

ALL-LANDS MANAGEMENT: CONVENING COMMUNITIES AND THEIR
LANDS AROUND FIRE MANAGEMENT

By

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A Thesis Presented to

The Faculty of Humboldt State University

In Partial Fulfillment of the Requirements for the Degree

Master of Arts in Social Science: Environment and Community

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July 2017

ABSTRACT

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Broadly defined, All-lands Management (ALM) is a land management approach involving collaborative, science-based ecosystem restoration at the landscape scale, across ownership and jurisdictional boundaries. My research investigates collaborative groups working to reduce wildfire risk by applying ALM. Fire risk in the Pacific West (California and Oregon) is increasing in severity and extent due to fire suppression and is exacerbated by the effects of drought, climate change, and expanding residential development. For decades federal, state, and local entities have expressed the need to work collaboratively, across boundaries and ownerships to reintroduce fire back onto the landscape to restore forest resiliency. This research reveals barriers that prevent broader ALM utilization, framing the implementation difficulties as bureaucratic rigidity problems. Ultimately, the goal of my research is to reveal the capacities of the cases this study is based that enable ALM.

I conducted in-depth interviews, participant observation, and document analysis with two case studies: the Western Klamath Restoration Partnership (WGRP) and the Ashland Forest Resiliency Stewardship Project (AFR). The cases demonstrate how ALM is being implemented in different contexts, as well as existing social, economic, and political barriers to its effective implementation. Both cases have employed principles of

the 2010 National Cohesive Wildland Fire Management Strategy – by following these principles both groups aim to shift out of a full suppression model of fire management into a more resilience based model. Both have faced a plethora of challenges, but have problem-solved differently. I explore the ways the two cases developed strategies to enhance their capacities for ALM.

ACKNOWLEDGEMENTS

My deepest gratitude goes to Dr. Erin Kelly for her faith in me to take on this research, as well as her dedication, motivation, and excitement with the topic of fire restoration and forest management. Her passion and the passion of many of the interviewees, who so graciously gave their time to contribute to this study, was infectious. They encouraged me and infused me with their passion. The connection to place and the concern that many have for their home in a fire-adapted environment is a weighty topic. Interviewees shared their abilities with me to remain inspired throughout complicated challenges. They are tasked to think outside the box and systematically better the natural environment while improving social conditions to enhance the quality of community life. It has been an honor to witness their drive to make positive social and environmental change. I thank my committee members for their input and insight into making my thesis something I am truly proud of, as well as to the USFS for its funding contributions. I'm so thankful for the Environment and Community program, all the staff, and my 2014 cohort for their camaraderie and helping me get through such an arduous, but incredible graduate school journey. I'll miss our discussions very much.

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ABBREVIATIONS

AFR: Ashland Forest Resiliency Stewardship Project

ALM: All Lands Management

AMA: Adaptive Management Area

BLM: Bureau of Land Management

CAL FIRE: California Department of Forestry and Fire Protection

DNR: Department of Natural Resources

EPA: Environmental Protection Agency

FAC: Fire Adapted Communities

FSC: Fire Safe Council

FLN: Fire Learning Network

MKWC: Mid Klamath Watershed Council

MSA: Master Stewardship Agreement

NFP: National Fire Plan

NFPA: National Fire Protection Association

NSO: Northern spotted owl

OSB: Orleans-Somes Bar

NGO: Non-governmental organization

S&PF: State and Private Forestry

SRRC: Salmon River Restoration Council

TEK: Traditional Ecological Knowledge

TNC: The Nature Conservancy

TREX: Prescribed Fire Training Exchange

USFS: United States Forest Service

WGRP: Western Klamath Restoration Partnership

WRTC: Watershed Research and Training Center

CHAPTER I. INTRODUCTION

Fire exclusion in mixed conifer, fire-adapted forests of the Pacific West has increased fuel accumulations and wildland fire severity (North et al. 2012). From 2000 to 2015, national fire statistics show a dramatic spike in wildfire acres burned and management costs (NIFC 2015). Forest policy is adjusting to address these problems by shifting from a model of fire suppression that sought to eliminate wildfire to an approach that recognizes wildfire as a natural process and seeks to manage forests for resilience to wildfire. Forests resilient to wildland fire are adapted to perturbation through wildfire and retain their fundamental structure and function (Cumming et al. 2013). A resilience-based approach to management of forest wildfires (hereafter, “resilience model”) attempts to redefine our relationship to wildfire from one of exclusion to one of living with fire and reducing its negative socioeconomic and ecological impacts (USDA 2015).

To achieve a forest resilience model, Tom Vilsack, the Secretary of Agriculture, in 2009 called for a “complete commitment to restoration” by utilizing an “all-lands approach to forest management” (USDA-USFS 2012, p.1). The National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) of 2010, a collaborative effort of local to national professionals, calls for a forest resilience model involving an “all-lands, all hands” approach (USDA and USDOJ 2009, p.1). This requires coordination among different landowner types and jurisdictions (all-hands) to achieve landscape-scale (all-lands) projects – an effective scale which remedies severe fire impacts (Quigley et al. 1996).

In this research, I focus on two groups striving to implement an all-lands approach, termed here “All-lands Management (ALM).” I equally stress the “all-hands,” or multi-owner and collaborative group planning aspect, because all-lands projects require that all jurisdictions work together. ALM is a land management approach involving collaborative, science-based ecosystem restoration at the landscape scale, across ownership and jurisdictional boundaries. Projects employing both “all-hands” and “all-lands” in ALM are the focus of this research to help better understand what is required in a shift to a resilience model.

I illustrate ALM – how groups are organizing for it, how it is implemented on the ground, and the policies and programs that support it –through two case studies, the Ashland Forest Resiliency Stewardship Project (AFR) group of Ashland, OR, and the Western Klamath Restoration Partnership (WKRP) group of Orleans, CA. Both are located in the Klamath-Siskiyou Mountains Ecoregion (Figures 1,2), a region with an exceptionally high rate of biodiversity, maintained in part through frequent fire (Agee 1993; Skinner et al. 2006; ODFW 2006; Briles et al. 2005). These groups both include collaboratives of diverse stakeholders and a mix of land ownership types. However, their strategies for implementing ALM, and the contexts in which they are doing so, differ substantially.

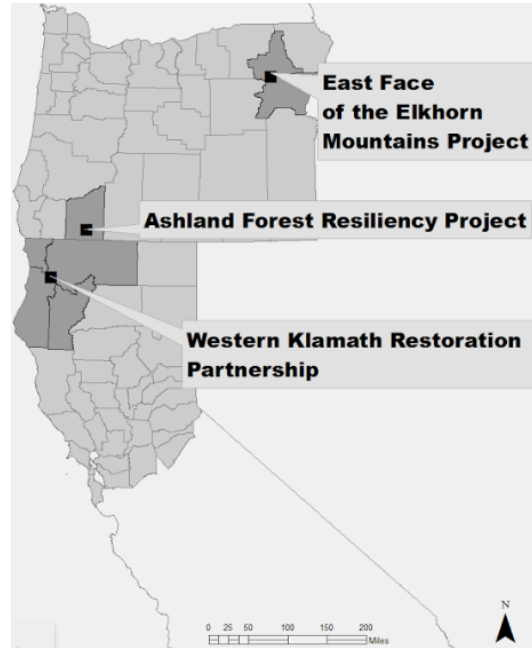


Figure 1. Geographic locations of ALM cases



Figure 2. Klamath-Siskiyou region extent

The stakeholders and policies supporting a forest resilience model are multi-scalar – they operate at local, regional, and national levels. At a national level, policies and programs have been developed to deal with fire threats that allow for federal agencies to work with local groups and to create a framework for the implementation of ALM. At a local level, collaborative capacity is being built to engage with these policies and programs through partnerships composed of Forest Service agency personnel, state and local government actors, tribal members and employees, local and national non-governmental organizations (NGOs), scientific experts, environmental organizations, and private landowners.

Diverse ALM collaborative groups involving multi-scalar organizations (local to national players) seek to engage all landowners to facilitate the shift to a resilience model. This is a type of problem-solving, which Ostrom (1998) termed “polycentric” governance, is characterized by nested, semi-autonomous decision-making units operating at multiple scales. Polycentric structures “can address environmental problems at multiple scales more readily than centralized governance structures” since they encourage different responses to complex problems and can encourage innovation by gathering together diverse individuals and organizations (Cumming et al. 2013, p.1144).

I hypothesize that for large-scale, cross-boundary coordination to endure there must be institutions, programs, and policies supporting it. Successful cross-boundary coordination involving these institutions, programs, and policies are collaborative, representative of all partners, and provide funding to all players. Institutions in the context of ALM refer to the collaborative groups active in forest management and the

rules they follow, that are represented in collaborative groups. Throughout this thesis, I refer to the collection of organizations that make up each collaborative as an ALM group.

The research question guiding this thesis is: How is ALM implemented in fire-adapted landscapes? I provide answers to this question through three objectives: 1) to describe ALM through two cases – how they organize, and engage with policies and programs; 2) to discuss the legal, regulatory, and economic contexts that facilitate and constrain ALM; and 3) to analyze how collaboratives capitalize on opportunities and overcome constraints to implement ALM. I depict ALM as a potential tool in the shift from fire suppression to a resilience model of forest management.

In this research, I characterize ALM as a type of Community-Based Natural Resource Management (CBNRM) because of the federal Cohesive Strategy's call to local stakeholders (organizations and residents) to co-lead ALM; as well as for the critical role local players had in this study. CBNRM may include many actors in addition to local players, for example: state, national, and non-governmental entities (Agrawal and Gibson 1999; Kellert et al. 2000). Because of this I situate this research in the CBNRM body of literature.

I contribute to CBNRM by discussing the implementation of ALM, a new management approach involving coordination of all landowners on mixed ownership landscapes, to work collectively to shift out of full suppression management. CBNRM does not distinctly take place on mixed ownership landscapes whereas ALM does (Cox et al. 2010; Gruber 2010; Blaikie 2006; Armitage 2005). Kellert et al. (2000) explained that CBNRM initially gained attention in the early 1970s to resolve conflicts between state

and local actors. Some conflicts involved centrally controlled conservation projects jeopardizing the long-term sustainability of sensitive areas. Similarly, ALM addresses vulnerability of sensitive areas. However, ALM contrasts with CBNRM in formalizing the decentralized management approach that brings all stakeholders together. Also, very few studies have examined collaborative and cooperative wildland fire management - another contribution of this research (McCaffrey et al. 2015).

This research reveals how policies and programs provide a framework for ALM as they are utilized by ALM groups in two case studies. In Chapter 2, I situate this research in the literature and provide context for changing fire policies. I discuss the ecological and budgetary crises of contemporary fire management facing policy and decision makers. In Chapter 3, I detail the research methods employed. Chapter 4 explains how two ALM cases utilize programs and policies differently. Lastly, Chapter 5 highlights the differing capacities and challenges of ALM groups in each case working to shift out of full suppression management.

There were several major themes revealed by the ALM case studies in this research. First, the ability of local-level organizations to partner with regional and national groups builds capacity for ALM. Second, stakeholders on all levels must share in decision-making. Last, ALM groups must be formally organized in order to jointly plan and coordinate among landowners in a given project.

CHAPTER II. LITERATURE REVIEW

The Changing Policies of Fire Management

In this section I provide fire policy and forest management context for federal lands of the United States and why managers are trying to shift out of pure fire suppression. Fire management approaches can be roughly divided into two camps: the suppression model, and the resilience model – which only partly consists of suppression. The dominant model, fire suppression, largely preceded the landmark 1995 Federal Wildland Fire Management Policy. This 1995 policy was the first national policy to acknowledge the need to shift away from full suppression and included the involvement of private landowners to achieve it.

The 1995 policy called for “landscape-level resource management and implementation ... and the involvement of all affected landowners and stakeholders” (NIFC 2001, p.1). Subsequently, in 2000 the Secretaries of the Departments of Agriculture and Interior were tasked with producing a report recommending how to: address severe, ongoing fire activity; reduce impacts of fire to rural communities and the environment; and ensure sufficient firefighting resources in the future. The report became the cornerstone of the National Fire Plan (NFP), and a major feature was interagency collaboration and coordination involving both federal and non-federal entities “to further develop a coordinated strategy addressing the threats posed by wildland fire” (DOI & USDA 2007, p.1).

The main tenets of the NFP were “a commitment to help protect communities, natural resources, and most importantly, the lives of firefighters and the public. This commitment is [still] shared among federal agencies, states, local governments, tribes, and other partners” (DOI & USDA 2007, p.1). The NFP signaled agency commitment to a forest resilience model and a shift away from full fire suppression; it has since been updated and was the precursor to the 2010 Cohesive Strategy. However, there remain significant challenges in making this shift (Stephens and Ruth 2005; North et al. 2012).

As part of the shift toward a resilience model, recent fire management policies and programs have encouraged landowners and managers to work across ownership boundaries to implement ALM. Some of these programs include the Collaborative Forest Landscape Restoration Program, Two Chiefs Joint Restoration Partnership, Firewise, and the Fire Learning Network. These programs have created capacities for managers to creatively adapt to threats and opportunities that current wildfire trends impose (Oregon 2015; Harling and Tripp 2014; Butler and Goldstein 2010; Cumming et al. 2013).

The dominant model: suppression

Though Native American people in the American West used fire as a primary management tool for 11,000 years, it was replaced by the suppression model (Sugihara and Barbour 2006). Suppression shaped forest-fire management starting in the 1880s in the United States during the European settlement era (Sugihara and Barbour 2006). In the 1890s fire was claimed to be “the enemy of the American forests” and this perspective began to dominate policy (Kosek 2006, p. 203). After five million acres burned in the

West in 1910, killing more than eighty people, suppression mandates intensified (Kosek 2006; Sugihara and Barbour 2006).

A U.S. Forest Service (USFS) study in the 1920s framed Native American burning as harmful to the primary value of national forests, which was timber production (Show and Kotok 1924). This and similar studies resulted in the Clarke-McNary Act of 1924, which effectively created a nationwide public land fire suppression policy (Stephens and Ruth 2005). Further reinforcement of suppression occurred in the 1940s when the Wartime Advertising Council launched the iconic Smokey the Bear campaign (Kosek 2006).

Fire suppression would dominate funding and management priorities for decades, though there was a slowly growing counter view that the cumulative impacts of fire suppression were linked to overall ecosystem decline in fire-adapted forests (Agee 1993). Over a century of fire suppression, logging, and road construction in western fire-adapted forests resulted in increased stand density, decreased overall tree size, and increased fuel loads - increasing vulnerability of forests to uncharacteristically high disturbance levels particularly from fire, insects, and disease (Stephens et al. 2009; Collins et al. 2011; Allen et al. 2005; Churchill et al. 2012). This resulted in high suppression costs and negative impacts to communities and forests (Everett and Fuller 2011; Stephens and Ruth 2005; Hessburg et al. 2005).

The turn toward the resilience model

A resilience model approach to forest and fire management has emerged. Authors Walker and Salt (2006) discuss the roots of resilience, and explain that it is “an entirely

new way of thinking about the management of our environment” (p. iv). They cite the growing dissatisfaction, worldwide, with the ways in which natural resources are managed where vulnerabilities to ecosystems and human communities have resulted (e.g. loss of wetlands, increasing floods, worsening water quality and fire events, resource depletion, etc.). Commonly termed, “Resilience thinking”, this model contrasts to the dominant management paradigm of command and control in which ecological systems are manipulated primarily for human use and benefit. Instead, resilience thinking acknowledges the dynamic and changing nature of ecosystems, and systems (social, ecological) in general, and proposes adaptive practices that work with systems rather than against them.

In the context of forest and fire management, a resilience model asserts that management which includes fire, like mechanical fuel reduction and prescribed-fire treatments applied together, as well as managed wildfire, can help re-establish forest health (Stephens et al. 2009; Churchill et al. 2012; Quigley et al. 1996). Studies define resilient forests as resembling reference stands, which retain pre-settlement era conditions. These conditions are characterized by uneven-aged forests of varying densities mixed with clearings and meadows that persisted for centuries due to frequent fire. These patterns can provide resiliency, as the forests historically burned at low or mixed severity, reducing fuel accumulations and ladder fuels and discouraging crown fires (Skinner et al. 2006; Taylor and Skinner 2003; Agee 1993). Shifting to a resilience model requires dramatic changes not only in stand treatments, but also environmental governance by calling upon all managers and landowners to coordinate strategies.

In 2002, President Bush announced his Healthy Forests Initiative to implement core components of the NFP to reduce adverse human and environmental impacts of wildland fire. These efforts led to the 2003 Healthy Forests Restoration Act (HFRA), which in part worked to streamline the lengthy National Environmental Policy Act (NEPA) review processes. It also mandated agencies to include the public in fuels reduction projects by holding public meetings during their preparation (USFS-DOI 2004). Additionally, the use of community wildfire protection plans (CWPPs) was mandated in the HFRA, though the idea of CWPPs was first proposed and implemented by communities active in fire management to better provide safety and protection to area residents (Shaffer et al. 2002; Abrams et al. 2015). CWPPs “provide a seamless guide for fuel reduction across ownerships, identifying those treatments to be completed by public agencies and those to be completed by private landowners” (USFS and USDOJ 2004, p.1). CWPPs are an important tool for local stakeholder involvement and for groups engaging with ALM (McCaffrey et al. 2015).

