions that contribute to the variation in these measures. To address these gaps in my understanding of governance network level adaptive capacity, I conducted a case study analysis of three governance networks in the Pacific Northwestern US, investigating both the key features of adaptive capacity across the three regions, and the socio-political conditions underlying these features. Using a set of 50 interviews with actors engaged in ecosystem management across the three regions, I found evidence that three key features of adaptive capacity were particularly relevant: social capital, access to resources, and leadership. Furthermore, I found that these features, in turn, were shaped considerably by four key underlying conditions: political power, legal power, institutional support, and land protection. In investigating these underlying conditions that shape adaptive capacity, this study begins to answer the call of political ecologists to analyze the systemic causes of vulnerability and adaptive capacity.

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## 1. Introduction

The effects of climate change on ecosystems have considerable impacts on the communities that steward and depend on the services these ecosystems provide. Because ecosystems often span across ownership boundaries, a wide range of landowner stewards are implicated in ecosystem governance; usually, no centralized governing entity has unilateral authority over management. This range of public and private stewards across different land ownership types engaged in ecosystem management is known as a governance network. As climate change alters the ecosystems that these governance networks manage, understanding their adaptive capacity is critical.

Adaptive capacity in the context of climate change is commonly defined as: “the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences” (McCarthy et al., 2001; Siders, 2019). This paper focuses on adaptive capacity at the governance network level: the network of entities and institutions that are implicated in the management of natural resources in a given region (Lemos and Agrawal, 2006). While the study of adaptive capacity is robust, much of the current research focuses on the individual and household level (Siders, 2019) while far less has examined the governance network level. Because it is often governance networks that manage ecosystems, this lacuna represents a barrier to adequately understanding the ways in which ecosystem level adaptive capacity might be cultivated.

To evaluate adaptive capacity, studies often employ indicator frameworks to measure it across a range of dimensions. For example, the “Five Capitals” framework (Scoones, 1998) has served as the foundation for numerous analyses of adaptive capacity at the individual and household level. Such framework-driven analyses focus on high-level indicators, rather than underlying conditions, an approach that has borne critique from political ecologists in recent years (Taylor, 2014; Watts, 2015). These underlying conditions are especially relevant in assessing adaptive capacity in governance network ecosystem management: networks are shaped by unique historical contexts and complex relationships among actors, and indicator-driven assessments shed little light on, for example, *why* some networks are characterized by greater social capital than others. Thus, to better understand the nature of adaptive capacity in this context, it is necessary to interrogate the underlying socio-political conditions that produce this variance in adaptive capacity measures. Few studies have thus far examined this.

To address this gap in my understanding of governance network level adaptive capacity, I examined the adaptive capacity of three governance networks engaged in ecosystem management and climate change adaptation in the rural Pacific Northwest. In each region, a set of organizations had participated in an ecosystem-level adaptation plan. In addition to identifying the salient dimensions of governance network adaptive capacity, I investigated the socio-political conditions underlying these dimensions that contributed to and constrained adaptive capacity. I employed an inductive approach, using semi-structured interviews with key stakeholders engaged in the development of each adaptation plan to illuminate the conditions that contribute to the networks’ adaptive capacity. Adaptive capacity in this context was realized through adaptation-oriented ecosystem management

work. It was usually not primarily conceived of explicitly as climate adaptation work, but rather consisted primarily of conservation and restoration projects intended rebuild healthy ecosystems—but in so doing, these projects served climate adaptation purposes.

Our study revealed three particularly salient features of adaptive capacity in this context: social capital, access to resources, and leadership. Furthermore, I found that these features were shaped by four socio-political conditions: political power, legal power, institutional support, and the extent of protected land. Revealing the influence of these underlying conditions demonstrates the value such an analysis in understanding the nature of adaptive capacity in this context.

## 2. Literature review

### 2.1 Adaptive Capacity

A common approach to investigating adaptive capacity across units of social organization involves creating a framework of indicators of distinct dimensions of adaptive capacity and using it generate quantitative measurements (e.g. Hirschfield et al., 2020; Silas et al., 2020; Gupta et al., 2010; Nelson et al., 2010). The diversity of indicators that have been employed is tremendous: in a comprehensive review, Siders (2019) found 158 distinct indicators deployed across the literature. The indicator approach, however, has borne criticism from political ecologists, who argue that treating vulnerability and adaptive capacity as static and quantifiable is misleading. While effective in evaluating the distinct elements that contribute to adaptive capacity, these approaches overlook the underlying conditions responsible for variability in these measures; political ecologists argue that I must understand adaptive capacity as dynamic and socially structured, and interrogate the processes that produce it (Watts, 2015; Taylor, 2014). To begin to analyze the processes that produce these adaptive capacity measures, it is first necessary to assess the socio-political conditions underlying the variance in these measures; for example, the governmental policies that provide access to financial resources that support adaptive capacity.

Some studies in adaptive capacity have taken important steps toward analyzing these underlying socio-political conditions. Vasquez-Leon et al. (2003), in their investigation of the vulnerability of farmers and ranchers on either side of the US-Mexico border, elucidate the political processes that have made wealthier white ranchers more resilient than small scale Hispanic farmers. Antwi-Agyei et al. (2015), in a study of two districts in Ghana, found that the complex land tenure system constrains the adaptive capacity of women and migrant farmers, and thus recommend specific policy changes that would provide these groups with greater security. And in a study of smallholder farmers in the Indian state of Odisha, Panda et al. (2013) found that access to crop insurance was a particularly effective method of increasing their adaptive capacity. While these studies represent a critical step in evaluating these underlying conditions more directly, with the exception of Vasquez-Leon et al. (2003), they focus primarily on the individual level; in governance network ecosystem management, such analyses are far fewer.

### 2.2 Governance Networks and Ecosystem Management

Governance network theory emerged from political science scholarship in the 1960s, (Klijn and Koppenjan, 2012), and in recent years, this approach has been employed in the

study of ecosystem governance (Fischer et al 2016; Fischer and Jasny, 2017). A governance network managing an ecosystem may include federal, state, local and tribal government, conservation-oriented nonprofit institutions, land trusts, and private landowners. While holding no legal mandate or official authority to manage resources collaboratively, governance networks, which may center on a strong, coherent collaborative unit, or just a loosely connected set of actors, can be understood as a de facto management body of a given ecosystem or landscape.

### 2.3 Adaptive Capacity at the Governance Network Level

Examining adaptive capacity of governance networks involved in ecosystem management has received increasing attention in recent years. Chaffin and colleagues (2014, 2016a, 2016b) conducted a robust examination of water governance in the Klamath Basin, using the adaptive cycle model as an analytical framework to demonstrate the potential emergence of adaptive governance. Petersen and Wellstead (2014) and Abrams et al (2017) examined the way in which ecological crisis can catalyze the emergence of a governance network. Studying the pine beetle epidemic across the western US in the late 20<sup>th</sup> century, they found that emergent governance networks operating between the community and state level contributed both critical capacity to respond to the crisis, and legitimacy in doing so. Fischer and Jasny (2017) examined interactions in a network of organizations involved in wildfire management in Oregon, finding that organizations tended to associate with others holding similar management goals, attitudes towards wildfire, and in similar geographic regions.

Several other studies have presented models to evaluate adaptive capacity in a similar, mid-range spatial scales. Engle and Lemos (2010) present a framework for the analysis of water governance networks in Brazil, Folke et al. (2005) lay a broad groundwork for understanding adaptive capacity in socio-ecological systems, and Gupta et al. (2010), in perhaps the most comprehensive model, present the adaptive capacity wheel, a framework for the analysis of adaptive capacity in institutions. These frameworks largely agree that important indicators at the governance level include information and knowledge, experience and expertise, networks, transparency, trust, commitment, legitimacy, accountability, collaboration, flexibility and leadership (Hill and Engle, 2013). However, none of these models seek to examine the underlying conditions that shape these indicators; instead, they take them as static, measurable features.

Thus, key gaps exist in my understand of adaptive capacity: few studies have evaluated it at the governance network level, and fewer have sought to examine the socio-political conditions that shape it. To address this gap, I conducted a case study analysis of three governance networks in the rural Pacific Northwestern US, each of which had produced a climate adaptation plan. Using an inductive approach, I investigated both the key salient dimensions of adaptive capacity in these regions, and the socio-political conditions underlying these key dimensions of governance network level adaptive capacity. In so doing, this study demonstrates that such an analysis of these underlying conditions allows for a much more deep and robust understanding of adaptive capacity in governance network ecosystem management.

### 3. Study Area and Study Sites

I conducted my study in the Pacific Northwestern US, the region composed of the states of Washington, Oregon, and the far northern part of California. Climate change presents a range of distinct threats to the region's ecosystems. The region's average temperature has risen nearly two degrees Fahrenheit since 1900, and its forests now face increasing risks from wildfire, drought, insect and disease outbreaks, and changing precipitation regimes (Abatzoglou et al., 2014; May et al., 2018). Land in this region is a mosaic of public and private ownership: 30-50% is federal land, 45-60% is privately owned, 3-13% is state owned, and the remainder is held by state, local, and tribal government, depending on the state (US Congressional Research Service, 2020; Washington State Recreation and Conservation Office, 2014; Christensen et al, 2008; Graves, 2016). Cross-boundary ecosystem management in the region is coordinated to varying extents by a few different types of governance networks, including watershed councils and forest collaboratives (Flitcroft et al., 2017; Davis et al., 2017; Habron, 2003).



**Figure 1:** Study area and study sites in the Pacific Northwestern United States

#### 3.1 Study Site Selection

I chose three case study locations on the basis that climate adaptation plans had been developed at least five years ago. In each study site, a set of organizations had developed these adaptation plans in coordination with the Model Forest Policy Program (MFPP), a nonprofit organization devoted to assisting rural communities across the US adapt to the

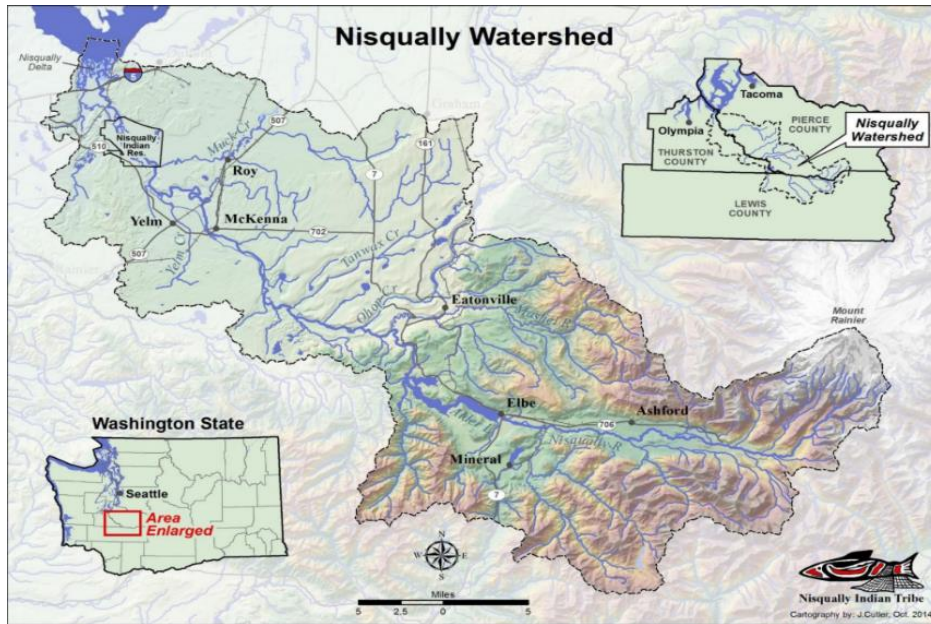


impacts of climate change (Model Forest Policy Program, 2020). These plans provided general background information on the region's climate-related concerns and the potential tools and strategies available to build resilience; they were not empirically analyzed. And as documents written collaboratively by actors in the climate adaptation governance network, they also served as an important jumping-off point for determining relevant potential interviewees.

## 3.2 Study Sites

### 3.2.1 Study Site 1: Nisqually River Watershed, Washington

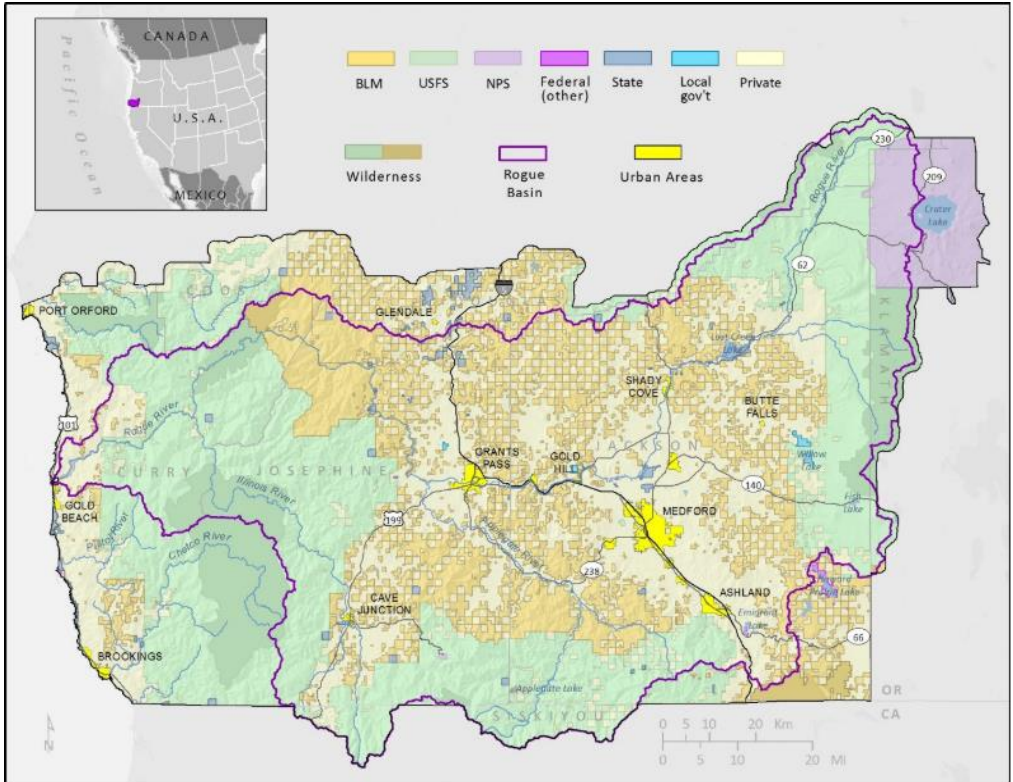
The Nisqually River lies in northwestern Washington State, originating ? on the slopes of Mount Rainier, and emptying into Puget Sound. With its headwaters in a national park, and estuary in a national wildlife refuge, it is one of the most protected rivers in the Pacific Northwest. Land ownership across the remainder of the river corridor is divided between a state forest, land trust, military base, state and local government, private citizens and the Nisqually Tribe. During the mid-20<sup>th</sup> century, the river was the center of a consequential treaty rights battle centering on the Nisqually Tribe's right to fish on the river, which eventually resulted in a federal court decision (the Boldt Decision) allocating the tribes of Puget Sound 50% of the annual salmonid harvest (US vs Washington, 1974; Wilkinson, 2006). This decision set the stage for the statewide Salmon Recovery Program in the mid-2000s and situated the Nisqually Tribe in a central role in resource management. Recognizing the economic and ecological importance of the river, in the mid-1980s, the Washington State legislature created the Nisqually River Council (NRC) and the Nisqually Land Trust to ensure ecologically sound management. The NRC is now made up of stakeholders from federal agencies, state and local government, the Nisqually Tribe, and the land trust, and is regionally renowned for its exceptionally effective collaboration. In 2014, the NRC partnered with the Model Forest Policy Program to create a climate adaptation plan. This plan, the *Forest and Water Climate Adaptation: A Plan for the Nisqually Watershed*, outlines the region's key climate threats, centering on the accelerating shift from a snow-fed to a rain-fed system, leading to declining base-level stream flow and increased water temperature, along with hillside erosion and flash floods (Greene, 2014).