Since the creation of these policies in the early 2000s scholars have reviewed whether they accomplish the goal of creating a more efficient and effective fire management program. Conclusions are mixed. Progress toward policy goals has been slower than anticipated while fire suppression and fuel reduction projects have been prioritized over restoration and community assistance – which more often engage local stakeholders (McCaffrey et al. 2015; Stephens and Ruth 2005). Private landowners have reported difficulties in partnering with federal entities because of lengthy planning processes (e.g. NEPA) when they prefer to take more timely actions toward risk

reduction (Bergmann and Bliss 2004). Meanwhile CWPPs have been effective in engaging partners (McCaffrey et al. 2013).

Stephens and Ruth (2005) discuss that despite the multiple legislative and administrative efforts in support of fuel reduction and restoration, there is a need for comprehensive policy. They call for policy to define key decisions in setting priorities, and that this should be made collaboratively at local levels. An outcome of the NFP was the formation of the Wildland Fire Leadership Council (WFLC). The Council is an intergovernmental committee dedicated to the implementation of wildland fire policy and goals, and is comprised of federal, state, tribal, county, and municipal government officials (DOI & USDA 2007). WFLC was at the helm of the 2010 Cohesive Strategy which aims to develop a collaborative structure for coordinated fire management that is inclusive of state and local governments as full partners in planning and decision making (DOI & USDA 2010). This partly answers the call by Stephens and Ruth for a comprehensive and inclusive fire management policy.

Implementing resilience through collaboration

The Cohesive Strategy policy encourages all-hands, all-lands fire management by strategically pushing diverse stakeholders on all levels to work collaboratively across all landscapes to make progress toward three goals. The three goals are: “1) resilient landscapes, 2) fire adapted communities, and 3) safe and effective wildfire response” (USDA and USDOJ 2009, p.1). Rather than purely suppress fire, the Cohesive Strategy emphasizes “liv[ing] with wildland fire” (USDA and USDOJ 2009, p. 1). National

programs have been developed to align with principles of the Cohesive Strategy and gather diverse stakeholders to make the shift to a new model of forest management.

Federal agencies and legislators developed funding mechanisms to enable Cohesive Strategy implementation, including the Collaborative Forest Landscape Restoration Program (CFLRP) of 2009 and the Joint Chiefs Landscape Restoration Partnership of 2014 (Joint Chiefs). CFLRP is administered by the U.S. Forest Service (USFS) while Joint Chiefs is administered by both the USFS and the Natural Resources Conservation Service (NRCS). The two cases in this research have engaged with the Joint Chiefs program, which funds fire restoration work on public and private lands in mixed-ownership landscapes. Joint Chiefs works to “improve the health of forests where public and private lands meet” (USDA and NRCS 2016, p.1).

The rigidity trap: despite resilience policies, suppression persists

In 2007 after five years of NFP implementation, a report from the Departments of Interior and Agriculture claimed significant progress was made by fire management agencies in creating effective fire protection while also adhering to commitments of collaboration with diverse stakeholders. However, the report showed that fire suppression continued to dominate management practices with 70% of treated lands receiving suppression while only 30% received restoration including fuel reduction (DOI & USDA 2007). Suppression management is deeply rooted in national forest management due to its 100-year (+) practice, and this protocol is similarly entrenched in public fire service agencies tasked with wildfire response.

The old suppression model is a form of crisis management, or emergency response-based model. Butler and Goldstein (2010) argue that bureaucratic institutions like the USFS are “caught in the rigidity trap” regarding crises such as wildfires (p.2). The authors argue that fire suppression is reinforced by agencies through “incentive structures, agency budgets, and professional practice” and as a result is resistant to novelty and innovation (p. 1). In addition, wildland fire management has pushed the USFS into a budget and management crisis due to the rising costs of fire suppression (USDA 2015). Crises can also reinforce financial and/or political support for the status quo as people implement what has worked previously and what they are already trained to do (Yaffee 1996; North et al. 2012; McCaffrey et al. 2015; Stephens and Ruth 2005).

According to the U.S. Dept. of Agriculture (USDA), the USFS now dedicates 52% of its total annual budget to managing fire, this is up from 16% in 1995, and is projected to increase to 65% by 2025 (USDA - USFS 2015). A 2015 report on the rising cost of wildfire states the USFS agency is “at a tipping point”, the trend of increasing costs “presents a significant threat to the viability of all other services that support our national forests” (USDA-USFS 2015, p. 3). Large management challenges face national forests like climate change, pushing the USFS towards this tipping point. Longer fire seasons by 78(+) days compared to 1970(s) fire seasons, as well as the increasing numbers of people moving into wildfire prone areas are both compounding challenges and driving up the cost of fire management (USDA - USFS 2015). Rising suppression costs due to longer fire seasons, degraded forest conditions, and fire protection services all complicate funding for restoration particularly through a process called “fire transfers”

(USDA - USFS 2015, p.3). Fire transfers are problematic as they redirect USFS monies away from programs like restoration and others to firefighting.

Bureaucratic rigidity impacts shifting to a resilience model in both planning and implementation. Cumming et al. (2013) evaluated landscape ecological studies with the aim of enhancing landscape resilience and found that flexibility of institutions in planning and implementation is of central importance. However, researchers have found that federal land management agencies often operate under rigid bureaucratic structures lacking specialized personnel to conduct prescribed fire and other activities, and put fire managers at risk of personal liability if, for example, a prescribed fire escapes (McCaffrey et al. 2015; North et al. 2012).

Policy-related factors reinforcing rigidity include complex planning requirements such as NEPA, and agency protocol that incentivizes personnel to leave one national forest for another in order to receive promotions (Wondolleck and Yaffee 2000; Stephens and Ruth 2005). Agency members that leave, instead of staying and investing in a long-term collaborative process such as ALM, may strain and disrupt the shift to a resilience model. Time and personnel investment builds trust among members of a group (Cortner and Moote 1999; McDermott et al. 1999). Researchers find building relationships and trust requires long-term dedication and time investment, and will not work with frequent changes in staffing (Davis and Moseley 2012).

On the other hand, NEPA introduces different rigidity challenges. The policy mandates a lengthy environmental review process of federal entities to look carefully at environmental conditions of a project area, and the potential impacts of intended actions.

Professionals have referred to NEPA as a “necessary evil”, which requires lengthy timelines and extensive planning (USFS agency member, interview 16). When groups involve private landowners that make up part of the mixed-ownership landscape, NEPA can present conflicting timeline priorities since non-federal jurisdictions are not required to follow NEPA. They do follow other state and local guidelines which do not have the complexity of NEPA.

Researchers have analyzed “the crux of the problem” in creating resilient landscapes and found that developing fire management, multi-scalar institutions (governmental and non-governmental groups across all scales) that act flexibly and proactively, and that can learn and adapt with discovery of new information to be critical (Butler and Goldstein 2010; Yaffee 1996; North et al. 2012; Cumming et al. 2013). This opposes traditional planning and management methods led by agencies that are centralized and operate from the top-down, rather than collaborative partnerships, which are expansive, inclusive of diverse viewpoints, and more flexible. Yaffee (1996) characterized collaborative decision-making as developing “problem solving approaches that are interagency, multiparty, and interdisciplinary” (p.725).

Collaboratives: Learning from Success in Local Places

Community-based natural resource management (CBNRM) is a collaborative, co-management form of governance that forms around unique geographic and cultural places and comprises “local, place-based projects, programs, and policies that have the goal of advancing healthy environments and human communities” (Lurie and Hibbard

2008, p. 430). Under CBNRM, centralized governmental authority is devolved to more local levels and NGOs (Brosius et al. 1998). CBNRM contrasts with the historically dominant American environmental management paradigm, which has followed a centralized, top-down method to environmental problem solving (Kusel and Baker 2003). Instead, CBNRM takes a bottom-up, locally-based approach shown to be more successful as projects incorporate time- and place-specific knowledge of residents and local organizations (Agrawal and Gibson 1999; Kellert et al. 2000; Blaikie 2006).

Lurie and Hibbard (2008) find local, place-based projects reveal on-the-ground resource management problems of a place and act as a central, organizing principle. CBNRM projects can focus land managers and promote solutions that may be more broadly applied, overcoming barriers. ALM groups have built upon the lessons of CBNRM by encompassing cross-boundary, landscape level, forest resilience planning and implementation. Additionally, CBNRM is commonly discussed as taking place in the broader context with regional and national partners, but ALM formalizes this multi-scalar partnership structure (Agrawal and Gibson 1999; Gruber 2010; Armitage 2005). ALM formalizes a multi-scalar partnership structure because of its multi-jurisdictional nature and its goal to engage local stakeholders in national programs with federal and national partners.

CBNRM is the notion that “communities should, and could, satisfactorily manage their own resources according to their local custom, knowledge and technologies” (Blaikie 2006). In a study comprising twenty-four cases of CBNRM, Gruber (2010) noted that the model “support[ed] long-term management through broad participation of

community members and resource users in decision making” – a concern of fire managers who understand that ALM and restoring forest resiliency requires long-term considerations (p.53). Armitage (2005) adds that CBNRM may incorporate local institutions, cultural practices, and knowledge systems into management and regulatory decision-making processes. In addition to incorporating local managers and their institutions, integrating local knowledge about natural systems can benefit partnerships and aid in problem solving. This asset can be understood through cultural capital – which refers to the ways human societies have dealt with, adapted to, and modified their natural environment over time (Berkes and Folke 1992).

Key insights CBNRM offers to ALM

CBNRM has continually evolved as communities learn lessons from each other about: efficient and fair resource use; the integration of different types of knowledge; and, the effective participation of diverse stakeholders in land management processes (Blaikie 2006). Successful CBNRM projects that provide lessons to ALM groups, have tended to have: 1) social, cultural, human, and financial capital; 2) shared decision-making among partners with a particular focus on local groups engaged in this process; and 3) information sharing among stakeholders (Blaikie 2006; Agrawal and Gibson 1999; Cox et al. 2010; Gruber 2010; Armitage 2005; Lurie and Hibbard 2008; Kellert et al. 2000).

The community capitals framework (Flora and Flora 2008) analyzes how resources held within a community may be invested to create new resources. Flora and Flora (2008) identified seven types of capital – natural, cultural, human, social, political,

financial and built, each of which has implications for ALM. Lurie and Hibbard (2008) found that as the geographic scale of projects and plans increase (i.e. landscape scale), so too does the need for networking capacity or social capital, which helps to address barriers such as limited financial resources, time, and staff. Social capital describes the expectations of reciprocity and networks of support that develop among members of a group, or between groups, that help to build capacity (Putnam 1995, Woolcock 1998). Social capital in resource management contributes to alleviating distrust, encouraging broader public participation, and increasing ability to obtain grants (Lurie and Hibbard 2008; Wagner and Fernandez-Gimenez 2008).

Human, cultural, and financial capital along with social capital, all help explain how resources, knowledge, and skill contribute to progress a group engaged in locally based, bottom-up resource management (Flora and Flora 2008). McDermott (1999) found that collaboration and building social networks across management scales (local to national) facilitates information sharing, identification of knowledge gaps and learning, mobilization of political support, and recruitment of human capital in the form of professional expertise. Human capital – the skills and expertise individuals bring to a partnership enhance capacities of a group (e.g. facilitation, technical knowledge (Berkes and Folke 1992; Becker 1994; Gruber 2010).

Cultural capital is understood as local knowledge about natural systems developed from the ways human societies have dealt with, adapted to, and modified their natural environment over time (Berkes and Folke 1992). As Flora and Flora define it, “cultural capital can be thought of as the filter through which people live their lives, the daily or

seasonal rituals they observe and the way they regard the world around them” (2008, p. 18).

Last, financial capital refers to having the financial means or having access to the financial means to plan and implement projects, a key factor in expensive restoration projects.

CBNRM groups in the Pacific West

CBNRM in the Pacific West arose during the timber wars in the early 1990s as a response to conflict between the timber industry and environmentalists (KenCairn 1995; Moseley 2000). Situated within forest-dependent communities, stakeholders sought to resolve conflicts that addressed both industry and environmental issues, and to resolve mistrust between local communities and federal land management agencies (Snow 2001; Weber 2000; Gruber 2010). The Applegate Partnership and the Watershed Research and Training Center were early examples of CBNRM in the Klamath-Siskiyou region (KenCairn 1995; Weber 2000; Middleton and Baker 2002).

The Applegate Partnership has created (with their social network of partners) innovative approaches to forest management practices involving prescribed burning, low impact timber harvesting, and selective cutting (Stankey et al. 2006). The Watershed Research and Training Center (with their social network of partners) has developed and applied similar forest practices but additionally worked to develop a restoration-based workforce along with economic markets based on restoration by-products (Stankey et al. 2006; Magyar 2013). Both groups have fostered an environment of collaboration, and networks of stakeholders (on local to national levels) to deal with fire management

conflicts (KenCairn 1995; Koontz et al. 2004; Moseley 2000; Middleton and Baker 2002).

In the early 1990s both the Applegate Partnership and Watershed Research and Training Center (WRTC) worked to overcome challenges of: disagreements on forest practices, collaboration despite differing opinions, a downsizing timber industry, and forest worker unemployment. They did this by spearheading collaborative partnerships with federal agencies and the forest industry, building understandings of the USFS agency bureaucracy to enhance local capacities to partner on this level, employing local skills and expertise of key players to co-lead projects and reach agreements, and garnering public support for their objectives (Jakes et al. 2007; USDA and USFS 2002). The Applegate Partnership and WRTC organizations laid the foundation for and built-up social capital that the ALM groups in this study have benefited from.

Challenges of Collaborations

This section highlights common challenges of CBNRM and cross-boundary cooperation and their relevance to ALM. Lurie and Hibbard (2008) explained that proponents of CBNRM have worked to advance both the ecological and socioeconomic objectives of forest communities, but Kellert et al. (2000) found that “achieving the goals of CBNRM has been complicated and organizationally challenging” (p.707). A main tenet of CBNRM is decentralization of decision making to shared decision-making among diverse partners, including local stakeholders, however this has proved particularly challenging (Blaikie 2006).

Agrawal and Gibson (1999) found there must be a focus on the multiple interests and actors within communities that constitute a diverse partnership, and that these must be incorporated to achieve shared decision-making. Increasingly, NGOs (e.g. The Nature Conservancy), have partnered to broaden the capacities of local groups - facilitating collaboration and coordination of projects inclusive of these partners' aims (Kittredge 2005; Fernandez-Gimenez et al. 2004; Snow 2001; Brosius et al. 1998).

Kittredge (2005) found that few collaboratives develop in the absence of federal agencies and their programs, and at the same time, their participation brings bureaucratic challenges, including long planning timelines, inflexibility, a culture focused on risk aversion rather than project priorities, and a lack of incentives for innovation (see also McDermott et al. 1999). Agency culture also brings high employee turnover requiring regular training of new personnel on existing projects, frustrating collaborators and straining relationships; inconsistent budget allocations; and complex management plan requirements (Fernandez-Gimenez et al. 2004). Another significant challenge for stakeholders may be to overcome mistrust and suspicion of government partners due to negative, past experiences (Bergmann and Bliss 2004).

Lastly, Bergmann and Bliss (2004) state that real and perceived power inequities can impact collaborative fire management among different land ownerships. They argue that collaboration relies on trusting relationships where decision-making processes are equally shared between private and public landowners, but note how rare this is, particularly at ecologically meaningful scales.

CHAPTER III. RESEARCH METHODS

In this chapter, I explain how I addressed my research questions through developing case studies and conducting semi-structured interviews, participant observation, and document analysis.

A Comparative Case Study

Yin states “A case study is an empirical inquiry that investigates a contemporary phenomenon within a real-life context” (2014, p.16). Case studies allow researchers to understand the how and why of contemporary events, and the problems and situations of those events (Yin 2008). Yin explains “case studies contribute knowledge of individual, organizational, social, and political phenomena; they allow an investigation to gain the holistic and meaningful characteristics of real-life events” (2014, p.4). This research approach is designed to “illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result” (Yin 2014, p.15).

Comparative case studies can reveal patterns of commonality and difference from one case to another (Fox-Wolfgramm 1997). Evidence gathered from multiple cases is often considered more compelling, and the overall study more robust (Yin 2014). Comparative case studies capture the interplay of what is going on in more than one organization over time (i.e. ALM group). This methodology may illuminate barriers and problem-solving techniques of organizations, and reveal complex mechanisms responsible for the similarities and differences occurring across organizations.

I analyzed two cases in this research: the Ashland Forest Resiliency (AFR) Stewardship Project group and the Western Klamath Restoration Partnership (WGRP) group. The WGRP and AFR groups were selected for their comparative differences (Table 1). These cases were developed to answer the guiding research question: How is ALM implemented in fire-adapted landscapes? I did this by documenting: 1) how groups organize, and engage with policies and programs; 2) the legal, regulatory, and economic environments of ALM collaboratives; and 3) how collaboratives implement ALM restoration goals despite limitations.

Table 1. Primary differences between ALM cases

Attributes	AFR	WGRP
State of origin	Oregon	California
Planning area	22,000 acres	1.2 million acres
Project jurisdiction	Rogue River-Siskiyou National Forest, City of Ashland	Klamath National Forest & Six Rivers National Forest, Karuk ancestral territory, private nonindustrial forest owners
Community setting	Semi-urban	Remote, rural
Group timeline	Older – est. 2004	Younger- est. 2013
Group makeup	4 Primary partners	Multi-organizational led collaborative

The Ashland Forest Resiliency Stewardship Project, AFR

The AFR group coordinates a project taking place in the Ashland Creek Watershed and is based in Ashland, Oregon. The group is a collaborative partnership

among the USFS, the City of Ashland, Lomakatsi Restoration Project, and The Nature Conservancy. These partners aim to reduce the risk of severe wildfire in the watershed, which provides Ashland's water supply, through a series of actions. Table 2 outlines the values and strategies forming the basis of this work. The group has collaborated with local organizations and landowners, interested citizens, and faculty and students at Southern Oregon University. In 2004, the community-based Ashland Watershed Steward Alliance group submitted a Community Alternative to a USFS proposed plan for managing national forest lands for fire resilience. Notably, the Community Alternative was largely integrated into USFS planning, and is indicative of the long-term, supportive environment of collaboration characterizing this region.