**Figure 2:** Map of the Nisqually Watershed from *Forest and Water Climate Adaptation: A Plan for the Nisqually Watershed*, the climate adaptation plan for the Nisqually Watershed, the writing of which was spearheaded by the Nisqually River Council

### 3.2.2 Study Site 2: Rogue Basin, Oregon

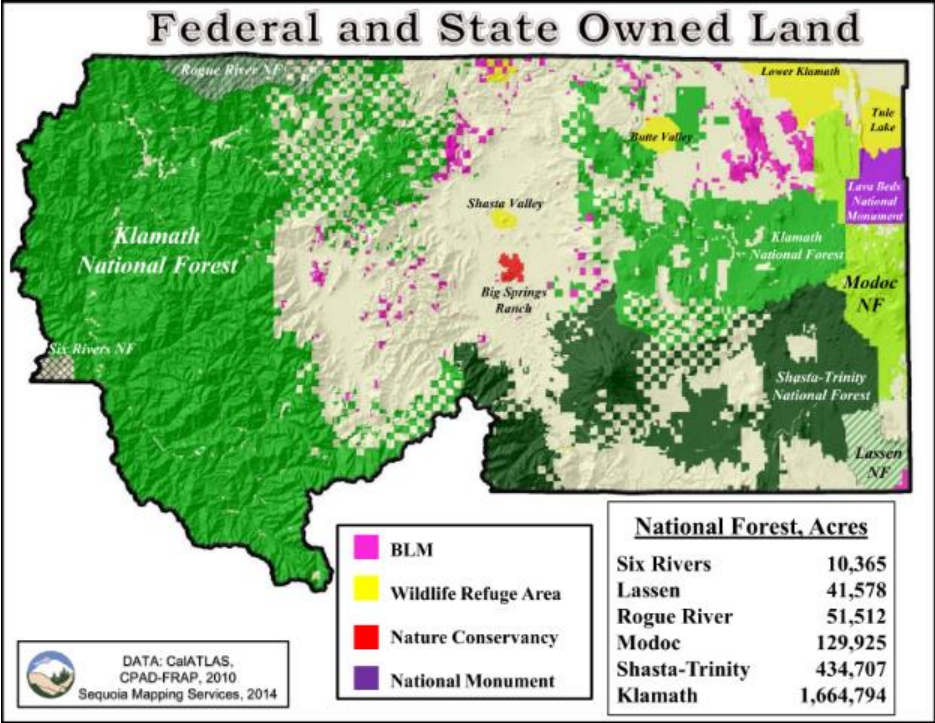
The Rogue Basin encompasses the region between the Klamath Mountains and the Cascades along the Rogue River in Southwest Oregon. It is the ancestral territory of a number of indigenous tribes, whose presence is now limited due to a brutal removal policy implemented in the late 1850s (Lewis, 2014). Over 60% of the total land in the basin is under federal control, and the population is quickly growing, especially along the wildland urban interface (WUI). The remainder of the region is mostly private land (largely industrial timberland), much of which exists in a unique “checkerboard” pattern with federal land, along with some state, county, and local government land. The Southern Oregon Forest Restoration Collaborative (SOFRC), established in 2007, is the governance network that served as the center of the analysis. Though federal, state, nonprofit and industry actors are engaged in SOFRC, collaborative management has faced considerable challenges, centering on divergent approaches to adaptive forest management (Fattig, 2013). SOFRC advocates for active forest management to restore ecosystem function and minimize the risk of uncharacteristically severe wildfires. Another influential local organization, the GEOS Institute, advocates for a more hands-off approach, arguing and that present day “catastrophic” wildfires actually serve an important ecological function (DellaSala and Hanson, 2015), and also suggest that the timber industry exerts undue influence on SOFRC’s work. In 2013, SOFRC collaborated with MFPP to create a regional climate adaptation plan. *The Rogue Basin Action Plan for Resilient Watersheds and Forests in a Changing Climate* outlines several key climate threats, chief among them the threat of catastrophic wildfire, as well as reduced stream flows and increased water temperature, which could devastate both fisheries and the outdoor recreation sector (Myer, 2013).



**Figure 2:** Map of the Rogue Basin from *The Rogue Basin Action Plan for Resilient Watersheds and Forests in a Changing Climate*, the climate adaptation plan for the Rogue Basin, the writing of which was spearheaded by the Southern Oregon Forest Restoration Collaborative

3.3.3 Study Site 3: Siskiyou County, California

Siskiyou County sits along California’s northern border with Oregon, and contains three major watersheds, earning it the nickname of the “faucet” of Northern California. While the county is resource rich, it is struggling economically – though Mount Shasta, an outdoor recreation attraction, supports a considerable tourism industry, much of the county remains poor (Cook, 2014). The county is the ancestral territory of a number of indigenous groups, many of whom still reside in the region, including the Klamath, Karuk, Yurok, and Modoc on the western side, and the Shasta, Winnemem Wintu, Achumawi, and Atsugewi tribes on the eastern side (Cook, 2014). Around 60% of land in the county is national forest, and the remainder is split between private land (largely industrial timberland), county and local government land, and tribal land. Ecosystem management in Siskiyou is defined by a number of conflicts, including strife over the bottling of spring water near Mt. Shasta, and water allotment and management in the Klamath Basin (Little, 2018; Chaffin et al., 2016a). In 2013, the Mount Shasta Bioregional Ecology Center collaborated with MFPP to create a climate adaptation plan, *Renew Siskiyou: A Roadmap to Resiliency*, which identifies two key threats: catastrophic wildfire and water stress (Cook, 2014). Unlike the other two case study regions, Siskiyou County lacks a single overarching collaborative resource management body; thus, the governance network in this region is less defined, but this presents a fruitful contrast to the other case study regions.



**Figure 2:** Map of Siskiyou County from *Renew Siskiyou: Roadmap to Resilience*, the climate adaptation plan for Siskiyou County, the writing of which was led by the Mount Shasta Bioregional Ecology Center.

**Table 1:** Key governance network actors in each case study region. Actors here were either interviewed, or noted by interviewees as central to regional ecosystem management (note: this is not an exhaustive list of entities engaged in ecosystem management in each region; rather, it is a list of those that were particularly relevant to climate adaptation planning processes).

<b>Case Study Region</b>	<b>Collaborative Body</b>	<b>Federal Actors</b>	<b>State Actors</b>	<b>Local Government</b>	<b>Native American Tribes</b>	<b>Nonprofit Organizations</b>	<b>Industry</b>
<b>Nisqually Watershed</b>	Nisqually River Council	Nisqually Wildlife Refuge, Mount Rainier National Park, Joint Base Lewis-McChord	Washington Dept of Fish and Wildlife, Washington Dept of Natural Resources, Puget Sound Partnership	Pierce County, Thurston County, Town of Eatonville, City of Yelm	Nisqually Indian Tribe	Nisqually Land Trust, Nisqually River Foundation	Tacoma Public Utilities
<b>Rogue Basin</b>	Southern Oregon Forest Restoration Collaborative	Rogue River-Siskiyou National Forest, Bureau of Land Management	Oregon Dept of Forestry	City of Ashland, City of Medford	N/A	The Nature Conservancy, GEOS Institute, KS Wild, The Freshwater Trust, Lomakatsi, Southern Oregon Climate Action Now	Southern Oregon Timber Industry Association
<b>Siskiyou County</b>	N/A	Klamath, Six Rivers, and Shasta-Trinity National Forests; NOAA Fisheries	North Coast Water Board, State Dept of Fish and Wildlife	City of Mount Shasta, Siskiyou County	Karuk Tribe	Mount Shasta Bioregional Ecology Center, Siskiyou Land Trust, Scott River Watershed Council, Cal Trout, Klamath River Renewal Corporation	N/A

## 4. Methods

I employed an inductive, cross-case comparison approach to investigate adaptive capacity at the governance network level in three regions of the rural Pacific Northwest. The primary source of data for this study was a set of 50 semi-structured interviews with representatives of ecosystem management organizations that had coalesced around a climate change adaptation plan in each study site. I conducted 16-17 semi-structured interviews in each study site (Table 2). I identified the interviewees through snowball sampling, beginning with a representative of the nonprofit organization responsible for leading the writing the adaptation plan, and then moving out to representatives from other organizations were either actively involved in creating the plan or are otherwise engaged in relevant regional ecosystem management activities. In preparation for these interviews, I read and took detailed notes on each region’s climate adaptation plan, and reviewed court cases, legislation, and other secondary work on the history and ecosystem governance of each region. Interviews were asked for their informed consent to participate in the study, which was designated as exempt by the University of Michigan Institutional Review Board.

**Table 2:** Number and type of stakeholders interviewed by site

Case Study Region	Stakeholder Type							Total
	Non-Profit Organization	Federal Agency	State Gov.	County/Local Gov.	Indigenous Tribe	Industry Representative	Private Citizen	
Nisqually Watershed, WA	5	4	2	3	1	0	2	17
Rogue Basin, OR	7	4	1	3	0	1	0	16
Siskiyou County, CA	8	3	0	3	2	1	0	17

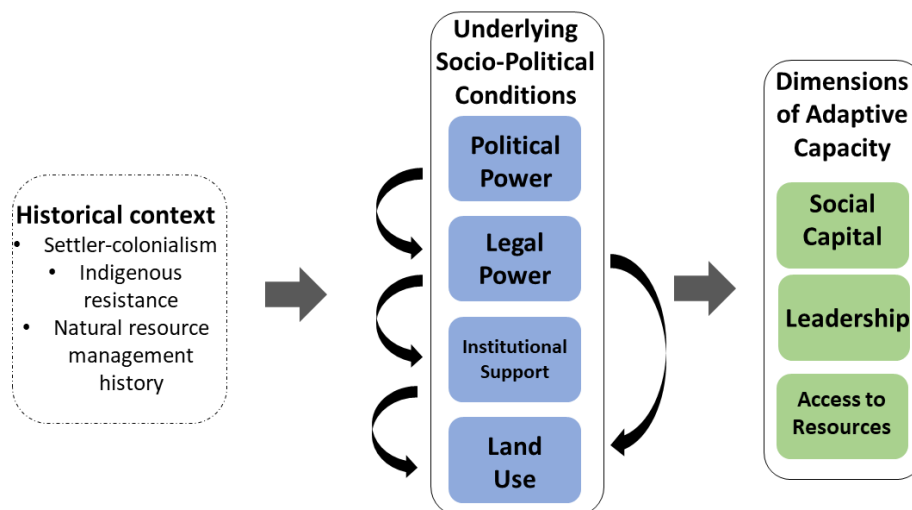
I created an interview guide with common set of questions focused on the process of writing the adaptation plan and its impact, along with the key issues in ecosystem management in the region, and the relationships among actors (Appendix A). I began by asking interviewees about their engagement with the writing of the climate adaptation plan to better understand the process by which the plan came about. I then asked about the impacts of the plan, to assess the degree to which the plan had been implemented along with the unintended, peripheral impacts of the plan. I then moved on to questions that addressed the state of ecosystem management in the region more generally, to better understand the context in which the plan had been written, asking about key projects, collaborations, and conflicts that have defined ecosystem management. The interviews were semi-structured, and thus I allowed conversation to develop organically and shift toward topics that were particularly relevant to each interviewee; conversations almost always wandered significantly from the initial codebook. Almost all interviews were conducted in person, averaging about one hour per interview.

I analyzed the interviews using an inductive approach, following in the tradition of constructivist grounded theory (Charmaz, 2012). Immediately following each interview, I developed analytical memos (Miles et al., 2014), summarizing my initial impressions; I then transcribed interviews verbatim to allow for detailed coding. In my first round of coding, I developed a set of categorical codes to distill the raw interview data into categories relating to each of the questions (Miles et al., 2014). Then, as I proceeded through the first round of coding, I developed an inductive codebook, using grounded theory to create codes to capture the dimensions of adaptive capacity and underlying conditions that emerged as important in each region (Appendix B). I conducted the coding with NVivo 12 data analysis software (QSR International Pty Ltd, 2018). Finally, I developed another set of analytical memos on these codes, to further investigate the importance of each of the conditions in shaping adaptive capacity, and the ways that these conditions interacted and shaped one another in each context.

## 5. Results

### 5.1 Introduction and summary of key findings

In my investigation of adaptive capacity in climate adaptation-focused ecosystem management in each of my study sites, I found evidence that three elements were particularly relevant to the governance networks' adaptive capacity: social capital, leadership, and access to resources (Table 3). I also found evidence for four key underlying socio-political conditions that help explain the variation across these dimensions of adaptive capacity: political power, legal power, the support of higher-level governance institutions, and land protection (Table 4). These conditions are deeply intertwined – for example, proximity to political power served as an important lever by which a governance network could gain the support of state and federal governance institutions. The relationships between the key dimensions of adaptive capacity, the underlying socio-political conditions, and the relevance of historical context is illustrated in Figure 1.



**Figure 1:** The relationship between historical context, underlying socio-political conditions, and dimensions of adaptive capacity.