Table 2. AFR watershed values and strategies to accomplish project work.

Watershed Values	
• Human life and property	• Older forests
• Abundant, clean drinking water	• Wildlife habitat
• Ecological sustainability	
Strategies	
• Thinning smaller trees	• Saving the largest trees
• Preserving habitat for wildlife dependent on older forests	• Preserving stream side habitat thereby ensuring water quality
• Protecting unstable slopes and erodible soils	

The AFR was selected for this research because it meets criteria for an ALM group and has implemented fire restoration activities. Also, it is in an area rich with a collaborative land management history offering important lessons.

The Western Klamath Restoration Partnership, WKRP

The WKRP is a larger scale effort than AFR and is located in California, providing a state-state comparison between California and Oregon. The geographic setting of the WKRP differs greatly from the AFR (Table 1). The WKRP group includes the: Karuk Tribe, Mid-Klamath Watershed Council, Salmon River Restoration Council, Happy Camp Fire Safe Council, Six Rivers National Forest, Klamath National Forest, and The Nature Conservancy (TNC). Additionally, the WKRP draws on broad local, regional, and national organizational network for information and resources. The 1.2 million acre planning area was established in 2013 encompassing the Karuk tribal ancestral territory. Implementation of work has largely occurred through the Prescribed Fire Training Exchange program led by TNC, and a large-scale pilot project is slated to begin in spring, 2017 to treat 6,500 acres.

The WKRP has developed landscape scale strategies for restoration (Table 3). A defining feature motivating the group is their high fire frequency and a sense of urgency among land managers who want to see fire resilient forests and surrounding communities protected. It is estimated that \$450 million has been spent in this area on fire suppression during 10 fire seasons from 2000-2015 (Harling 2015).

Table 3. WKRP landscape scale restoration strategies from fire history map targeting high risk areas.

Landscape scale strategies	
Creating defensible space around structures and critical infrastructure.	Safe and reliable access and egress routes on existing road network.
Safeguard public/private boundaries through fuelbreak systems.	Fuelbreaks constructed along existing firelines, ridges, trails to establish “fireshed” or wildfire containment area.
Maintain existing fuels treatments on public/private lands for effectiveness.	Targeted fuel treatments for cultural and ecological purposes to adhere to tribal practices utilizing fire as a tool.

Methods: Data Collection and Analysis

I conducted a total of 57 semi-structured interviews with collaborative partners, group associates, and local residents of the two cases from May to August 2015. Semi-structured interviews involved an interview guide with listed questions to increase the likelihood that all topics would be covered; as well as to allow data to be compared across interviews and case studies (DeWalt and DeWalt 2002, p.122). Targeted interviews began with collaborative leaders, followed by snowball sampling from their recommendations of partners and landowners. Table 4 provides a breakdown of the interviewees, and Appendices 1 and 2 list numbered interviewees and their affiliation to protect their anonymity. Questions were centered on gaining understanding of events, insight from people involved in planning and implementation, and perspectives from landowners. For the interview question template, see Appendix 3.

Table 4. Interviewees by case study and affiliation

Collaborative group	Number of interviewees	Interviewees
AFR	30	<ul style="list-style-type: none"> - Federal/state agency: N=5 - Retired federal agency: N=5 - Local non-profit organization: N=5 - National non-governmental organization: N=3 - Local government: N=1 - Logging industry: N=3 - Academia: N=1 - Non-industrial private landowner/resident: N=7
WKRP	27	<ul style="list-style-type: none"> - Karuk Tribe: N=4 - Federal/state agency: N=6 - Retired federal agency: N=1 - Local non-governmental organization: N=6 - National non-governmental organization: N=3 - Non-industrial private landowner/resident: N=7

Fifty of the fifty-seven interviews were audio recorded, transcribed, and coded using the methods of Corbin and Strauss (2014). The remaining seven interviews were conducted either by phone (n=3), or in-person (n=4), with notes taken but no audio recording, and then coded. Codes were then organized and analyzed using ATLAS.ti qualitative data analysis software by following Susanne Friese's reference guide (2014; see Appendix 4 for code list). Interview data were compiled with notes from participant observational events and document analysis in order to cross reference data and promote understanding.

I participated in six events including workshops, field tours, and one conference from May 2015 to April 2016. Participation enhances both the quality of the data obtained during fieldwork as well as the interpretation of that data (DeWalt and DeWalt 2002). I participated in WKRP planning workshops and attended AFR events such as a

field tour and conference. WKRP planning workshops exhibited the collaborative process of the group which provided a unique opportunity to observe challenges faced by the group and their active problem solving.

The AFR events illuminated a different stage of an ALM effort. Field tours have been part of a larger community engagement plan showing project actions and are offered to encourage continuous public involvement. The AFR conference was held at the request of WFLC national fire managers, the purpose was an inquiry into a successful version of ALM. This rare opportunity provided a glimpse into the interaction of diverse stakeholders convening around new ideas for the future of fire management. Participation opportunities greatly contextualized many of the concepts people spoke about and that were discussed in documents I had read. This data collection method locates the researcher “on-the-scene” of performed work and greatly enriches supplemental data (DeWalt and DeWalt 2002, p.8).

I conducted document analysis in concert with interviews and participation, to verify and support the information I had gathered. Document examples I engaged with include: USFS reports, USDA and USFS policy, Karuk Tribal Eco-Cultural Resources Management Plan, the WKRP Restoration Management Plan, newspaper articles, speeches and presentations, and governmental/non-governmental website searches.

The following chapter discusses how the AFR and WKRP are engaging with principles of the Cohesive Strategy and shifting away from pure fire suppression. Both groups’ challenges as well as creative solutions I often found to be place-specific and rooted in the geographic context where they are located. There are many similarities

between them but there are important differences that show how ALM may be implemented in different contexts.

CHAPTER IV. RESULTS

Both ALM groups, the Ashland Forest Resiliency Stewardship Project (AFR) and the Western Klamath Restoration Partnership (WKR), are landscape-scale collaboratives conducting cross-boundary (all-hands, all-lands) restoration but are doing so on very different scales, in different ways, and for different purposes (Tables 5, 6). This chapter largely expands on the contents in these tables.

Table 5. ALM case study similarities shared by AFR and WKR

ALM Group Similarities
Geography: Klamath Mountain Ecoregion
Fire regime: Mixed-severity (however forest conditions commonly causing high severity)
Land use history: timber production
Social capital: long regional collaborative histories (early 90s)
Knowledge base: Combination of scientific, local and traditional ecological knowledge
Facilitation: The Nature Conservancy (TNC) linking together diverse partners

Table 6. Differentiating characteristics between ALM cases

ALM Group Differences	AFR	WKR
Environmental		
Natural setting	Semi-urban	Remote - rural
Planning scale	22,000 acres	1.2 million acres
Political		
Jurisdiction	City of Ashland, Rogue River-Siskiyou National Forest	Karuk Tribe, Six Rivers & Klamath National Forests, private landowners
Economy	Tourism/recreation	Restoration/marijuana
Social		
Governance	Four-organization collaborative	Multi-partner collaborative
Goals	Watershed health, drinking water security, community involvement	Landscape health, function & community well-being

ALM Group Differences	AFR	WGRP
Funding	Estimate	Rough estimate
	<ul style="list-style-type: none"> - USFS: \$6.2 million - Joint Chiefs: \$5.2 million - State: \$2.5 million - Ashland & NGO match: \$2 million 	<ul style="list-style-type: none"> - USFS: \$550,000 - Karuk Tribe: \$240,000(+) - Joint Chiefs: unknown (see p. 77) - State & Private Forestry \$1 million - NGO: unknown
Cross-boundary restoration work completed		
	6,800+ acres	3 TREX burns. Restoration planning phase (2013-2016). Pilot project (2017).

Ashland is located at the base of Mt. Ashland, in an urban setting, and the city boundary abuts the USFS Rogue River-Siskiyou National Forest (RRSNF) – which provides Ashland’s water supply. These two landowners (i.e. jurisdictions), the City of Ashland and the USFS, comprise the all-lands aspect of the AFR group’s project boundary (Table 6). An Ashland city official described the unique relationship the City has historically had with the USFS:

The Secretary of Agriculture and the City signed a formal cooperative agreement in 1929 to protect the city’s water supply. The Forestry Division Chief position is a little unusual for a municipal fire department to have a forest division, which is usually relegated to the US Forest Service or state agencies. The City is unique in that we have 1000 acres of municipal forest land [inside the RRSNF] that are managed for a combination of fire safety and [eco] system services kinds of goals. (Interview 44, Ashland City employee)

In contrast to AFR’s water supply focus, the WGRP group is aiming to redefine the culture of fire management by reestablishing the human-fire relationship (i.e. broad,

accepted use of prescribed fire). One member described a defining principle driving the group in accomplishing their ecological goals:

We wanted to be able to bring fire back and bring that human interaction and reestablish it back to those—the ecological process of function of fire, and restore the human-fire relationships across the landscape. (Interview 3, Karuk tribal member)

Many small communities in this rural, backcountry setting dot the vast landscape, but the plan area is dominated by SRNF and KNF lands – which also hold Karuk ancestral lands in legal trust. Less than 10% of WKRP’s 1.2 million acre planning area is private land.

Early, Innovative Collaboratives Creating Social Capital

It was really funny . . . they came out together and said something like, *“We’ve been talkin [environmentalists and timber representatives], and we agree on what ought to be done with our ecosystems down here, and we shouldn’t be at each other’s throat. We should be thinking about the commonality of what we agree on and how to implement collaboration.”* [former agency member recalling an early 1990s public meeting with the Applegate Partnership]

Two regional community-based groups preceded the AFR and WKRP - the Applegate Partnership and the Watershed Research and Training Center (WRTC), respectively. These groups, originating in the early 1990s, grew a network of forest professionals that experimented with collaboration and spawned regional social capital. The quote above depicts the novel approach of the Applegate Partnership which brought together very divided forest management stakeholders (e.g. residents, local managers, forest industry) to reach common ground on mainly private lands (Jakes et al. 2007, KenCairn 1995). In contrast, the WRTC focused on public lands and strove to [re]employ

foresters out of work – due to the decline of the timber industry. They did so by encouraging collaboration and restoration with the USFS (Danks 2000, Abrams et al. 2015). Both the AFR and WKRP have benefitted from these early collaborative efforts as they have built skills among local professionals (i.e. human capital) to work alongside federal agencies in projects, and social capital in developing both local organization and agency capacity to develop binding agreements (e.g. Memorandum of Understanding, MOU) and work together.

The late 1980s and early 1990s is a time commonly referred to as the Pacific Northwest Timber Wars - an era of great conflict in regional forest management (Charnley 2006). The Timber Wars were marked by intense conflict between the environmental community and the logging industry; as was evidenced by protests and litigation that resulted in policy gridlock. Opposition largely centered around clear-cut logging, old growth tree harvesting, and endangered species. At this time, the Applegate Partnership and WRTC were working to diffuse tension, find forest management solutions, and create jobs in light of a slowing timber industry.

The Applegate Valley in southwestern Oregon, and Hayfork, California, where the community groups were based were selected as Adaptive Management Areas (AMAs) under the Northwest Forest Plan. AMAs prioritized collaborative restoration and were areas set aside to test principles of ecosystem management (i.e. management practices mindful of ecological impacts), and encouraged shifting from top down, agency-driven forest management to incorporate local stakeholder collaboration, learning, and experimentation (Stankey et al. 2006).

The Applegate Partnership pioneered strategic landscape-scale management as depicted by the following quote that talks about their fire plan – one of the first that was community developed:

We took all the boundaries off the property. We actually sat down with all of the agency folks and said let's take the boundaries off the BLM land. Let's take the boundaries off the private lands. Let's take the boundaries off the forest service land. Let's take the county lines out. Let's take the state lines out and let's look at this landscape. Where do we begin? Regardless of ownership. (Interview 41, Applegate resident)

The quote references the 2002 Applegate Fire Plan - one of the first Community Wildfire Protection Plans (CWPPs). In Hayfork, the WRTC similarly co-developed and early CWPP and also focused on workforce training; developing alternative economies utilizing small diameter wood and restoration by-product; and creating a formal partnership between the USFS and local forest professionals.

The Applegate Partnership, WRTC, and partners in their collaborative networks, have influenced federal fire management policies by engaging in collaborative management inclusive of diverse partners. For example, the Applegate Partnership helped secure substantial funding through the 2001 National Fire Plan, while WRTC utilized stewardship contracting – an underused, but formal mechanism for local groups to partner with the USFS (Rural Voices 2015). These activities have built local capacities for collaborative forest management and ALM efforts today.

The Applegate Partnership and WRTC have helped build partner networks and opened access to resources for other collaborative efforts. A direct example of this occurred in 2009 with early WKRP members. In 2009, Hayfork, California hosted the

State of Our Forests Conference, which resulted in linking TNC (a partner of the WRTC) with the WKRP.

AFR: How it Developed

The origin of AFR began in 1929 with a cooperative agreement between the City of Ashland and the USFS to jointly manage the Ashland Creek Watershed, the city's water supply. The cooperative agreement between these two entities restricted resource extraction in the watershed largely because the geology is composed of unstable slopes with high rates of erosion (Bennett 2010). This unique agreement has nurtured a long-term relationship with local and federal agency managers and because of this has enhanced local capacities to work alongside federal agencies. In the mid-late 1990s a controversial project was proposed by the Rogue River-Siskiyou National Forest (RRSNF). The outcome of the controversial project would ultimately reflect much local, professional input that significantly shaped AFR's project design.

The Ashland Creek Watershed is in the RRSNF, and contains 1000 acres of private, municipal lands (fig. 3). The cooperative, joint management arrangement and multi-ownership jurisdiction laid the foundation for how ALM is being carried out by the group. Additionally, the City of Ashland has been inclusive of citizens in the development of the AFR, which has helped build community support for the restoration plan – furthering the mission of ALM into the future.

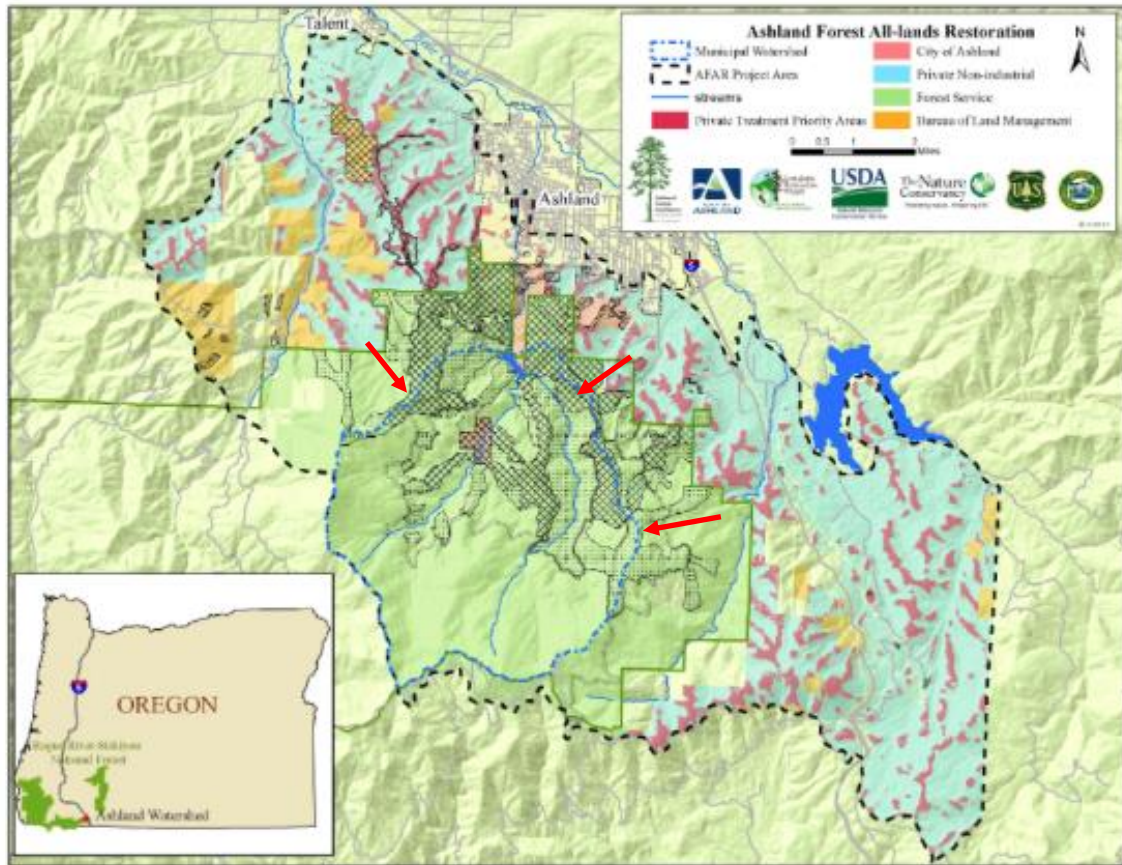


Figure 3. Ashland Creek Watershed outlined by blue dashed line. Note the pink parcel inside the watershed boundary - constitutes 1000 acres of Ashland municipal lands. Black dash outlines expansion project.