## 5.2 Dimensions of Adaptive Capacity

### 5.2.1 Social Capital

When asked about the factors contributing to success in implementing adaptation-oriented resource management projects, interviewees consistently described the strong relationships and trust among governance network actors. These social resources that actors draw from when pursuing livelihood strategies are commonly referred to as social capital (Scoones, 1998). The value of social capital was especially clear in the Nisqually River Council, whose success in collaborative resource management work is extensive—according to many interviewees, it has served as a gold standard for watershed councils across the Northwest—and nearly every interviewee attributed much of this success to the exceptionally strong relationships among stakeholders. Interviewees described these relationships very positively, and one, an employee of a state agency, noted that when disagreements did emerge, this trust “made it easier to know where the other person was coming from.” Social capital appeared to be less robust in the Rogue Basin. SOFRC, the region’s collaborative governance body, is relatively young, and it has been engaged in a multi-year conflict with another local organization which holds a sharply divergent view of forest management. According to many stakeholders in the Rogue Basin, the fiery, often public, nature of this conflict has significantly hindered SOFRC’s ability to implement adaptation-oriented forest management. And in Siskiyou County, collaborative work in ecosystem management was far less robust, suggesting that social capital was even less developed. I found no evidence of an overarching collaborative management group comparable to the NRC or SOFRC; ecosystem management in the county is defined by a range of serious conflicts, especially relating to water use. However, some interviewees expressed cautious optimism that emerging collaborative groups such as the Upper Sacramento Water Action Group and the Scott Valley Groundwater Commission were opening doors to a more collaborative future.

### 5.2.2 Leadership

Leadership also emerged as an important dimension of adaptive capacity when informants were asked about the factors that contributed to advancing adaptation-oriented ecosystem management goals. This was most obvious in the Nisqually Watershed, where nearly every interviewee brought up the world-renowned treaty rights activist, Billy Frank Jr. After spearheading the campaign to fully restore the Tribe’s treaty rights during the Nisqually Fish Wars, Frank shifted his focus to collaborative work, becoming deeply involved in the NRC. Interviewees described his work to advance the health of the Nisqually Watershed as incalculable, underscoring his charisma and his impressive ability to balance bullish advocacy with trust-building and compromise—as one long-time NRC member put it, “Frank was a visionary.” Paired with Frank’s singular leadership, interviewees also discussed the central importance of two other instrumental leaders of the NRC. In both the Rogue Basin and Siskiyou County, interviews revealed no singular, influential leaders. In the Rogue Basin, interviewees discussed several individuals that served important roles in collaborative



ecosystem management work, but described most of their progress as the result of collective effort. Several spoke about the difficulty in bridging the gap between the organizations aligned with SOFRC's management agenda and that of the GEOS institute, one interviewee expressing explicitly that a particularly adroit leader may have been able to facilitate more productive dialogue. And in Siskiyou County, there were some sites of conflict in which certain individuals served critical roles in cultivating collaboration—namely, in the removal of dams along the Klamath River. However, in much of the rest of the county, conflicts raged with no end in sight, interviewees identified no individual leaders as able to transcend these conflicts.

### 5.2.3 Access to resources

Access to resources, in the form of both financial capital and staffing capacity, emerged as the third salient dimension of adaptive capacity. In the Nisqually watershed, the NRC was relatively well equipped with both financial resources for conservation, and staffing capacity. It receives a constant stream of state funding, along with some funding from federal agencies and private foundations, and is thus able to support several full-time employees. Several interviewees cited this staffing support in logistical and administrative work as absolutely critical to the NRC's success—“it makes a huge difference,” said one long-time member. The reality in the Rogue Basin and Siskiyou County was quite different. SOFRC was historically volunteer-run, and though now has one employee, one interviewee described it as “kind of a one person show with no infrastructure.” SOFRC has published a complex, coordinated forest management plan aiming to restore the Basin's forests to historical ecological conditions—*The Rogue Basin Strategy* (Metlen et al., 2017)—but funding its implementation has been a considerable challenge. Interviewees expressed frustration that far more funding was available for fire suppression than prevention, and even grant programs like the Collaborative Forest Landscape Restoration Program (CFLRP), which could provide critical seed funding, is limited to Forest Service land. The situation in Siskiyou County was even more stark. Across the county, interviewees lamented the difficulties wrought by lack of both staffing capacity and project funding—as one interviewee put it, “you can't do any conservation work around here and expect to get paid for it.” Several attributed this partially to the region's isolation from major metropolitan areas, noting that funding from Bay Area foundations rarely reached Siskiyou County. One interviewee speculated that this seriously hampered collaborative work: to bring industry to the table, she noted, local conservation organizations needed to demonstrate their influence, which required major grants.

**Table 3:** The three dimensions of adaptive capacity across the three case study regions

Case Study Region	Dimensions of Adaptive Capacity			Adaptive Capacity
	Social Capital	Leadership	Access to Resources	
<b>Nisqually Watershed</b>	<p><i>Well Developed</i></p> <p>The Nisqually River Council, the region’s collaborative resource governance body, has existed for over 30 years, and interviewees reported strong relationships between members and high levels of trust.</p>	<p><i>Strong</i></p> <p>Billy Frank Jr of the Nisqually Tribe, a world-renowned treaty rights activist, was instrumental in bringing about current landscape of collaborative, adaptation-oriented ecosystem management</p>	<p><i>Extensive</i></p> <p>Largely driven by salmon habitat recovery efforts, NRC members, especially the Nisqually Tribe, have access to a considerable amount of funding for adaptation-oriented ecosystem management</p>	<b>Relatively high</b>
<b>Rogue Basin</b>	<p><i>Moderately Developed</i></p> <p>SOFRC, the Rogue Basin’s collaborative body, established in 2007, but its tenure has been tumultuous. Furthermore, effective ecosystem management has been slowed by conflict about the nature of “adaptive” management</p>	<p><i>Weak</i></p> <p>No SOFRC members were described as having nearly the same ability to transcend conflict and unify antagonistic parties around shared goals as Billy Frank Jr.</p>	<p><i>Moderate</i></p> <p>Adaptation-oriented management plans are in need of far more funding than is currently available to be implemented in their entirety. However, several pilot projects have received funding.</p>	<b>Moderate</b>
<b>Siskiyou County</b>	<p><i>Minimal Developed</i></p> <p>There was no evidence of a single, overarching collaborative management body, and conflicts over ecosystem management abound</p>	<p><i>Weak</i></p> <p>While movements such as the Klamath dam removal project have benefited from effective leadership of several key figures, no unifying leaders were cited as particularly influential across the county</p>	<p><i>Limited</i></p> <p>Numerous interviewees engaged in conservation work bemoaned the dearth of funding for conservation projects; very few such positions even exist</p>	<b>Relatively Low</b>

### 5.3 Underlying Socio-political conditions

While these three dimensions of adaptive capacity serve as a useful metric for comparison, this study sought to drill below them, and understand the underlying socio-political conditions that shaped adaptive capacity in governance network ecosystem management. I found that four key underlying socio-political conditions appeared to shape adaptive capacity: political power, legal power, institutional support, and land protection.

#### 5.3.1 Access to Political Power

In all three governance networks, connections to actors wielding political power proved to be centrally important. In the Nisqually Watershed, powerful allies in both state and federal government were instrumental in the NRC's robust success in watershed protection and restoration initiatives. Indeed, the NRC was formed by state legislation, and interviewees identified several state and federal representatives in both parties that had served as long term allies, ensuring that funding for their work remained consistent. Noted one long-time member: "it's not like your usual sort of green coalition...it's definitely homegrown." In the Rogue Basin, interviewees described SOFRC's connections to political power as significant, though not quite as robust. Two state legislators have been champions of both climate change mitigation and wildfire prevention through active management. And at the federal level, senator Ron Wyden secured millions of dollars from the 2009 stimulus package for the Ashland Forest Resiliency Project, which has served as a demonstration project for the *Rogue Basin Strategy* (Metlen et al., 2017). In Siskiyou County, many interviewees expressed a sense of utter isolation from the levers of political power in the same way that they felt isolated from most funding streams. This, some felt, contributed to their inability to effect change in channels besides litigation. One key exception to this phenomenon, however, were the actors engaged in the Klamath River dam removal campaign. While the original agreement failed to secure federal funding, the states of California and Oregon, recognizing the singular importance of this collaborative effort, stepped in and provided the funding (Allen, 2010).

#### 5.3.2 Legal Power

Legal tools proved similarly significant, especially in the Nisqually Watershed, where the success of conservation initiatives has largely been founded upon the unique legal power set out by the Boldt Decision (US vs State of Washington, 1974). "You simply cannot overstate the importance of [the Boldt] decision" said one former employee of Mount Rainier National Park. One of the most sweeping decisions in the history of resource management in the Pacific Northwest, it mandated that 50% of annual catch of the Puget Sound salmonid fisheries be allocated to the indigenous tribes of Washington State, providing Tribes with unprecedented leverage in ecosystem management (US V. Washington, 1974; Brown, 1994). This has proven instrumental in advancing collaborative adaptation-oriented conservation efforts in the Nisqually Watershed, laying the groundwork for the creation of the Salmon Recovery Program, which has provided millions in state and federal funding for habitat restoration efforts. In both the Rogue Basin and Siskiyou County, no such legal framework exists to drive collaborative management. The only powerful legal tools available to conservation organizations are the Endangered Species Act and Environmental Protection

Act, used for challenging management action on federal land. And while anecdotally, the advent of forest collaboratives in Oregon has reduced litigation, collaboration is entirely voluntary. The unity of a collaborative group can be tenuous: as one interviewee described, whenever major relevant legislation emerges at the state or federal level, some collaborative members have “retreated to their corners” because legislative solutions are more efficient, making the collaborative’s work seem like “such a waste of time and energy.”

### 5.3.3. Institutional Support

The value of support from higher-level governing institutions was also quite influential. Such support has been imperative to the success of the NRC, apparent in its very formation: while most watershed councils arise organically, the NRC was formed through state legislative action. This legislation both institutionalized a consistent stream of state funding for the NRC, allowing it to maintain a substantial staff over the past three decades, and also created the Nisqually Land Trust, which has proven critical in supporting conservation work. And as discussed, the Nisqually Tribe is quite uniquely situated: as both a Tribe and the Nisqually Watershed’s lead entity (an official term) for salmon recovery, it has access to several streams of state and federal funding for salmon habitat restoration, which has proven essential for the NRC’s conservation and restoration initiatives. The impact of institutional support is realized nearly as clearly in its absence as its presence. Interviewees in the Rogue Basin noted that under Obama, national forests had climate change coordinators that worked closely with SOFRC; when the Trump administration eliminated these positions, collaborative progress on adaptation work slowed considerably. And in much of Siskiyou County, interviewees reported that adaptation-oriented projects faced serious hurdles presented by risk-averse state agencies, which made it difficult to secure permits for nontraditional projects. As described by one conservation organization, “it’s a huge fight at the state level to get people to understand that giving us one permit at a time and having us fight every year to come in here and maintain these [in-stream structures], it’s a waste of time.” However, as trust is established and the efficacy of such programs is demonstrated, institutional support can be built: after years of cultivating relationships with state agencies, this organization was able to secure California’s first adaptive management permit to install beaver dam analogs, allowing them to bypass some of the onerous re-permitting processes.

### 5.3.4 Extent of protected land

Finally, my study also revealed the importance of land protection and ownership arrangements. Protected land in the Nisqually watershed is robust. The river begins at the Nisqually Glacier on Mount Rainier, and flows out through a mostly undeveloped valley into a national wildlife refuge. Nearly 80% of the main stem of the river is protected, a combination of federal and state protected land, 7,500 acres owned by the Nisqually Land Trust, and 86,000 acres in a military base. This extraordinary level of protection has buffered development, preserving much of the ecosystem function and the resilience of the watershed. One interviewee pointed out the tremendous importance of the wildlife refuge at the mouth of the river specifically: “because there is no Port of Tacoma here, there is no bigfoot...I don’t have the massive players that are in other watersheds, and that makes a difference.”

Neither the Rogue Basin nor Siskiyou County contains nearly as much preserved land. Though in both regions, over 60% of land is federally controlled, this land is entirely in the hands of either the BLM or the Forest Service, and thus subject to harvesting. Though Siskiyou County is home to a land trust, they have far more requests for easements than they have the capacity to handle, and the Rogue Basin lacks a land trust entirely. Further exacerbating this situation in the Rogue Basin is the “checkerboard” land ownership pattern created by the O&C Land Act – a significant portion of the BLM land exists in square mile chunks alternating with private land. Interviewees reported that this makes adaptation-oriented management of this land near impossible, because much of it is almost entirely inaccessible.

#### 5.3.5 Interactions among socio-political conditions

Finally, my findings revealed that political power, legal power, institutional support, and land protection are mutually reinforcing. For example, in the Nisqually Watershed, the Nisqually Land Trust was created in 1987; its creation and sustained support from the state government is an example of both the critical role of proximity to political power and institutional support of higher-level governing entities. This state government support has allowed for the land trust to preserve 7,500 acres of land in the watershed, further increasing the ecosystem’s resilience. In this way, proximity to political power, institutional support, and protected land are inextricably linked in building adaptive capacity. Moreover, attendance to the historical dynamics that produced these conditions can help explain a governance network’s current state (a full accounting of which would require much more detailed case studies). This is illustrated best in the Nisqually watershed: understanding the Nisqually Tribes’ access to ample resources for conservation requires comprehension of their legal power endowed by the Boldt Decision, which necessitates understanding the decades of activism and civil disobedience that eventually forced the issue into the courts.