AFR's restoration plan was the eventual outcome of the controversial 1996 USFS project called the Ashland Interface Fire Hazard Reduction project (HazRed, fig. 4). Critics of HazRed argued the project did not follow the 1995 Federal Wildland Fire Management Policy (fig. 4), which emphasized shifting away from pure fire suppression toward reintroduction of fire and conducting broad forest restoration. HazRed was further criticized for having a more commercial logging focus rather than a restoration focus. After multiple project design iterations and innovative local input, AFR plans were finalized in 2004 largely by the Community Alternative Team (fig. 4).

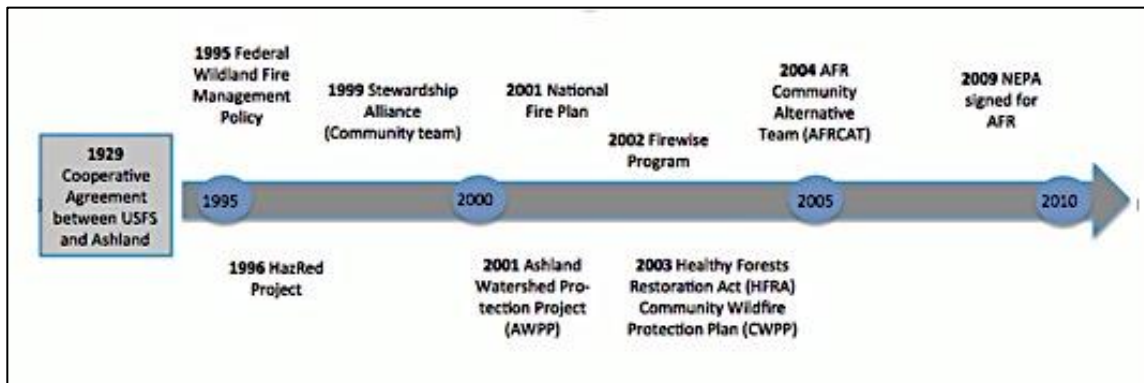


Figure 4. Timeline of policy events leading to the development of the AFR collaborative and project

AFR becomes the solution for the HazRed conflict

The Ranger at that time said, “Let’s work with the community a little closer.” They [USFS] came up with a different project [alternative] that was more informed by the public and had some concessions in it, like a 17-inch diameter limit, in other words, no trees bigger than 17 inches would be cut. That actually got signed in the early 2000s. (Interview 32, Forest Service agency member)

This quote references HazRed, how it was met with resistance, but how it ultimately led to agreement and different design priorities. Though the stated objectives of HazRed were to reduce fire hazard levels and address fire risk, opposing stakeholders disagreed that project plans reflected this (Ingalsbee 2003). Area activists led demonstrations, rallies, and hikes into the proposed project area. The extraordinary USFS district ranger at the time was willing to listen and to collaborate, and brought diverse stakeholders together. The region was not new to collaboration, but for an agency administrator to initiate such efforts was unusual.

With the involvement of Ashland’s Mayor and a responsive RRSNF district ranger, local stakeholders drafted a planning alternative to the ones developed by the RRSNF. The RRSNF was receptive to the community-developed alternative and largely

integrated it. However, some stakeholders remained unsatisfied and argued it adhered too rigidly to fire suppression (Bennett 2010). HazRed was withdrawn for a second time. The next draft plan redefined parameters, and again incorporated public input from the same local group of professionals, and project goals were again refocused. This new iteration was named the Ashland Watershed Protection Project or AWPP, and was the precursor to AFR. AWPP prioritized the objectives of “high quality drinking water and maintain[ed] large areas of old growth habitat by creating a fire resilient landscape resistant to high severity wildfire” (Ingalsbee 2003, p.232).

The district ranger, who came from an education and communication background, provided skilled facilitation. The local group the agency partnered with included: agency personnel, local experts, forest industry professionals, and community members. In 2004 stakeholders proposed expanding AWPP under the newly formed CWPP policy tool – and AFR’s restoration plan materialized. The local group reconvened under a new name called the Ashland Forest Resiliency Community Alternative Team (AFRCAT), recruited new members like TNC, and again drafted a community alternative (fig. 4). An AFRCAT member spoke about TNC’s involvement and key contributions:

The Nature Conservancy kind of fell into it through creating that CWPP and the alternative. They’re interested in expanding their role as an organization and not just managing preserves, which they traditionally have been known for, but now looking at the landscape and seeing how much need there was for forest restoration and protection of key resources, that they had a lot to contribute and were very interested. This became an opportunity for them to look at federal land and participate in a process in a really key watershed. They became kind of a natural player in Ashland and in our work. (Interview 44, Ashland City employee)

AFRCAT's community alternative largely influenced the project alternatives the RRSNF developed for AFR's restoration plan:

The Forest Service said "Hey, if you want to participate in this new process [CWPP], we'll give you some time to put it [community alternative] together." Quickly the community rallied and organized a team. We put together this coalition [AFRCAT] of environmental interests and community and city as a forestlands commission. It's a volunteer group of folks but highly knowledgeable. We put together this infrastructure. It was successful, and was sent to the Forest Service in the form of this CWPP in 2004 and eventually they accepted it. The final decision was maybe 80 or 85 percent of the community alternative. (Interview 44, Ashland City employee)

The Record of Decision for AFR's Environmental Impact Statement was signed in 2009 and its Purpose and Need statements highlight AFR's objectives. AFR's Purpose stated it would "protect Values at Risk, reduce hazardous fuels, reduce crown fire potential and obtain conditions that are more resilient to wildland fires" (USFS 2009, p. I-6). The stated Need was "for urgent reduction of the potential for large-scale, high-severity wildland fire" (USFS 2009, p. I-6).

The political environment in the early 2000s was favorable toward collaboration to reduce wildland fire risk. The 2001 National Fire Plan (NFP) worked to resolve gridlock by encouraging partnerships and emphasizing the safety of rural communities and restoration. An AFR partner working during the rollout of the NFP offered this:

I think building the trust just takes time from succeeding in putting initiatives together [largely catalyzed by NFP funding] and working through the kinks. Having sideboards, really strong operational agreements that need to be developed right up front. We're doing it right now. (Interview 36, Non-profit organization member)

The NFP delivered substantial funding to southwestern Oregon for fuels reduction work as this area was a hotbed of collaborative activity. The influx of funding would be

temporary, but this period would help build organizational capacities and put new fire management policies and tools like CWPPs to work.

The AFR group and restoration accomplishments

NEPA challenges and recommended solutions.

The Record of Decision (ROD) for AFR, the last step in NEPA's procedural process, was finally signed in 2009. It took over four years for the Environmental Impact Statement (EIS) to reach a ROD in light of the extensive, collaborative effort. This delay was mostly due to legal challenges to AFR's restoration plan, enabled through the NEPA public review process (Boucher 2016a). According to AFR participants, the NEPA review process imposed time delays, stress on partners, and frustration on managers who wanted to see more legal protections for such laboriously developed projects. Interviewees spoke about the important function of NEPA and it enabling public input, but saw a need for refining how projects were legally challenged.

Increased legal protections for collaborative projects were desired by managers particularly after development of an EIS, since it is the most extensive, environmental analysis under NEPA. Further, the most credible and trusted EIS is produced by an inclusive and diverse collaborative partnership as it represents a wide array of stakeholder interests. Several interviewees argued that a ROD from an inclusive and representative collaborative should garner more legal authority and be challenged less. In describing barriers like this, one BLM agency member said:

The analysis work that it takes to get a project from the ground up and into implementation. It has just increased tremendously over the years and for a number of reasons. Certainly increasing the defensibility of projects when they

get challenged, legally challenged. That has certainly increased our cost.
(Interview 40, BLM agency member)

AFR partners repeatedly iterated the time and energy required for NEPA, and the delays caused by the process because of the pressing need to scale up the size and number of projects. The need for scaling-up projects was the primary argument for more legal authority to collaboratives to expedite the extensive planning processes.

Moreover, AFR partners and area managers have made extensive efforts at broader public inclusion into project planning, bolstering their case for an expedited NEPA process. AFR partners have incorporated public interests and concerns through a formal process called the Community Engagement Plan (City of Ashland 2011).

The Community Engagement Plan enhances support for AFR restoration by building trust through public inclusion, but it is also used to help guide project priorities. This Plan has involved the City: hiring a Community Engagement Coordinator, development of a public website, and offering watershed tours to help educate, inform, and provide transparency about project actions. This outreach by AFR partners was intended to build support for restoration rather than getting caught up in litigation. An AFR partner described a successful instance due to public outreach:

When we first were doing our helicopter logging here about—gosh, it’s been almost three years now. We would be having log trucks coming through downtown. We actually did a real aggressive campaign to try and make people aware of it, like going door to door all along the haul route and meeting with businesses in town, going to their place and saying, “Hey, this is gonna be happening.” (Interview 32, Forest Service agency member)

Interviewees talked about how having a truck loaded with timber in the past, and driving through town would be quite controversial. Through public inclusion from the start,

interviewees indicated that public tensions around forest management have been reduced for the first time in decades.

AFR group coordination (all-hands) and project work (all-lands).

Once NEPA cleared, the AFR group took three months to develop a Master Stewardship Agreement (fig. 5). The Master Stewardship Agreement (MSA) formalized the partnership between federal and non-federal partners to jointly conduct restoration work (USDA - USFS et al. 2010). MSAs differ from general USFS stewardship contracts because an MSA covers a larger area and addresses a series of projects compared to a single one (Bey 2015). AFR partners quickly produced the MSA due to the availability of American Recovery and Reinvestment Act (ARRA) funds for project work, totaling \$6.2 million. ARRA funds financed restoration through 2013 (City of Ashland et al. 2010, fig. 5). A RRSNF employee described some key features of the AFR group that enabled some of their initial accomplishments:

I think part of AFR was just a perfect storm with just the right personalities and the right people with skills came together. I intentionally tried not to lead the process. I tried to let the group figure out what I'd say, like "Well, we're gonna have to have prescriptions written. So how are we going to accomplish that?" Knowing how it happened with the Forest Service but not with a partnership. We were fortunate to have people with all those kinds of skills in different places. (Interview 32, Forest Service agency member)

This quote shows the critical nature of having human capital in the personalities of the partnership with the knowledge and expertise to enable a USFS employee to collaborate. Collaboration by an agency with diverse partners, particularly local partners, indicates major shifts in agency culture in ways critical for ALM.

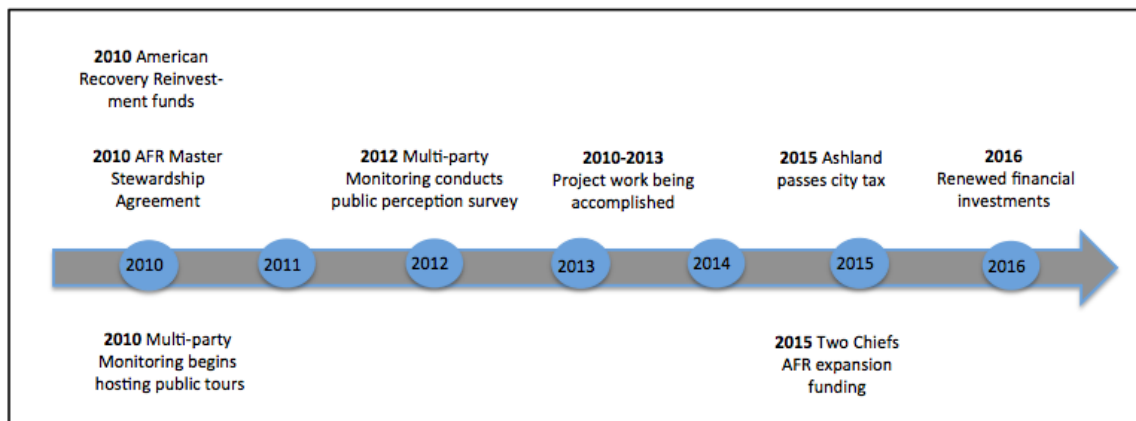


Figure 5. Timeline of events with the commencement of AFR's project work

The AFR group was finalized in 2009 with the joining of the fourth and final partner, the Lomakatsi Restoration Project (Lomakatsi), the restoration work implementers. AFR partners jointly developed 7,600 acres of treatments across the 22,000-acre plan area. Planned treatments of 7,600 acres followed scientific rationale whereby treating 1/3 of an area will markedly reduce the severe impacts of wildland fire (Franklin et al. 2002; Quigley et al. 1996). As of 2016 over 6,000 acres have been treated and partners are right on track with the 10-year MSA contract (City of Ashland 2016).

In addition to the restoration conducted on USFS lands, coordinated treatments were carried out in 2013 between the RRSNF and the City of Ashland, on the City's 1,000-acre parcel. Ashland's forester worked closely with the RRSNF's silviculturist to coordinate treatments on adjacent lands (Boucher 2016a). The Forest Division of Ashland Fire and Rescue carried out the work on city land while Lomakatsi led the work in the RRSNF. Also, Ashland coordinated with the USFS for the helicopter removal of timber via helicopter. A helicopter was utilized on both municipal and USFS lands while Ashland used a USFS helicopter landing site, and utilized USFS roads to transport logs

(Boucher 2016b). Such close coordination is due to the working relationship among partners ongoing since the 1990s, but of course also rooted in the 1929 cooperative agreement.

Noting the complexities in conducting joint restoration projects with partners like the USFS provided instructive lessons for future work. One Lomakatsi manager described some of the challenges in working with a federal agency like the USFS:

I've had to learn how the Forest Service works. Their system of authority, to be able to navigate through it, because if you don't know it, you become really frustrated. I think building trust takes time from succeeding in putting initiatives together and working through the kinks. Having sideboards, really strong operational agreements that need to be developed right up front. We have one agreement [MSA] in the Illinois Valley [unrelated to AFR]. We've been through four district rangers, two forest supervisors. There's those people in the agency that are lifers. They don't wanna move up the ladder, they wanna live where they work and do a whole career there. Find those people. They live here, they're gonna do 35 years here. Find those people, they're the ones that'll outlive the ranger. (Interview 36, Non-profit organization member)

The same individual expanded on why fostering trust while working with the USFS agency can be difficult to maintain:

I'll be straight with you. Trust can be broken when staff allocation of time capacity with the agencies is limited. Too much is put on the middle managements plate to deliver [and] trust gets broken. (Interview 36, Non-profit organization member)

Another AFR partner spoke about the decreased capacities of the USFS agency:

The Forest Service doesn't having the funding, doesn't have the staff capacity to be treating the amount of land they want to, so they're leaning on their partners through these stewardship agreements. (Interview 48, Non-profit organization member)

These quotes illustrate some key challenges impeding progress by the AFR group: agency turnover, and agency over-reliance on partners due to agency downsizing. The

reduction of USFS commercial timber coupled with increasing fire severity has restructured the agency. Consequently, there has been a significant reduction of revenue which is compounded by fire suppression management that has funneled funding away from restoration to deal with its increasing costs.

Funding challenges to restoration and compounding factors.

Restoration work, such as pre-treatments involving manual and mechanical fuels reduction, is labor-intensive and very expensive. A federal agency member described the nature of these projects:

These projects are expensive. They take a long time to plan. They take a long time to put into effect, and you have to maintain it if it's gonna have long-term value. (Interview 56, Oregon Dept. of Forestry agency member)

A Lomakatsi manager spoke about restoration costs in the broader context of the Rogue River Basin – landscape of the Ashland Creek Watershed:

Seventy thousand acres a year just in the Rogue Basin to keep up with everything [restoration needs according to research]. We're implementing now probably close to 10,000 acres a year, 8 to 10, and that's just employing—our crews [alone] number about 30. So to treat 1,000 acres a year you need 10 workers. So you need a million bucks to employ ten people all year if they were doing fuels reduction. So if you do the math, and start thinking about it for 10,000 acres ... It's about 1,000 acres of work for \$1 million. So if you put 70,000 acres in there, it gets really expensive. (Interview 36, Non-profit organization member)

AFR partners repeatedly spoke about the need for long-term funding investments. Most often public funding, relied heavily upon for restoration, comes in the form of short-term grants. Short-term grants do not incorporate considerations for long-term, regular maintenance of areas that have had initial treatments. Excluding regular maintenance can

negate initial restoration and will not accomplish the goal of reducing fire risk (Agee 1993, Collins et al. 2011).

The AFR group has enjoyed success at obtaining grants and other public and private sources of funding from a variety of funders from 2010-2016 (Table 7).

Table 7. AFR funding contributions by organization

Organization	Contribution
USFS-RRSNF	\$6,350,000
Joint Chiefs	\$5,200,000
State of Oregon	\$2,500,000
AFR collaborative restoration by-product	\$1,500,000
Non-federal partners	\$830,000
City of Ashland resident tax	\$700,000

As of 2016, AFR has been awarded over \$17 million, which includes its 2015 restoration plan expansion under the Joint Chiefs program to incorporate adjacent private lands (fig. 3, p. 38). This expansion grew the project footprint from 22,000 to 53,000 acres, and was motivated by successes of joint planning and implementation by the group.

AFR's expansion through Joint Chiefs.