**Table 4:** The four key socio-political conditions underlying adaptive capacity across the three case study regions

<b>Socio-Political Conditions</b>				
<b>Case Study Region</b>	<b>Political Power:</b> Connections with political actors that would wield their power to support the aims of governance network actors	<b>Legal Power:</b> Access to legal tools useful in advancing adaptation-oriented conservation work	<b>Institutional Support:</b> The institutionalized support of higher-level governance entities	<b>Land Protection:</b> The extent of protected land, and the manner in which it was arranged
<b>Nisqually Watershed</b>	<i>Well Connected</i>  The NRC was born out of political action at the state level, and several current state and federal legislators were cited as champions of their work	<i>Robust Legal Tools</i>  Because of the precedent set by the 1974 Boldt Decision, indigenous tribes in Washington State are legally entitled to 50% of the annual catch of the Puget Sound fisheries. This set the stage for the Nisqually Tribe to have considerable influence in ecosystem management, which they use to advance restoration and conservation goals	<i>Considerable Support</i>  The Nisqually River Council receives a steady stream of state funding for staffing and projects. Furthermore, because of the Boldt Decision, The Nisqually Tribe has strong support of the Northwest Indian Fisheries Commission, and access to significant funding through state and federal salmon recovery initiatives	<i>Highly Protected</i>  Nearly 80% of the mainstem of the Nisqually River is preserved – its headwaters are in a national park, its mouth is in a national wildlife refuge, and much of the rest is protected as other forms of state, federal, and land trust land.
<b>Rogue Basin</b>	<i>Moderately Connected</i>  SOFRC members cite several state legislators as allies, and one senator as a key supporter of adaptation-oriented forest management	<i>Few Legal Tools</i>  No unique legal tools are available to implement adaptive resource management initiatives	<i>Minimal Support</i>  Under the Obama administration, interviewees cited the federal agency climate change coordinators as particularly strong allies of SOFRC’s work. However, many of these positions no longer exist.	<i>Moderately Protected</i>  While 2/3 of the region’s land is in federal ownership, it is mixed-use BLM and USFS land. Furthermore, much of the BLM land is in a “checkerboard” ownership pattern, mixed with private land, making management particularly difficult
<b>Siskiyou County</b>	<i>Isolated</i>  Actors engaged in adaptation-oriented resource management felt very removed from political power; that they had few local, state, or federal political leaders championing their work.	<i>Few Legal Tools</i>  No unique legal tools are available to implement adaptive resource management initiatives	<i>Minimal Support</i>  Support is not robust, but over many years, some organizations have built strong relationships with federal and state agencies, which has eased permitting processes.	<i>Moderately Protected</i>  While around 2/3 of the land is federally owned, it is mixed-used BLM and USFS land

## 6. Discussion

Through qualitative analysis of interviews with key stakeholders, I identified three salient dimensions of the adaptive capacity of governance network level ecosystem management: social capital, leadership, and access to resources. I also identified four key socio-political conditions that contributed to the adaptive capacity of these governance networks: political power, legal power, support of higher-level governing institutions, and the extent of land protection. Each of these conditions played a distinct role in shaping the context in which adaptive capacity emerged: political and legal power played significant roles in the funding available for adaptation efforts; the support of institutions such as state agencies and legislature aided in permitting processes and assured the longevity of collaborative organizations; and land protection arrangements—both protection status and ownership patterns—had a significant influence on actors' ability to plan and implement adaptation-oriented management strategies. This study also revealed that these conditions are densely intertwined, and cannot be understood in isolation, and furthermore, that placing them in their historical context sheds further light on the nature of adaptive capacity at the governance network level.

These findings concerning the three relevant indicators of adaptive capacity—social capital, leadership, and access to resources—are congruent with the literature on adaptive capacity at the governance network level. Governance networks are composed of relationships among actors engaged in ecosystem management; it is thus unsurprising that the strength of these relationships, captured by the concept of social capital, has an influence on adaptive capacity. Several studies have found empirical support for this conclusion (Gutierrez et al., 2010; Fischer and Jasny, 2017). Several studies have demonstrated that leadership is an important dimension of governance network level adaptive capacity as well (Dutra et al., 2015; Clarvis and Engle, 2013; Gutierrez et al., 2011). Finally, resource access is a particularly widely employed indicator of adaptive capacity in this context (E.g. Gupta et al., 2010; Engle, 2012; Eakin et al., 2011). In governance networks, this may include grants available to conservation organizations, the budgets of federal agencies, and funding set aside by local governments and tribes for ecosystem management related work. As described by Gupta et al. (2010), institutions need to be able to generate sufficient financial resources to effect adaptive change.

A small body of literature explicitly examines the socio-political conditions underlying adaptive capacity. Vasquez-Leon et al. (2003) elucidate the structural advantages that have made wealthy, white ranchers more resilient to climatic impacts than Hispanic farmers on either side of the US-Mexico border, and Eakin (2005) describes the ways in which neoliberal policies limit the ability of Mexican smallholder farmers to accumulate resources, and thus circumscribe their adaptive capacity. A few papers have explored some of the specific conditions that I discussed in this paper. For example, Kalikoski et al. (2010) found that declining support of higher-level governance institutions contributed to increased vulnerability of artisanal fishermen in Brazil's Patos Lagoon. This is congruent my core finding that the support of higher-level governing institutions can be instrumental in support a governance network's adaptive capacity. Antwi-Agyei et al. (2015) and Panda et al. (2013)

both assessed the role of land tenure, finding, respectively, that complex land tenure policies and crop insurance played a significant role in shaping the adaptive capacity of smallholder farmers. This, too, matches my findings about the significance of land ownership arrangements. Though all of these studies make rich contributions to the literature on the structural conditions shaping adaptive capacity, they focus mostly on adaptive capacity at the individual level. Thus, this study, in its focus on examining socio-political conditions at the governance level, presents a unique contribution.

Direct analysis of the role of legal and political power in shaping adaptive capacity at the governance network level is only just emerging. Morrison et al (2017) illuminate this lacuna in the literature, arguing that conceptualizations of polycentric governance systems pay too little to the ways in which power dynamics influence climate action. Most existing literature on the subject focuses on the instances in which state actors contribute to a governance network's adaptive capacity by levying taxes and instituting new regulations (Marshall et al., 2013; Fenna, 2012). My work, thus, offers distinct insight on the importance of legal tools that governance network actors have access to, and the value of close relationships with powerful political actors.

This study had several distinct limitations. Though I sought to interview a range of types of stakeholders in each case study region, some were more difficult to secure – interviewing representatives of the timber industry, for example, proved difficult. Thus, interview data is likely not perfectly representative of all actors engaged in ecosystem management. Furthermore, limits to time and resources precluded interviewing all key stakeholders in each region. Nevertheless, I felt that I reached saturation through the interviews I conducted; new themes ceased to emerge with additional interviews before I stopped data collection. Researching the governance network in Siskiyou County presented some unique challenges, likely reflecting the fact that the county level may not have been the most productive unit of analysis for an assessment of a coherent governance network; an analysis of a single watershed within the county could have proven more focused and fruitful<sup>1</sup>. More rigorous preliminary vetting may have resulted in my focusing on one watershed, or choosing a different region altogether. Finally, it is important to note that although in each of these regions, stakeholders contributed to a climate adaptation plan, the networks do not self-identify as climate adaptation governance networks, per se.

This study points towards an urgent research agenda in the study of adaptive capacity at the governance network level: deeper analysis of the historical processes and power dynamics that produce adaptive capacity. This will require pairing key stakeholder interviews with ethnological research methods and a more thorough review of archival materials. While I did not engage in such a robust investigation, this study did begin to demonstrate its potential importance. Through such an anthropological approach, scholars of adaptive capacity can answer the critiques articulated by political ecologists that the study of social

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<sup>1</sup> As noted earlier, I chose the county as my unit of analysis because, as with the other two case study regions, a regional nonprofit, the Mount Shasta Bioregional Ecology Center, had written a climate adaptation plan (*Renew Siskiyou*) with the Model Forest Policy Program.



vulnerability shies away from interrogating “the power relations that produce and reproduce vulnerability over time” (Taylor, 2014: 83).

Adaptive capacity is a dynamic and emergent property of a governance network, shaped not just by current-day socio-political conditions, but by the decades, even centuries, of historical processes that produced these conditions. The comparatively robust adaptive capacity of the Nisqually Watershed represents a useful illustration here. The Nisqually River Council coordinates effective, adaptation-oriented ecosystem management across the watershed with impressive efficacy, and these efforts are driven largely by the Nisqually Tribe, who are widely regarded as exceptional ecosystem stewards. Understanding the workings of the NRC today, though, requires tracking the decades-long history of Nisqually resistance to state laws that violated treaty rights through a coordinated campaign of civil disobedience. This was no polite disagreement, and was not resolved through a collaborative process – it was a fight waged by members of a colonized nation to demand that the settler state grant them their treaty rights. Only once the Boldt Decision reshaped the legal landscape could the tribes of the Puget Sound situate themselves on more equitable footing with government agencies and industry and forge a path toward collaborative governance (Brown, 1994). Thus, many of the factors contributing to adaptive capacity in the watershed today are a result of this campaign, and so understanding adaptive capacity in the Nisqually Watershed requires an interrogation of power: the power of the settler state, and the power of indigenous resistance. The constraints of this study were such that these historical dynamics could not be fully investigated in each case study region; future research could explore this more robustly.

Future research should face head-on the charge laid by political ecologists, and directly examine the power dynamics that produce current-day adaptive capacity. Toward this end of understanding the forces driving vulnerability, two distinct and interrelated historical forces deserve particular attention: capitalist accumulation, and colonialist genocide and dispossession. For the field to pave the way toward a more just world, one in which all communities are equipped to adapt to the impacts of climate change, scholars should critically investigate the forces that produce vulnerability in order to, as Pelling (2012: 171) describes, “tackle the causes of vulnerability at their roots.”

## 7. Conclusion

With this study, I sought to contribute to the understanding of the relevant features of adaptive capacity in governance network level ecosystem management, and the socio-political conditions that shape those features. Through an inductive, case study analysis, I found evidence for three particularly relevant features of adaptive capacity: social capital, access to resources, and leadership. Furthermore, I found evidence that these dimensions of adaptive capacity were shaped considerably by four underlying socio-political conditions: political power, legal power, institutional support, and land protection. In so doing, this study demonstrated the ways in which a robust understanding of adaptive capacity in this context is considerably enhanced by drilling down below traditional indicators of adaptive capacity to investigate the conditions that contribute to these features: it is not by chance that one

governance network may have access to considerably greater financial capital for ecosystem management than others, this variation is historically produced. Future research in adaptive capacity should continue along this trajectory toward in depth, historically situated analyses of the ways in which adaptive capacity is produced, drawing from fields such as political ecology and science and technology studies to critically examine the processes the produce adaptive capacity.

## Appendix A: Interview Guide

Hi, I'm Matt, a master's student from the University of Michigan studying environmental policy and climate change adaptation. I'm interested in how rural communities are planning for climate change, especially those whose social, cultural, and economic life are tightly tied to natural resources. To assess this, I'm looking at a few different adaptation plans that have been written for rural regions in the Northwest, facilitated by the Model Forest Policy Program, and talking with folks involved in writing the plans to better understand the process. Because adaptation is a process that requires the work of all types of landowners and ecosystem management actors, I want to hear from a range of stakeholders – NGOs, federal government agencies, local government, tribes, and industry. I'm interested in how the different types of stakeholders are involved—who has influence, how they interact—along with the relevant legislative and legal context that produced the plan, and lastly, I'm interested in what influence the plan may have had on policy or planning in this region.

I want to learn about what these processes are like for folks like you. Given your position and experience with (agency of institution), I think you'll have unique insight on these questions that will help me understand this

Thanks so much for taking time out of your busy schedule to talk with me!

To start off, I'm interested broadly in your organization's work, and how it fits into ecosystem management in this region

- I've read about your organization, and have a sense for its work, but I'm interested in hearing it in your telling – could you give me the rough sketch of the nature of the work that you do here?

Now I have a few questions about the development and writing of the plan along with the context in which it was written

- What was the impetus for applying for MFPP CSU program?
  - What was going on either in the organization or in the broader context of ecosystem management when you decided to apply?
- What was the initial intended purpose of writing the plan?
- Could you walk me through the process of writing the plan?
  - Who was the driving force behind keeping the plan moving?
  - How were stakeholders engaged?
  - Did goals or priorities shift at all during the course of the writing process?

In the writing process, I'm interested in how priorities are negotiated and set.

- Could you walk me through what you remember of the process of determining the plan's top priorities?

Related to these priorities, the plan identifies the following goals for management:\_\_\_\_\_. In what ways has progress been made toward these ends?

How has your organization changed since this plan was developed? Perhaps in\_\_\_\_

- The composition of the organization?
- The way work gets done?
- The goals?

Now I have a few questions about the broader context of ecosystem management in the context of climate change.

- Does your organization collaborate with other organizations in ecosystem management-related projects?
  - Are these collaborations effective in advancing the goals of your organizations?
  - What factors do you think have either improved such collaboration, or made it more difficult?
- If you were to identify just one or a few actors that are especially important in shaping ecosystem management in this region, who would they be?
- I know that even in collaborative resource management contexts, conflicts are bound to arise. Would you be willing to tell me a bit about the types of conflicts that tend to emerge in this region?
  - When conflicts do arise, what do they tend to be about?
  - Are there particular actors, or allied interest, that tend to instigate conflict, and if so, who are they?
- As I mentioned earlier, I'm also interested in the unique legislative and legal context shaping ecosystem management in this region
  - Are there key pieces of legislation or key events that I should know about that significantly shaped this context?
- During the time that you were writing this plan, what organizations or agencies were your key partners in climate-related resource management? (e.g. organizations that you worked with on a regular basis)

Is there anything relating to climate change adaptation planning or ecosystem managements that I haven't covered?

## Appendix B: Code Book

### AC - deductive

Legitimacy	Indications of social acceptance of decisions and support of stakeholders
Leadership	References to key leaders in conservation/restoration collaborative work
Learning capacity	Institutions or the network as a whole learning and adapting their behaviors accordingly
Representation-participation	Information about the representation and participation of a variety of stakeholder groups
Resources	Access to resources for conservation or restoration related work
Funding-issues	Impediments related to securing funding
Funding-sources	Sources of funding

### AC - inductive

Inst-support	Is there institutional support for a network governing body
Protected land	Land in protection
Legal power	References to legal levers
Political-champions	Elected leaders that support conservation and adaptation work
Trust	Discussion of trust in building collaborative relationships

### Background

climate-concerns	Their key concerns about climate impacts in the region
climate-work	How climate impacts influence their work
legal-leg-context	Information on the legal and legislative context
key-court	Important contextual court cases
key-legislation	Important contextual legislation
key-planning-docs	Other important planning documents (e.g. salmon recovery plan)
main-work	The primary focus of the organization

### Collaborative Management

Challenges	Impediments to effective collaborative management
Collab-work	Examples of successful collaborative work
Conflict	Major conflicts in collab management
Conflict-entities	Entities that are likely to be involved in conflict
Conflict-faultlines	Fault lines and key issues that produce conflict
Function	Information on the basic workings and function of the collaborative body
Influential-entities	Entities within the collaborative management body that are particularly influential
GovNet	Members of governance network

### Plan

Awareness	Do stakeholders know about the plan?
Impact	The direct and indirect impacts that the adaptation plan produced
impact-intended	Direct, intended impacts of plan (broader than individual actions)
impact-peripheral	Indirect impacts of plan (e.g. new collaborations, funding)
impetus	The impetus for writing the plan and contextual conditions
implementation	Information on the process of implementing the adaptation plan
implementation-impediment	Impediments to implementation of actions
implementation-success	Successful implementation of specific actions outlined and reasons for success
process	The process of writing the plan
authors	Any information relating to the authors of the plan
stakeholder-engage	How stakeholders were engaged
Utility	Do stakeholders find the plan useful?

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