In the early stages of AFR planning, obtaining project funding was uncertain but the group persisted:

Another challenge was when we planned AFR, I knew it was gonna cost \$10 to 12 million to do the work. We knew, at best, this whole forest gets \$1 million a year in fuels reduction funding. We have 1.8 million acres, so to do it in ten years [as stipulated in the MSA] we needed, basically, \$1 million a year. That would be the entire forest budget for ten years. (Interview 32, Forest Service agency member)

As illustrated, AFR partners received \$6.2 million in ARRA funds which kick started work and funded restoration from 2010-2013. During this time 4,000(+) acres were

treated and as a result the group has obtained additional funding from a variety of sources and grown the planning area.

The expanded area added onto AFR was called AFAR, or the Ashland Forest All-lands Restoration project. Joint Chiefs has contributed over \$5.2 million so far with more monies expected in the 3-year grant program. The progress of the group has grown the project area and recruited additional (private) landowners – these new partners have expanded the mosaic of stakeholders in the ALM project. The expansion and recruitment of new landowners is in part due to the close relationship AFR partners have had with the local Natural Resource Conservation Service (NRCS) office – the federal agency responsible for restoration on private lands in a Joint Chiefs project. The NRCS has been actively engaged with landowners in the area while fostering relationships with area professionals. The NRCS and AFR partners have jointly worked together developing AFAR, and Lomakatsi will again lead restoration work implementation.

A TNC representative spoke about how the group received Joint Chiefs funding and about upcoming projections:

With the advocacy of the Mayor going back East [Washington D.C.] and lobbying folks in the Forest Service and taking advantage of every opportunity to meet with leaders, and then the Natural Resources Conservation Service, we were successful in getting a Joint Chief's award which will be launched this summer. Got a million dollars for working cross-boundary on private lands. (Interview 28, The Nature Conservancy representative)

A key factor of AFR's success has been the contributing capacities by its partners.

Lomakatsi has contributed capacity for doing the work, TNC has enhanced collaborative capacity through its expertise, the City of Ashland formally linked local stakeholders to

agency partners, and the USFS is committed to being an equal partner while also contributing significant funds. The next section describes some detail on partner roles.

Capacity building of TNC, Lomakatsi, City of Ashland, and the RRSNF

A TNC representative spoke about their role in AFR:

What we've been doing is enabling the middle, providing it with information, with transparency, with vocabulary, with stories, with experiences, and empowering the middle that could see its way through this dichotomy [environmentalists against timber] that was counterproductive, [but] which served its purpose. (Interview 28, The Nature Conservancy representative)

The same TNC member spoke about how they've engaged with federal and state agencies in order to link them to their local partners:

[We've done] a lot of active engagement with the leadership of the Forest Service, the NRCS, Oregon Department of Forestry sharing how we've been successful which has been all about involving the community or engaging the community with the best available science and developing a project and implementing it in a transparent way. (Interview 28, The Nature Conservancy representative)

To illustrate the above quote, Lomakatsi and the City of Ashland have been integral to gathering support from the community, and TNC has helped accomplish this priority. By “enabling the middle” and linking local and agency partners through a common language and understanding, TNC has enhanced accomplishments among partners.

The City fills a key role in leading community engagement as illustrated through the Community Engagement Plan. The City has fostered public trust and support as evidenced by a tax on residents' water bills that partially funds restoration work – projected totals = \$700,000 by 2016. A local resident spoke about the Ashland Forestry Division Chief's key role in fostering support:

Ashland has accomplished something that is just so wonderful [with AFR]. I remember, in 2000 or so, one of their firefighters [now the Division Chief], was able to talk to people and get them receptive to it. In meetings, he was talking to all the rest of us, from all of our different areas. He was talking with the BLM and the Forest Service and all the fire chiefs. He's very professional. He's charismatic. He carries himself well, and people listen when he talks. He just knew how to get it done. The progress that they've made is just phenomenal. (Interview 47, Applegate resident)

Aside from its funding and community engagement roles, the City also contributes technical expertise to AFR as was demonstrated by the restoration work conducted on the 1,000-acre parcel inside the RRSNF. These roles illustrated the capacity contributions of the City to the partnership.

Lomakatsi is a local, non-governmental organization implementing the restoration for AFR / AFAR projects - contributing key technical skills. In addition, like the City, the organization is a close partner to both the public and RRSNF. Lomakatsi started in the mid-1990s working with the broad, small-scale, private landowners in Ashland's surrounding area. They have fostered relationships and developed ecological forestry techniques in the past with these partnerships. Lomakatsi's ecological forestry is rooted in local and regional tribal knowledges, reinforced by forest science as represented for example by researcher Jerry Franklin (Lomakatsi 2005). Lomakatsi has since shifted from small-scale to larger scale, federal agency joint projects like AFR. In AFAR, the organization has employed these previously developed skills of working with private landowners and partnering with the USFS. A partner remarked on Lomakatsi's capacities and recruitment to AFR:

They were seen by the [RRSNF] forest supervisor at the time as a community player, having capacity to implement work on the ground, whereas the other

partners really didn't have much capacity. The city had some but not much to get work done on the ground and Lomakatsi had already established that they could do that, and they were actively doing it. (Interview 44, Ashland City employee)

Lomakatsi pioneered application of ecological forestry at a time when deep mistrust was prevalent between the public and the timber industry. In the mid 1990s the co-founders of the organization uprooted themselves from careers in the timber industry to forge a new management model. They were guided by ecological principles sourced from area tribes, also referred to as traditional ecological knowledge, or TEK. There is significant tribal presence in the region of southwestern Oregon and northern California that both groups, AFR and WKRP, have incorporated. According to an organization manager:

We took the prescriptions and the innovative restoration that we developed on private lands across thousands of acres and were able to extrapolate it onto the federal land side with the support of a community that was against logging and against the agencies. They [community] backed us because we were implementing the ecological fuels reduction approach. (Interview 36, Non-profit organization member)

The same manager expanded on their methods for completing project work and how they've built capacities to meet an increasing demand for restoration:

How we've built capacities, we've leaned on the contractors, the timber operators that exist in southern Oregon, and we've incorporated them into these large-scale projects by hiring them and leaning on their capacity that already exists, and then training them in the ecological fuels reduction approach and giving them opportunity. We're really serving like an administrative body of large-scale projects. We're doing some of the work, and then we're soliciting bids and proposals to hire others to do the work. We work with over 15 other operators and employ up to 150 people at one time, like we're doin' right now. [We] work across 15,000 acres a year. (Interview 36, Non-profit organization member)

In addition to Lomakatsi's work with the public and RRSNF, they also work with the local, available restoration workforce which has links to the once bustling forest industry. The organization utilizes this dwindling but remaining infrastructure to conduct work; which is a particular mission of the group - to create jobs and grow a local, restoration workforce.

A TNC representative spoke about particular skills Lomakatsi brings to the AFR group, and also illuminates particular funding challenges in restoration:

There is a good analogy [about streams of funding] with the electrical grid. You get these huge surges where you've got more power—in this case, money—than you can deal with. We need a moderator. You need a transformer to regulate the flow of money from the federal government, which is incredibly boom and bust [short-term grants]. For us, the transformer is Lomakatsi because of their ability to scale up and down to meet the need. They're able to harness what would otherwise be energy just burned off as heat. (Interview 45, The Nature Conservancy representative)

AFR group members have worked to address funding challenges that commonly face restoration projects like this. An Ashland city tax for restoration work provides reliable income, the group has attracted varied partners they can rely on, and restoration by-products (wood chips, biomass etc.) have been harnessed.

As the RRSNF is the primary landowner and has jurisdiction on 95% of the AFR project area, an agency partner reflected on how the agency navigated their role in the group as an equal partner – a significant shift from their traditional role:

Typically, when the Forest Service would do a project or a contract we'll write prescriptions, lay it out, give specifications on how to do the work. On this one we started, we didn't have any of that. So the partners filled that role for us by doing a lot of that work that the Forest Service would usually do. That really, I think, was really key. That added capacity to getting it off the ground and

moving—plus, I mean, having the advantage of [cost-share] funding.
(Interview 38, Forest Service agency member)

This illustrates the decreased capacity challenges of the USFS and the way AFR partners were able to shore that up. However, AFR partners spoke highly of the integral role of the USFS-AFR project manager. In the words of a TNC partner:

[The AFR project manager] has been key to our success. Somebody inside Forest Service who really believes in this project and who has been willing to rattle cages and just do a lot of the hard labor of pulling together plans, prospects, and proposals, and all the spreadsheets and the budgeting. He also brings to it his history of working as a smoke jumper and working with fire and his experience working in silviculture and managing stands. (Interview 28, The Nature Conservancy representative)

Each of the partners of the AFR contribute particular capacities to the group. This quote illustrates that the USFS-RRSNF is no exception. In fact, this AFR manager has helped pave a new way forward as an equal partner in a collaborative, redefining the role that the agency may fill in ALM in the future.

WKRP: How it Developed

Stirrings of the WKRP first originated in the early 1990s when the Karuk Tribe initiated collaborative prescribed burn projects with the Klamath National Forest (KNF). The WKRP planning boundary follows the ancestral territory of the Karuk Tribe, but also spans two national forests. In 1986 the Karuk received federal recognition status. They do not have a reservation but have reacquired lands, as well as gained back lands through fee to trust conversion (Tripp 2013). Land acquisition and fee to trust conversions totaled 1,660 acres as of 2013, and continuing acquisition of land is a high priority for the tribe.

Reacquiring lands has triggered the Federal trust responsibility from the government to the Karuk (Tripp 2013). The Federal trust responsibility mandates the federal government “assist Indian tribes (monetarily) to protect their lands and resources” (Reuters 2016 p.2).

The Federal trust responsibility recognizes tribal treaties thus supporting tribal sovereignty, and reinforces the government-to-government relationship the Karuk Tribe has with the federal government (DOI 2012). This relationship enables the tribe to prioritize conservation goals, and the Karuk Tribe Dept. of Natural Resources states their mission is to “protect, enhance, and restore the cultural/natural resources and ecological processes upon which Karuk people depend” (Karuk Tribe 2006, p.11).

In addition to the Federal trust responsibility, further rights are extended to tribes by the 1997 Secretarial order #3206 from the Dept. of the Interior (DOI 2012). This order specifies that under the Endangered Species Act (ESA), conservation actions taken by federal agencies must harmonize with the Federal trust responsibility to tribes when actions are taken under the ESA which affect tribal lands and tribal trust resources. Three ESA species listed in the western Klamath Mountains are the northern spotted owl (*Strix occidentalis caurina*), and Chinook (*Oncorhynchus tshawytscha*) and Coho salmon (*Oncorhynchus kisutch*). Wild salmon, in particular, have historic, sacred, and subsistence meaning to the Tribe (Karuk Tribe 2006).

Management of these species between the federal government and the Karuk, in part, shapes the tribe’s role in managing tribal trust lands that span the Six Rivers National Forest (SRNF) and the KNF (fig. 6). Many Karuk tribal members remain on original territory along the Klamath and Salmon rivers in northern California; they

comprise the second largest tribe in the state in terms of population, and are co-leading the WKRP planning effort (Tripp 2013). Since 1986 the Tribe has grown its administrative bodies from only a handful of employees and an operating budget of \$250,000, to 231 employees with a budget of \$37 million (Tripp 2013). Initially, the Tribe pursued fisheries management, but in the early 1990s began incorporating fire and fuels. At this time the Tribe became increasingly alarmed at the deteriorating condition of the forests and watersheds – linked to past practices of extractive logging and fire suppression (USDA and DOI 2012).



Figure 6. WKRP planning area outlining Karuk ancestral territory, and spanning Six Rivers and Klamath National Forests

Since the early 1990s, multiple collaborative projects have been attempted in the region of the WKRP, but none have been markedly successful except for the 2008 Orleans Community Fuels Reduction Project (OCFR). Although WKRP members who participated in OCFR describe it for the conflict it spurred, they also noted how the end result was clarity by tribal and local partners regarding what components were necessary for successful, collaborative fire restoration efforts.

Conflict leads to clarity and goals for the WKRP

The OCFR project, originally the source of great conflict, motivated a range of actions, ideas, and partnerships which led to a coherent vision forming the basis of WKRP. OCFR was developed under the Healthy Forest Restoration Act emphasizing collaboration and community involvement. The project, like AFR's HazRed project, was rooted in conflict but also was resolved through collaborative agreement. Interviewees generally thought planning for OCFR went well and were quite hopeful about future collaborative prospects with the USFS. However, once implementation began local partners noted certain treatments were contrary to what was agreed upon. A local manager reflected on what happened:

Public input [during NEPA process] went into this black box and they [USFS] came out with something that was just totally different. There were some very specific requests that were made by the tribe regarding cultural sites that were disregarded. There were specific requests about certain logging companies to avoid that the community and the tribe did not feel comfortable with but that company was the one that was chosen. There were some things that were just—whether it was the supervisor who changed them, whether it was that they were marked different, things didn't get translated. Suddenly there were specific cultural sites that were desecrated during the implementation. (Interview 8, Non-profit organization member)

OCFR resulted in litigation when the Karuk Tribe, along with local stakeholders, filed suit against the KNF for violating the National Historic Preservation Act (DOI and USDA 2012). As a result of what transpired, the Tribe and local partners reevaluated their approach to collaborative restoration and formed the Mid-Klamath Restoration Partnership (MKRP) to coordinate treatments going forward. The MKRP (precursor to the WKRP) split priorities into instream and upslope work because of disagreements on treatments and shifted focus to instream restoration where significant agreement and funding existed.

The intention of MKRP was to build social capital and gather network resources in order to address upslope issues once the opportunity arose. A WKRP partner described this time:

When we got the Mid Klamath Restoration Partnership together in 2007, all the players for the instream stuff were there and ready to go. There was very little disagreement. Our overlap was great and our mission was clear. Whereas the upslope it was the opposite, it was clear that key partners weren't at the table and were unlikely to come to the table. That the issue was contentious enough that we didn't have the skills to address it. We agreed right away that we were going to breakout instream from the upslope where we're gonna focus on the instream work initially and wait until we gathered resources to address the upslope. (Interview 1, Non-profit organization member)

After two years of successful instream work, the 2009 State of Our Forests Conference was held, and was co-sponsored by the WRTC and TNC's Fire Learning Network (FLN). The instream work, along with future collaborative upslope goals, drew the attention of the FLN Director - providing expertise and resources through programs early WKRP partners needed to jumpstart meetings and planning.

The FLN brought personnel and other resources to the mid-Klamath; they provided much needed facilitation that unified all stakeholders around common goals. A WKRP partner recalled this time:

[The FLN] brought those resources to the table that allowed us to have faith that if we threw it out there to that contentious group [we would be able to] come together. That we would be able to make that be a positive experience through high level facilitation and having a process that allowed us to form relationships rather than break them. (Interview 1, Non-profit organization member)

The FLN provided skilled facilitators fluent in collaborative fire management, helped recruit agency members to participate, and diffused tension that provided opportunities to mend relationships among stakeholders.

Once gaining the support of the FLN, a series of actions took place that helped build capacities of the group, including the development of a CWPP, engagement in the Firewise program, and formation of a regional Western Klamath FLN. These actions opened up local stakeholders to funding, knowledge, and information to share with the community to help increase safety and reduce fire risk. The National Fire Protection Association (Firewise), the USFS (CWPPs), and TNC (FLN) are national organizations leading these programs and connecting local managers to a national network of fire managers and other resources.

Other national partners and resources gathered by area partners from 2010 - 2014 included: 1) joining the Fire Adapted Communities (FACs) – extension program of FLN; 2) creation of a GIS Overlay Assessment (funded by local, regional, and national sources) that helped guide project priorities by providing understanding of landscape fire activity;

and 3) development of the Somes Bar Integrated Fire Management Project (guiding WKRP pilot projects) – which drew largely upon an earlier CWPP (Harling and Tripp 2014, fig. 7). Figure 7 provides a timeline of events leading to the formation of the WKRP and its key partners, discussed at length in the next section.

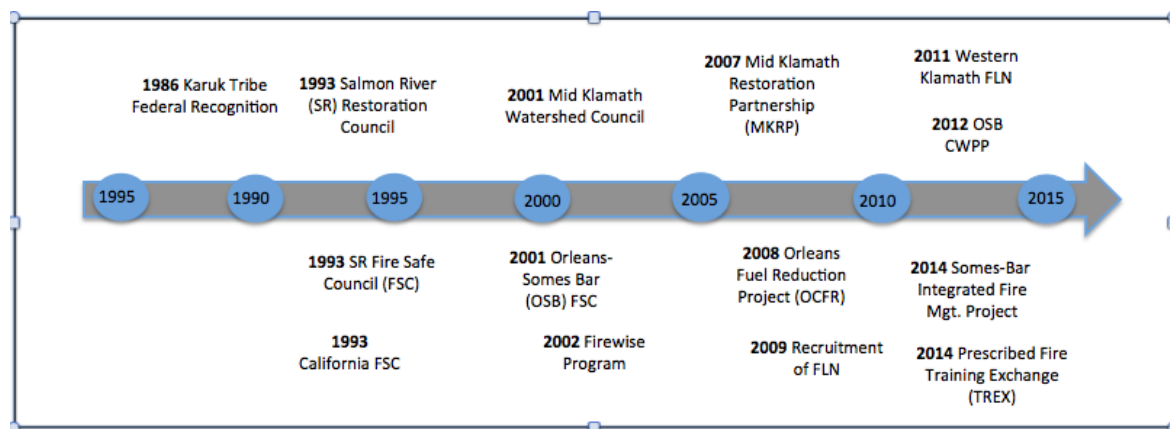


Figure 7. Timeline of events in the WKRP's development through working programs, gathering tools, and resources

In May 2013, the MKRP held their first formal collaborative meeting. By the second meeting the group finalized its name, the Western Klamath Restoration Partnership, to reflect the new plan area footprint. Directors at the Karuk Tribe and the local, non-governmental organization Mid-Klamath Watershed Council (MKWC) initially spearheaded the WKRP effort in part due to an almost two decade-old, well-respected relationship:

What I've learned in tribal country is that sometimes results need to be sacrificed for relationships... I'm always ready to turn funding away if it damages relationships. I think that's key. The OCFR project was just a lesson on what not to do when you're trying to build relationships and trust. I think the tenet of this work is that it's the process and the relationships built through that process that will lead to long-term results. (Interview 1, Non-profit organization member)

This quote depicts the strong partnership and leadership within the WKRP. Once WKRP was formalized, two additional “co-leads” were nominated, by the larger collaborative group, totaling four in all. One nominee was from the KNF and the other was from the expanded plan area and local, non-governmental organization Salmon River Restoration Council.

The SRNF is the last remaining major partner in the WKRP. Together with the KNF, these national forests make up over 90% of the planning area.

The WKRP Partners and Restoration Plan

The WKRP is a larger, and more sprawling ALM group compared to AFR in several ways: there are more collaborating partners; it is an open collaborative to residents while the AFR is more closed; the planning area is significantly larger; and although collaboration has been repeatedly attempted since the 1990s less work has been implemented on the ground due to the inability of partners to align (fig. 8).

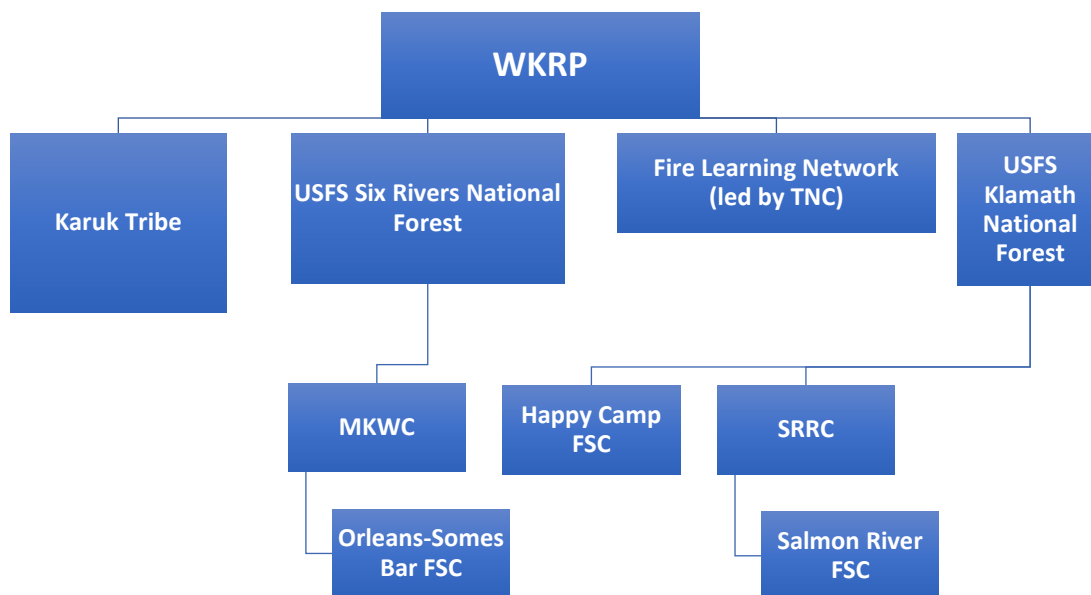


Figure 8. WKRP's group partners and the communities they are based in

The first tier of figure 8 represents the WKRP group as a whole; the second tier are the national, federal, and tribal partners; while the third (and fourth) tier(s) are the local stakeholder organizations. The integral local organizations (in addition to the Karuk Tribe) include the Salmon River Restoration Council (SRRC) and their subsidiary Salmon River Fire Safe Council (SR-FSC), as well as the Happy Camp FSC – are all surrounded by the KNF (fig. 8). The remaining local partners, MKWC and their subsidiary Orleans-Somes Bar FSC, are surrounded by the SRNF (fig. 8).

The WKRP has prioritized reaching agreement among partners, aligning priorities, and engaging in joint planning - all within a complex, steep, and rugged landscape. In order for all partners to align individual priorities, the group is following an international model for collaboration led by TNC called the Open Standards Process of

Conservation (OSP). One WKRP partner compared past attempts at collaboration to the current one guided by the OSP:

Once I heard The Nature Conservancy was involved, that really was the key point for me to get involved because I was involved in other collaborative efforts or attempted collaborative efforts, but they were pretty much being facilitated and run by Forest Service personnel. They weren't successful. They went on for two years in some cases. The trust was never there, could never be established.

To have an outside, independent party like this come in is great. That's where my hope lies, by having an entity like that come in that maybe we can start building greater trust and already [we] see that it opens up dialogue that I haven't seen before. There's more equality among participants than what there was before. The playing field has been leveled, so to speak. That really helps bring forth more honest dialogue. (Interview 2, Klamath Mountains resident)

TNC's employment of the OSP guides planning, implementation, monitoring, and learning of projects. According to TNC, the OSP has been used successfully for almost twenty years in diverse contexts internationally (TNC 2015). Many WKRP partners expressed great optimism in following the OSP, especially with TNC's skilled facilitation.

The landscape complexity of the western Klamath Mountains is similar to AFR's, however the scale and strategic plans are quite different. WKRP pilot projects first began out of the Orleans-Somes Bar community, but two more communities in the plan area have developed pilot projects: Happy Camp and Sawyers Bar (i.e. Salmon River subbasin) (fig. 9, shown below).



Figure 9. The WKRP community-based ALM project areas

The three community-based project areas of the WKRP were designed to anchor the restoration plan and serve to focus on different priorities of the group (Table 8).

Priorities, identified through the OSP, are wide-ranging and take on an ecosystem management approach:

We're looking at bigger effects on fisheries and seeing a clear connection which has to be articulated over and over again, and continues to be between fish and forests and fish and fire. Seeing that logging practices and sediment from roads and the health of the forests was very much connected with the health of the river systems and with the fisheries and the lack of fire. (Interview 8, Non-profit organization member)

Another partner expressed a similar sentiment, but adds the importance of community well-being for the group:

What is good for the forests, and the wildlife, and the rivers is ultimately really good for everyone. I think it increases the quality of life, the ability of subsistence, so it's really quality of life that is the essence. If you have really healthy, vital fisheries, and wildlife, and watersheds, you're breathing clean air, and you have clean water. It's the best place on earth. (Interview 10, Karuk tribal member)

Because of the group's engagement with the OSP, involving diverse partners, priorities were developed encapsulating their mission. These priorities linked ecological, human, and economic goals (Table 8).

Table 8. WKRP priorities developed collectively through the Open Standards Process

Conservation targets/values	
- Fire Adapted Communities (FACs)	- Resilient bio-diverse forests/plants/animals
- Restored fire regimes	- Sustainable local economies
- Healthy river systems	- Cultural and community vitality
Threats to conservation targets/values	
- Lack of stable jobs	- Erosion of community and cultural values, including Karuk traditional practices
- High fuel loading	- Altered forest structure and composition (overly dense forests)
- Lack of defensible space	- Habitat degradation (terrestrial and aquatic)
- Impaired fishery	- Lack of defensible space
Group strategies developed	
- Accelerate development of FACs	- Develop and implement landscape level strategic fuels reduction treatments.
- Increase local restoration capacity	- Increase use of fire to restore & maintain pre-European conditions in a contemporary context
- Develop partnerships for implementing zones of agreement.	- Create sustainable diverse revenue streams to address all threats and values
- Support implementing fisheries restoration plans	- Develop integrated, inter-generational education programs and activities that complement our identified strategies.
- Integrate food security into forest management	

Leadership of the WKRP is twofold. There is a “core team” that guides the group, while four elected “co-leads” represent the different communities, coordinate priorities, and direct local projects (Harling and Tripp 2014b, p.10). One partner summarized the vision and overall goal of the group:

Really at the core is understanding that there is a human fire relationship that’s been broken. Our current policies don’t support that. They take the use of fire out of the hands of the people and they put it in the hands of a few federal officials that are removed from its effects on the landscape scale. How we build back that human fire relationship at the community level, that’s our ultimate goal. Is change that understanding of fearing fires to feeding the fires, to embracing it, as well using it as a primary tool for managing this landscape. (Interview 1, Non-profit organization member)

This quote provides insight into the frustrations of local managers excluded from past federal agency-led, top-down projects. However, interviewees seemed to have a renewed sense of hope for collaboration that finally incorporated local priorities.

Although the WKRP was predominantly in the planning phase of ALM at the time I conducted interviews, the group had received significant funding from state, federal, and tribal sources (Table 9). A primary objective of WKRP, like Lomakatsi, is building a local restoration workforce, and partners understand an imperative of this is developing diverse revenue streams that will leverage major funding sources from state and federal agencies.

Table 9. WKRP funding mechanisms and/or resource contributions

Source of funds	Amount (approximate)
Karuk Tribe	Annual contributions from Federal trust responsibilities – from BIA through USFS
USFS State and Private Forestry	\$1.1 million to non-federal partners
Six Rivers National Forest	\$500,000 (also committed to annual contributions)
Klamath National Forest	\$26,000 (2014 WKRP restoration plan)
Joint Chiefs: Mid-Klamath River Communities	\$3 million (2014, 2015 – small portion allocated to WKRP, see p. 77)
California Fire Safe Council (CA-FSC)	Annual contributions/grants to Happy Camp, Salmon River, and OSB FSCs

Community-based all-lands projects anchoring WKRP

Partners of the WKRP have recognized there is urgency for coordinating and collaborating on work in the western Klamath Mountains because of the severe fire risk in the landscape. A local manager reported that in the last decade (prior to 2015) over 400,000 acres burned and over \$450 million dollars was spent on fire suppression (Harling 2015). In response, the group devised strategies for scaling up restoration:

We can either choose to spend \$450 million like we have in the last 10 years on fire suppression or we can choose to spend \$45 million, a tenth of that, on strategic fuels reduction followed by prescribed fire...If we can agree to focus our efforts, our combined efforts on establishing those fuel breaks, getting good fire back on the landscape where we can. That will allow us to embrace managed wildfire. (Interview 1, Non-profit organization member)

The WKRP is working to restore the role of fire to the landscape, and creating conditions to do landscape level work through managed wildfire (i.e. allowing fire to burn in contained areas). In addition, partners are focusing on community and fire fighter safety, and their well-being, and getting fire back on the landscape at more opportune times through prescribed fire – outside of extreme, high fire season.

The first pilot projects were based out of the Orleans-Somes Bar (OSB) community due to the support from the SRNF, previous accomplishments here by WKRP leaders, and readily identified projects outlined by a CWPP. The three communities anchoring the WKRP have each focused on different strategies: 1) developing landscape level fuel reduction treatments - the focus of the OSB pilot projects; 2) developing inclusive partnerships for implementing areas of agreement – focus of Sawyers Bar pilot project; and 3) accelerating development of FACs – focus of Happy Camp pilot project.

The OSB pilot project is slated to begin 2017, totals 6,500 acres, and consists of four project areas (fig. 10). Private landowners were notified through mailed letters by MKWC staff. The letters informed them that their lands were being incorporated into the project area; though one interviewee talked about the difficulty in contacting residents, some of whom did not want to participate:

Yeah, so then the letter said I'd be following-up with phone calls, so I tried to do that, but a lot of times, it's just hard to leave a message that's long enough that they understand what I'm talking about, but short enough that I don't get cut off. I'm always getting cut off.

I think there's a group where it's privacy [resistance to incorporation] because of marijuana, but there's also a strong element in this community of just privacy in general. That's why they came out here. Yeah, distrust, privacy. Let's see, what else? Well, also, just pride. Like this one fellow up there, Donahue [project site], he's like, "I don't need any help. I do it myself. I've been doing it myself for 30 years, and now my son helps me," or whatever. (Interview 22, Non-profit organization member)

Inclusion of private landowners has depended upon WKRP leaders coordinating projects to incorporate them. Landowners, who may at first be resistant, are personally contacted and persuaded, to either conduct or accept fire risk reduction treatments so that all-lands

are included in project areas. MKWC has become well-respected among local residents, and has worked to build trust; this helps to bring these lands into projects. Local NGOs and area residents in the western Klamath region have had fairly recent, past negative dealings with federal agencies, and organizations like MKWC are critical for building back trust in relationships.

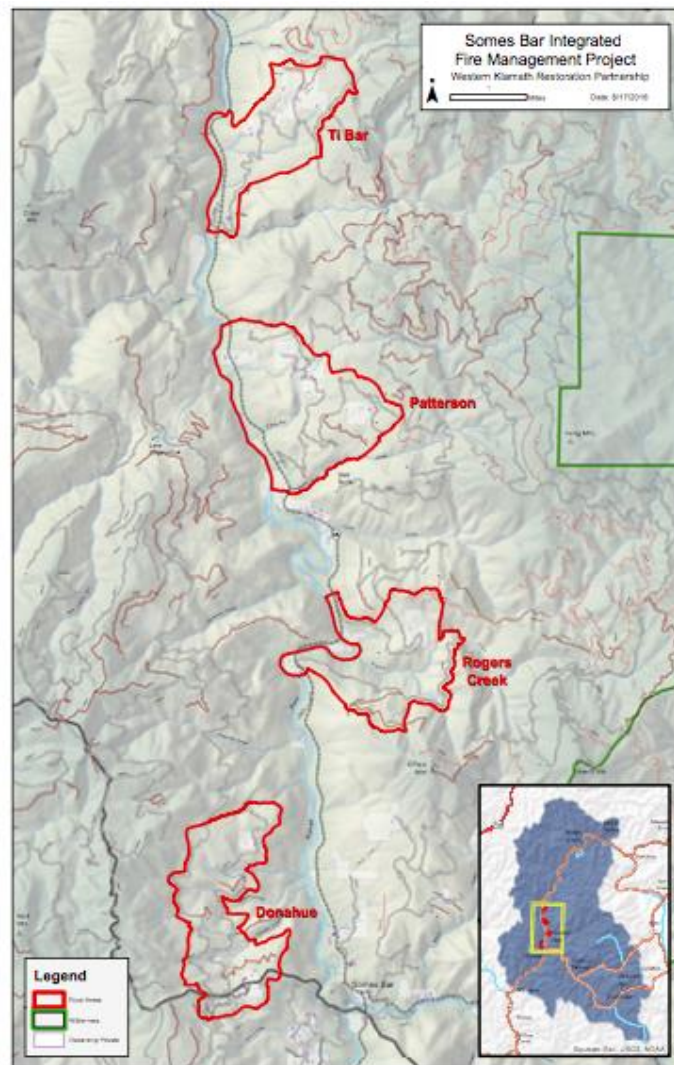


Figure 10. WGRP pilot projects slated for restoration work in 2017. Note light colored parcels of private lands within each project area

Part of the mission of the OSB pilot projects is to apply lessons learned from the WKRP's multiple experiences (in 2014, 2015, and 2016) with TNC's Prescribed Fire Training Exchange (TREX) program. TREX trains for federal level wildfire management by providing national certifications to local managers to conduct treatments on public lands. A TREX manager spoke in favor of the program:

TREX is pretty radical with burning on federal land. It's breaking down social barriers that have limited collaboration for decades. Some of the TREX projects have been done on private lands, public lands, some cross boundary work, a military base, and a giant ranch. Funding is a major barrier though to prescribe burning but TNC has shown that lots of acreage is accomplished through volunteers. International participants have been encouraged to attend and a group from Spain was at the 2014 TREX in the Klamath. (Interview 25, The Nature Conservancy representative)

TREX is a major tool for conducting cross-boundary, landscape level treatments by local managers on federal lands – a particular focus for future WKRP projects. A WKRP member spoke about the innovation of TREX:

Whether it's the prescribed fire training exchange [TREX] model based on a type three incident management team, that's locally based and potentially available for fire suppression and prescribed fire. A lot of these things are really helping the national folks to understand what a new fire management paradigm looks like (Interview 1, Non-profit organization member).

The Klamath has therefore been a place of innovation exemplifying a new fire management model for national managers and policy makers.

The remaining two community-based projects, Happy Camp and Sawyers Bar, are located within the KNF. Figure 11 illustrates the Happy Camp pilot project - different land uses and highlights the private lands on the eastern edge, near the town limits of Happy Camp. The Happy Camp pilot is led by agency members from the USFS Happy

Camp Ranger District and Happy Camp FSC - mainly composed of community members. The Sawyers Bar pilot project is led by the Salmon River Restoration Council (SRRC), the Salmon River FSC, and KNF agency representatives. While all three community-based projects adhere to WKRP's mission as a whole, each are focusing on particular geographic areas. As an example, SRRC's Yellow Jacket Ridge Project is an experimental, science-based project to reintroduce fire to an area which has been the site of recent wildland fire (fig. 12). Though this project is occurring solely on federal lands, its effects will be examined by multiple partners, illustrating the all-hands, collaborative aspect of ALM.

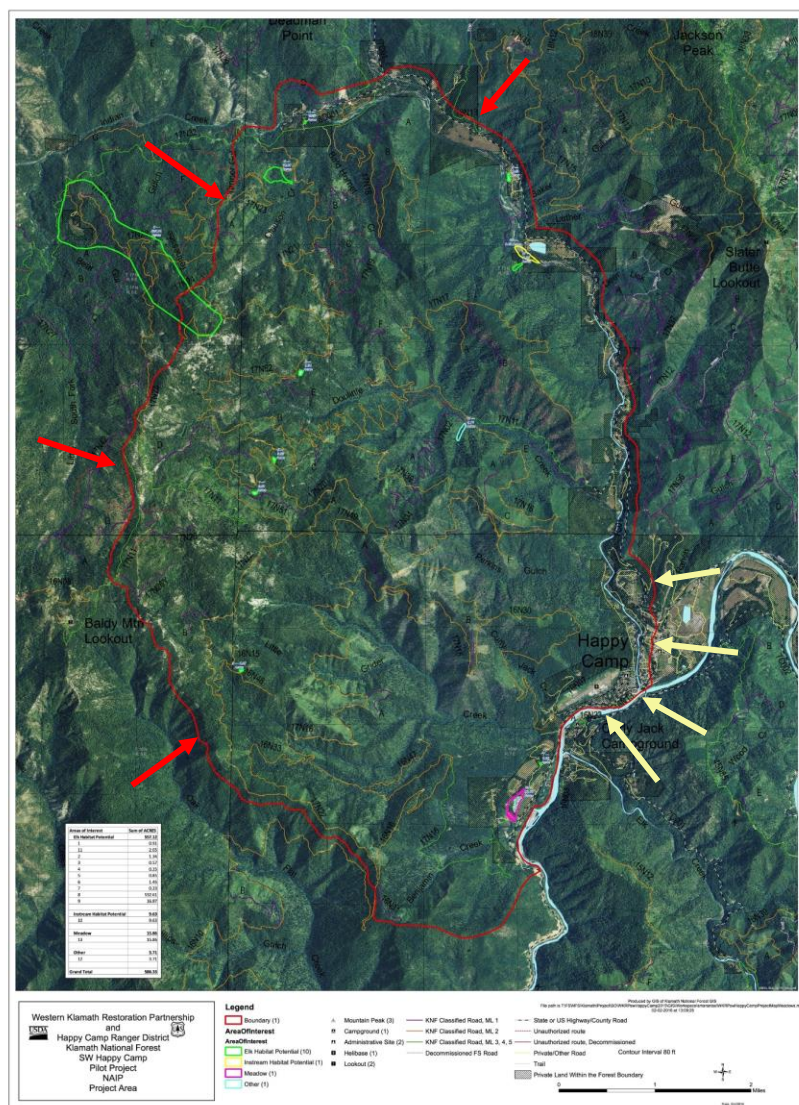


Figure 11. Happy Camp pilot project. Note dark gray shading on eastern edge showing private lands

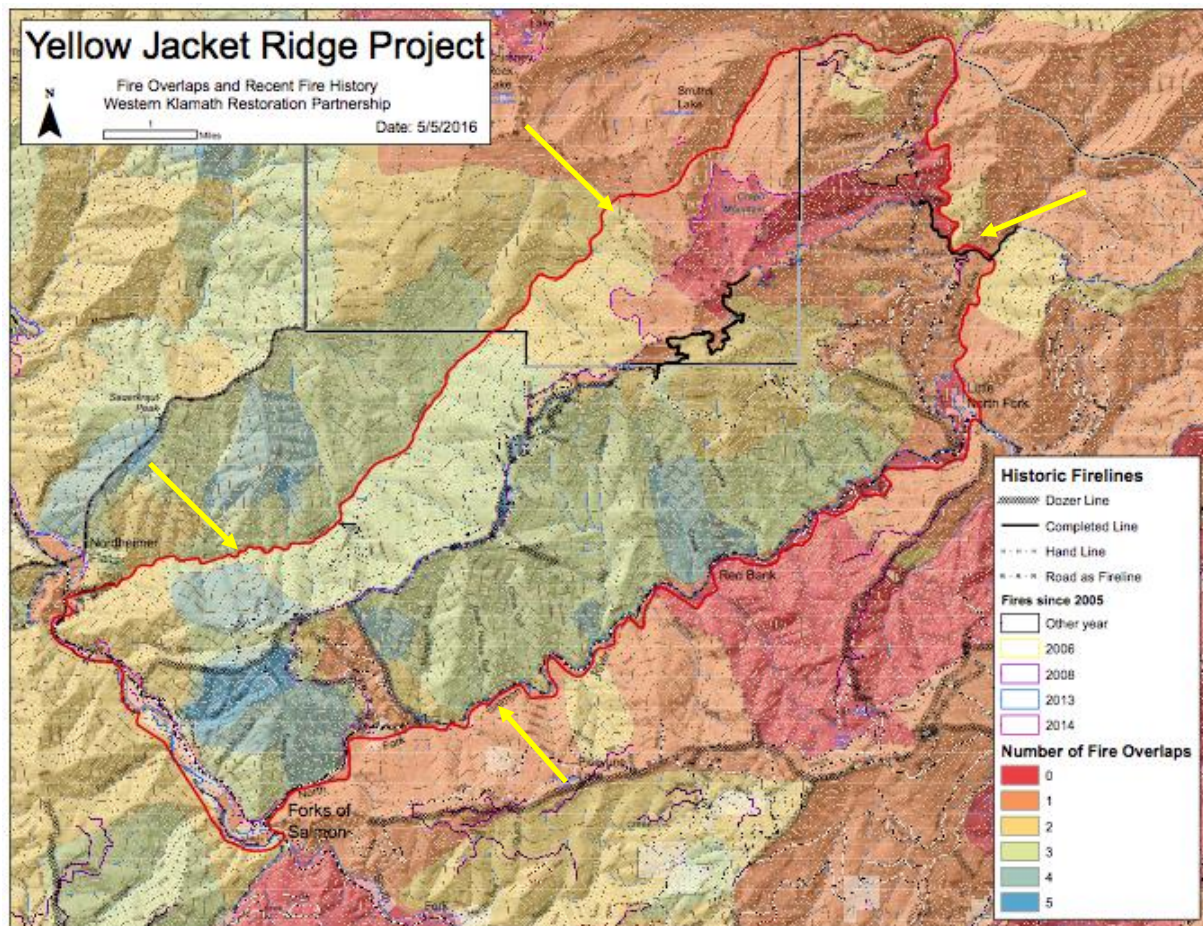


Figure 12. Pilot project taking place out of Sawyers Bar in the Salmon River subbasin

Changing relationships among managers of the WKRP

The WKRP has received financial and staff support from the KNF but has also had conflicts in partnering with them. To illustrate, one of the WKRP co-leads is a KNF fire ecologist; the KNF provided the funding for the group's restoration plan production; and the SRRC in Sawyers Bar has worked closely, at times, with the KNF over the years. On the other hand, the KNF proposed a controversial Westside Fire Recovery Project

(Westside) after a fire event in August 2014, that resulted in litigation actions taken by WKRP partners.

The Karuk Tribe along with a consortium of environmental groups, filed a lawsuit challenging Westside once its draft EIS was presented for public review. The lawsuit warned the project would cause negative impacts to salmon and that it failed to incorporate fire on the landscape. Westside's critics cautioned it reverted to a model of salvaging timber, replanting, and fire suppression. The Tribe proposed an additional alternative to the ones in the Westside EIS drafted by KNF, which decreased the salvage area by 1/3 and prioritized WKRP's principles of protecting rural communities, and working towards reintroduction of beneficial fire. A WKRP partner talked about dealings over the Westside project:

We've had months, and months, and months of time that Klamath National Forest has been able to engage with us and for us to provide direction on their Westside salvage, but because they drag their feet, did their own thing. That's not, to me, the way you deal with a landowner on your forest because we're a landowner and they don't see us as that. In our mindset, it's like we're not the owner of the land, but we are most definitely the most important component of the landscape. (Interview 14, Karuk tribal member)

In this instance, the KNF excluded WKRP partners from the planning of the Westside project.

Multiple WKRP partners spoke about differing national forest priorities and the constituencies of the SRNF compared to the KNF. The KNF is headquartered in Siskiyou County and has predominantly been a ranching/timber area, while SRNF is located in Humboldt County, a more liberal area receptive to collaboration. The more liberal nature

of Humboldt County is partly due to the existing environmental groups, as well as the presence of Humboldt State University academics pushing SRNF in that direction.

Okay, so Humboldt County, Indian Country, green, green-oriented [liberal nature]. The Federal government, and the State governments, local governments are startin' to understand a little bit more, it's more receptive to the communities - native communities, local communities, academic communities. Siskiyou County – conservative, agriculture. That's where I grew up... it's hard to get out to those communities because they're set in their ways. (Interview 11, Karuk tribal member)

She's [KNF Supervisor] balancing a whole different pot of stakeholders which includes Siskiyou County and a lot more timberland owners that are very weary of trying to be part of the [collaborative] decision making process... The Klamath [KNF] is the last bastion of the true timber beasts. They have been getting their cut out there. (Interview 1, Non-profit organization member)

As illustrated, Happy Camp and Sawyers Bar exist within the KNF jurisdiction.

WKRP partners residing in these areas are pushing forward with restoration plan priorities and are very cognizant of the present challenges in partnering with the KNF.

Growing capacity for ALM in the Klamath also reveals barriers

Similar to the AFR, WKRP federal partners are relying on their collaborative partners to lead out-of-the-box, innovative projects comprising all-lands, all-hands aspects of a forest resilience model. Partners often cited the commonly used phrase, “all hands-on deck,” to invoke what is necessary to carry out this new model.

After the failure of the OCFR project, WKRP partners began gathering resources and building network capacity largely by continuing work through the California Fire Safe Council (FSC) program – which funds many local FSCs. FSCs support small-scale, community-based efforts to reduce wildland fire risk to private lands. This program has

assisted in building local capacity around fire management in the Klamath region, where local partners leading the WKRP have all worked through community-based FSCs for over twenty years (fig. 13).

WKRP has worked to organize area fire managers (federal, state, local) and local groups and communities through the collaborative; sought resources through partners and programs; and accomplished agreement on fire management not only through partner support and inclusive expertise, but through individuals who have fostered relationships and trust (fig. 13). Figure 13 maps the groups who have worked to unify this partnership. Notable groups' roles enabling agreement involve: TNC (expertise, Fire Learning Network, facilitation), USFS-SRNF (committed long-term funding and staff), MKWC director (linking participating stakeholders).

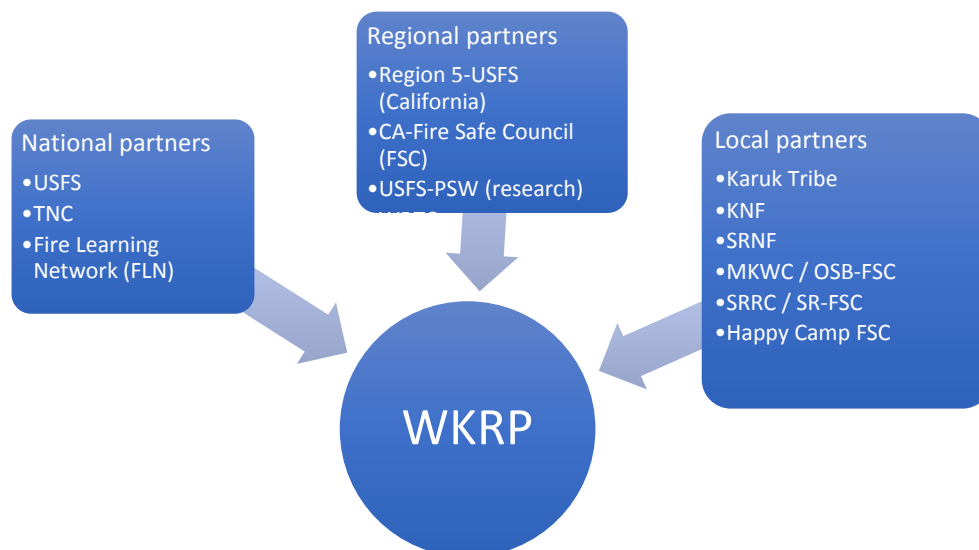


Figure 13. WKRP partners across multiple scales unifying partners for collective agreement

WGRP stakeholders for the first time are collectively moving forward on upslope projects largely through the help of the FLN's prescribed fire TREX program. The prescribed-burn program has been instrumental since it furthers the mission of the group to return "good fire" back to the landscape. Over 90% of the landscape is USFS land, and the downsized agency has limited capacity for work. TREX acknowledges this and demonstrates an alternative model through building local capacities. Capacities are built through the program's national certification training to conduct work on public and private lands, and also by bringing volunteers in the form of fire crews in training.

Barriers to building capacities for ALM in the Klamath region partly involve funding mechanisms and bureaucratic challenges that come with USFS partnerships. Similar to AFR, a funding mechanism for the WGRP has also been Joint Chiefs, through the KNF. Approximately \$3 million in funding was provided by the program but because of the condition that funds were to be used for work only, not planning, these dollars have not assisted the group as much as they could have (USDA and NRCS 2016). Only a small portion of Joint Chiefs funding was allocated to private lands within the OSB community project, much more might have been if adequate personnel from the NRCS had been available. One forester from the NRCS was dedicated to appropriate the funding, which was not enough support for this plan area. The majority of Joint Chiefs funds went to NEPA-ready projects already prepared by the KNF and without any input from the WGRP – WGRP partners felt this was another missed collaborative opportunity by the KNF (TNC 2013).

Interestingly, a WKRP manager expressed a counterintuitive point how receiving money is not always a positive thing when the capacity to appropriate it is not sufficiently developed:

We're on an unlevel playing field when they've [Forest Service] got \$2-3 million in internal funding to support their work. That was part of the beauty of WKRP is they [SRNF] recognized that the partners also need funding to participate in a meaningful way. That was a huge shift. At that same time a lot of our non-federal partners including MKWC and the tribe are going through growing pains. Our staffing levels, funding levels, triggered our first audit. Just because of the amount of money we made which then took up a bunch of our staff time. At a time when we're adding a bunch of staff to the payroll. A lot of money is not necessarily a good thing unless we have the capacity to use it in a good way and to weather those growing pains. (Interview 1, Non-profit organization member)

This quote shows one of the major contributions of the USFS. It displays a cultural shift between the USFS-Region 5 (i.e. California) and local SRNF offices to support groups in ways they have not previously – granting funding for planning. Administrators in the Forest Supervisor and District Ranger positions at SRNF provide key support. These key positions are held by members of the Hoopa Native American Tribe, historic neighbor to the Karuk. The tribal influence has been encouraged by regional partners (USFS Region 5) and is providing critical support catalyzing WKRP's mission and supporting the integration of TEK with western science. However, challenges remain that must be addressed, particularly formal support for capacity building, if ALM is to have longevity.

Finally, WKRP partners have identified barriers to ALM and are strategizing ways to overcome them. A WKRP member reflected on potential solutions that largely involve fire managers and administrators, on all levels, agreeing on a collective plan:

Whether it's by engaging with CAL FIRE so they don't create too restrictive burn windows. Or whether it's engaging our regulatory agency so they don't restrict our treatments, time windows or treatment options that won't get the job done because of potential impacts to [sensitive] species. All those issues need to be addressed. As well as the—bringing the community along with us, the information sharing, the shared learning. (Interview 1, Non-profit organization member)

This quote highlights a general principle of ALM which is calling upon all managers and stakeholders to jointly create agreements on what kind of fire management actions a particular landscape will receive. It also depicts the complex nature involved in accomplishing this – but shows how managers are engaged in spearheading the effort.

CHAPTER V. DISCUSSION

Top-Down Support in Shifting to a Forest Resilience Model

This research examined two cases working to shift out of a pure fire suppression mode of forest management to a resilience model by employing ALM - as encouraged by the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy). This research sought to answer the research question – How is ALM implemented in fire adapted landscapes - through three objectives: 1) how groups organize, and engage with policies and programs; 2) the legal, regulatory, and economic environments of ALM collaboratives; and 3) how collaboratives implement ALM restoration goals despite limitations. I hypothesized that for large-scale, cross-boundary coordination to endure there must be institutions, programs, and policies to support them.

Although each case offered different lessons for ALM planning and implementation, I affirmed my hypothesis in that they both shared the need for a supporting framework (i.e. institutions, programs, policies) and resulting infrastructure for carrying out this new management approach. The AFR and WKRP demonstrate different organizational structures of ALM, restoration project work on a landscape scale, and the difficulties and opportunities ALM presents. Despite their differences, both cases shared common frameworks, were guided by common policies, and were supported by common programs such as Joint Chiefs. They also participated in common programs, such as Firewise, and they had common participants, such as The Nature Conservancy.

The Cohesive Strategy was the common policy adhered to by both cases in this study and exemplifies Agrawal and Gibson's finding that supportive policy is critical for bottom-up resource management. This policy encourages a model of management that addresses both the increasing costs and risks of severe wildland fire. Both groups, the WKRP and AFR, align with Cohesive Strategy principles that join "all-hands" and "all-lands" to accomplish it. Their implementation of all-hands, all-lands management is termed ALM, a land management approach involving collaborative, science-based ecosystem restoration at the landscape scale that occurs across ownership and jurisdictional boundaries.

The challenges of developing a resilience model

This section briefly touches on what Kellert et al. (2000) describe as the challenge of effective implementation due to the extraordinarily complex nature of CBNRM, but in this case ALM. The Cohesive Strategy calls upon all-lands jurisdictions (local, regional, state, federal, national) to collectively conduct fire management through ALM, a vastly different approach than traditional top-down, agency driven management. As illustrated, forest management is largely separated into two camps: fire suppression and resilience (or restoration-based). The Cohesive Strategy prioritizes restoration by emphasizing the need to restore forests to become resilient to fire by reintroducing it, and doing so through a collaborative process of diverse partners on all levels, for the long-term (DOI & USDA 2010). However, there are no blueprints in doing this and collaborative groups must design and innovate how this process will take place.

Design and innovation in both cases provided lessons in ALM planning and implementation. Planning that organized partners and established shared decision-making included AFR's Master Stewardship Agreement (MSA), while the WKRPP employed TNC's Open Standards Process. Innovation around implementation was demonstrated by both groups calling upon local stakeholders and existing traditional ecological knowledge (TEK). TEK guided new practices working toward a resilience model, which is still relatively unknown to most managers across the U.S. (Senos et al. 2012).

An innovative idea by a WKRPP partner was to redesign forest management to encourage ALM through an all-lands workforce. In other words, since ALM implementation is locally based, it is largely dependent upon a local workforce. Thus, local organizations should have the capacity for wide-ranging projects year-round, including suppression to support the various priorities for a landscape. If local groups are to address various priorities and manage and conduct wide-ranging projects, a full-time workforce is likely necessary. Depending on geographic characteristics this may not be possible everywhere. However, ALM which is local-centric, highlights the need for significant workforce development and training. Programs addressing the need for workforce development and training include TREX, Fire Adapted Communities, California Fire Safe Councils, and Lomakatsi's work model. These programs provide examples of proactive ways managers are reducing wildland fire risk, that could be more effective if scaled-up.

Funding ALM through programs and economic generation

Development of funding sources that not only support a local workforce but that cover the cost of restoration is paramount. Lomakatsi provides a work model that is doing this and can offer lessons to be learned by others. AFR partners are contracted by an MSA which binds them to a 20% cost match whereby the USFS provides 80% to conduct work. The expense of restoration (particularly costs involved with initial treatments), and a down-sizing USFS agency more reliant on partners, requires creative funding strategies to support this work.

Not only is it important to have skilled partners who can raise funds through grants, it is also important to generate alternative funding sources. Examples of this provided by both ALM cases include: restoration by-product utilization (small diameter wood, biomass, chips), biochar (fertilizer) production, selective logging, and “adding value” to ecosystem services (i.e. water storage/filtration, soil building, carbon storage). Although these ideas are practical and creative, they tend to fall short without significant investment. The AFR case provides an example of an approach supplemented by investment. Invested funding sources include the USFS, NRCS, and state of Oregon; while economic generation has come from selective logging, restoration by-product utilization, and taxing Ashland residents. The AFR funding strategies provide an instructive model to extrapolate from where possible.

Constraints to ALM funding

Compared to AFR, the WKRP has also received funds from the NRCS (Joint Chiefs), among others, but has not yet translated funds to on-the-ground work quite like

AFR. Challenges to translating these funds included: lacking NEPA ready projects (i.e. time, funding, capacity delays); presence of NEPA ready projects at the KNF; lacking capacity of the NRCS to provide sufficient staff to the WKRP; the lack of a robust local workforce; and the condition that funds be used for work implementation only, not capacity building.

ALM is a long-term, complex model that requires large amounts of funding. It is widely agreed upon that in order to achieve forest resiliency, regular fire treatments (every 7-10 yrs.) must be applied. Failing to institute regular follow-up treatments risks futility of doing any restoration work at all (North et al. 2012; Churchill et al. 2012; Moritz et al. 2014). The AFR and WKRP show two different ways of engaging with ALM that exhibit long-term cost savings compared to suppression.

These ALM cases and others like them that are applying Cohesive Strategy principles of increasing safety, lowering costs, and preserving vital forests, are paving the way for a resilient model of forest management. Pure fire suppression is an entrenched, reinforced model supported by rigid bureaucracies resistant to change. Aligning with Butler and Goldstein (2010), diverse groups like the AFR and WKRP that have high levels of expertise, enhanced by TNC partners, foster creativity and innovation that carve new pathways and break free from bureaucratic rigidity.

Bottom-Up Support for ALM: Social, Cultural and Human Capital

Social capital is the existing links or connections of a group where mutual gains are fostered that benefit the parties of a group and their social network (Woolcock 1998;

Putnam 1995; Lurie and Hibbard 2008; Wagner and Fernandez-Gimenez 2008). The mutual gains are based on the reciprocal nature of the relationships that form the links in a network, enhancing the capacities for achieving group goals. In the case of ALM, mutual gains involved employment of Cohesive Strategy principles and working towards a resilience model of forest management.

To accomplish Cohesive Strategy principles, its collaborative creators urge that “all-hands” and “all-lands” join fire managers, residents, and their landscapes to jointly develop locally-based fire management strategies. This new approach to fire management flips suppression management on its head and redirects efforts to come from the local level. I found social capital to be a fundamental necessity to overcome the old model, or the “rigidity trap”, of fire suppression reinforced by the bureaucratic agencies resistant to change.

Diverse stakeholders build capacity for ALM

I observed social capital to be critically sourced from locally-based partners such as Lomakatsi, the City of Ashland, the Karuk Tribe, and MKWC. In alignment with Kellert et al. (2000), bottom-up (locally-based) resource management is more successful when partners have high levels of political and forest management sophistication. In other words, these local partners have the ability to be an equal partner with their state, national, and federal partners. As illustrated, both ALM cases’ local partners belong to long established social networks that have been building social capital for over three decades. Among ALM group partners and their broader social network, social capital has garnered increased trust and mutual respect; public participation and thus support from

the surrounding community; attainment of political recognition; an increased ability to obtain grants; success in joint planning exemplified by work completed on-the-ground; and a broader view of the landscape by bringing in diverse landowners and drawing on additional resources.

Local partners like the City of Ashland and Lomakatsi, and the Karuk Tribe and MKWC, through their ability to not only obtain grants and raise funds, but complete on-the-ground restoration have enhanced capacity for ALM through human and cultural capital; and as a result, reinforced social capital. Wagner and Fernandez-Gimenez (2008) find that existing social capital can positively reinforce itself - this was clearly displayed in this study. The City of Ashland's tax on residents, and Lomakatsi's ability to obtain grants and manage restoration implementation recruited funding and support from not only the USFS, but with new partners, like the NRCS and ODF. Similarly, with the Karuk Tribe's invested federal trust funds, MKWC's skill at obtaining grants, and through successes in joint fisheries restoration, TNC and the FLN were recruited. TNC and the FLN brought the TREX program, enabling cross-boundary prescribed burning, which has enhanced local capacity for prescribed burning through training certifications.

Not only are locally-based partners playing an important role in building social capital for ALM but so are regional, national, and federal partners. As illustrated, the formalized multi-scalar nature of partners (local to national) in ALM groups, compared to CBNRM, is a primary difference between the two models, and major contribution of this research. Kittredge (2005) highlights the need for a force that brings all stakeholders and

landowners together, and how NGOs are increasingly being it. Both ALM cases displayed this by partnering with TNC, a national NGO.

TNC was critical for facilitating agreement among diverse partners, and enhanced social capital as a result. AFR partners included TNC, while the WKRP partnered with the FLN - a program co-led by TNC and who they directly worked with. TNC has exemplified what Ostrom (1998) describes as a “polycentric institution”, which is a nested, semi-autonomous decision-making organization that simultaneously operates at multiple scales, which helps to overcome the rigidity trap imposed by bureaucracies. Because of this the organization has enhanced the capacity for ALM with both ALM groups.

Human and cultural capital: reinforcers of social capital

Becker (1994) finds that human capital is the embodiment of knowledge, skills, and abilities of people. He deduces the most important investments of human capital come from education and training. Comparatively, cultural capital refers to knowledge obtained by human societies that provides them with the means to adapt to and deal with the natural environment, and also how to actively modify it (Berkes and Folke 1992). Both ALM cases, as illustrated, have unique capabilities due to long-established networks that have reinforced social capital. I argue that existing human and cultural capital are a main catalyst for building social capital enabling ALM, as was demonstrated by both cases.

Human capital enabling “all-hands”.

Both ALM cases have built upon existing sources of human capital in their areas. The Pacific Northwest region is known for its high level of ecological diversity and richness in natural resources - this has drawn people with varied interests into forest management. When the Northwest Forest Plan shifted forest management priorities to include restoration, people engaged in this work were called upon. When the first national fire policy, 1995 Federal Wildland Fire Management, urged a shift away from pure suppression, more knowledge from professionals was needed. People in this region have grappled with these forest management shifts and as a result built human capital to better manage their forest resources, benefitting ALM efforts today. The newest shift to resilience-based forest management again calls upon professionals to pave the way for a new model with their skills.

As the Cohesive Strategy stresses a model like ALM, emphasizing actions to take place on the landscape level, local partners must be able to organize, manage, direct, and lead day-to-day planning and restoration work activities. Also, local partners engaged in ALM are tied into a national network of forest professionals and officials and must simultaneously engage on regional and national levels. To do this, I found a requirement for bottom-up resource management is to have a high level of human capital, with an emphasis on local managers' skills and abilities (Gruber 2010; Lurie and Hibbard 2008).

Uniquely, both ALM groups comprise similar specialized sources of human capital. Both groups have relied upon the work of PhD scientists that specialize in the ecoregion that they are found. For example, AFR partners repeatedly cited Jerry Franklin

(University of Washington), while the WKRP cited Carl Skinner (Pacific Southwest Research Station).

Local network partners of each ALM group have been active in collaborative forest management for over two decades. The Applegate Partnership's founder led one of the first attempts to bring together diametrically opposed parties, environmentalists and the timber industry, to not only find common ground, but to collaborate. This regional innovation has persisted. Similarly, the WRTC engaged in formal partnerships with the USFS and laid the foundation for new contractual arrangements with the agency (Abrams et al. 2015).

A few examples illustrate human capital through innovations by AFR partners, and provide a glimpse into their impact. In Ashland's formal cooperative agreement with the USFS, I found three important figures filling key roles. The head of Ashland's Forestry Division Dept., Ashland's City Mayor, and the USFS-AFR manager. All three of these figures shared a common skill of bringing various groups together and facilitating communication. The Forestry Division Chief brought local partners together during the early stages of AFR; the Mayor lobbied in D.C. and influenced agency officials to support AFR; and the USFS-AFR manager facilitated agreement and collaboration among AFR partners.

Key figures in the WKRP who brought diverse partners together and facilitated communication included: TNC actors facilitating the OSP process; a MKWC director able to translate locally-rooted values to higher level partners (national, federal); a Karuk PhD and USFS PSW scientist (along with others) working to unite science with TEK;

and the SRNF supervisor (area tribal member), who helped to unify Karuk priorities with USFS priorities, and through effective communication garnered wider support (e.g. USFS Region 5).

The Western Klamath and Southwest Oregon regions have been areas of innovation and creativity in part because of attracting research and researchers. This supports Gruber (2010), who found through analysis of 24 CBNRM cases that effective communication of research results and a common technical understanding among all partners is integral to successful efforts.

Cultural capital enabling “all-lands”.

The areas of these case studies have rich, existing knowledge bases provided by local tribal societies who live on their ancestral lands. The cultural capital present in the region of these case studies includes the combination of western science and TEK. Combining both knowledges is thought to broaden creative management solutions, and likely lead to better ecological outcomes. In agreement with this, researchers have found integrating locally rooted knowledges and practices of bottom-up management leads to greater success for restoration projects (Blaikie 2006; Kellert et al. 2000; Gruber 2010). The incorporation of TEK has led innovative restoration strategies for a new model of fire management which does not yet have a set protocol for the design of restoration treatments.

Lomakatsi has contributed human capital through their co-founders who embody unique skills in having prior careers engaging with both the forest industry and private, family forest owners. In their work with private landowners, Lomakatsi has specialized in

pioneering ecological forestry treatments sourced from area tribal experts fluent in fire ecology principles (Lomakatsi 2005). The organization works to fulfill its mission to: “restore ecosystems and the sustainability of communities, cultures, and economies” (Lomakatsi 2005). Lomakatsi’s ability to coordinate resources, work alongside federal partners, and employ ecological forestry, while building trust with landowners and the community are partially why this group has been so successful.

Comparatively, the western Klamath region, co-led by the Karuk Tribe is poised to engage in large-scale, prescribed fire restoration experimentation because of its rural, backcountry setting. This approach has many challenges, one of which is smoke exposure for which the group has sought solutions to (i.e. home filter distribution). The group is positioned to demonstrate the idea of resiliency on a large scale, and to exhibit the effectiveness that reintroducing fire to a landscape could have in comparison to pure fire suppression. Similar to AFR, this group is combining western science with TEK in their innovative approach to restoration.

Enabling Factors and Constraints of ALM

Institutions for ALM encouraged by The Nature Conservancy

A striking example of capacity enhancement by TNC is through the FLN. TNC and the FLN exhibits Ostrom’s concept of polycentric institutions where they “can address environmental problems at multiple scales better than centralized governance structures” and encourage different responses to complex problems and foster innovation by gathering together diverse individuals and organizations (Cumming et al. 2013,

p.1144). As more non-federal partners engage with federal partners in a resilience model of fire management through ALM, complicated networks of federal agencies, state forestry agencies, and local (county, municipal, and volunteer) groups, are piecing together how to function as a unit. These complicated networks of fire managers must organize and coordinate and TNC is helping in that mission.

The United States FLN (US-FLN) is a national organization, but ties in local and regional FLNs (collaboratives) into the national organization, or network. Up to twice per year local leaders meet with regional partners to share and learn from partners' successes and mistakes, and peer reviews of restoration plans (TNC 2013). The US-FLN has been found to build local expertise, thus sophistication, through: knowledge sharing, training, addressing particular needs through topical workshops, and restoration implementation (Butler and Goldstein 2010). These FLN tactics enhance social capital and capacity for ALM groups and projects as they encourage social learning to adapt to emerging information.

Cumming et al. (2013) and others find necessities of fostering resilient landscapes are developing appropriate institutions that will act flexibly, proactively, and at appropriate scales (Butler and Goldstein 2010). These authors cite development of these institutions must grow and adapt through social learning. TNC and the FLN display these authors' findings in promoting resilient landscapes through development of fire management institutions that adapt and change by facilitating information sharing. Both ALM groups have fully engaged with the FLN. Before WKRP was a formal organization, group members formed a local FLN collaborative - WK-FLN. Similarly, AFR

stakeholders, apart from the ALM effort, participated in a regional FLN collaborative – Northwest FLN. Therefore, both cases have enhanced their capacities by engaging in the FLN’s social learning process.

TNC is restructuring fire management institutions through a multi-scalar approach by linking local and regional collaboratives into a national network. This has facilitated problem solving and collective agreement among fire managers to actualize Cohesive Strategy principles to on-the-ground work. The organization helps link policy and decision makers, and high level (regional and national) professionals, to local level fire managers addressing high fire risk and events that put their communities and well-being in jeopardy. By the FLN bringing together diverse stakeholders in a formal way, and enhancing local level capacities, the organization has significantly elevated the potential for ALM – which greatly depends on local fire management capacities.

In addition to TNC and the FLN bringing stakeholders together, they also help to create group cohesiveness in partnerships thus enabling groups to function as a unit. One TNC staff and TREX manager articulated this ability at one of WKRP’s TREX events: “through the Western Klamath Restoration Partnership and TREX, we can help by providing key examples of how cost savings can be realized, while achieving better ecological results on the ground and protecting and enhancing cultural resources. The ability for our staff to communicate and engage with stakeholders on all levels is instrumental in facilitating this paradigm shift” (TNC 2017, p. 3). The mission of TNC to facilitate all levels of fire managers to work together is combatting one of the biggest challenges of ALM and the shift to a resilient forest management model.

Challenges to diverse stakeholder collaboration in ALM

Major challenges to ALM included: distrust by local managers and their constituents to partner with federal agencies due to past, negative dealings such as in the case with the WKRP; lack of confidence by federal agencies to partner with local groups due to deficient capacities also demonstrated by the WKRP before TREX (i.e. political and institutional sophistication); and underdeveloped mechanisms to usher shared-decision making authority thus joint-administration of projects which ALM encourages, contrasting with traditional, top-down, agency administration. These findings mirror previous findings (e.g., Ferranto et al. 2013; Bergmann and Bliss 2004; Gruber 2010; McCaffrey et al. 2015; Cumming et al. 2013; Agrawal and Gibson 1999; Kellert et al. 2000; Wagner and Fernandez-Gimenez 2008).

Shared decision-making processes is likely the biggest hurdle for ALM groups conducting jointly-administered restoration plans. Joint administration effectively means all partners have a seat at the decision-making table and are all considered to have equivalent contributions in carrying out the collectively developed restoration plan mission. Trust and confidence by all partners lie at the heart of realizing shared decision-making authority within a partnership and are more attainable with existing social capital and well-established social networks (Agrawal and Gibson 1999; Kellert et al. 2000; Gruber 2010).

AFR partners' approach to ALM began small (but did later expand), with a well-defined planning boundary and shared decision-making. Their methods align with authors in having an increased chance of success because of that approach (Cox et al.

2010; Gruber 2010; Blaikie 2006; Armitage 2005). However, this counters a main idea of ALM which is to scale-up to large scales, the boundaries of projects. Contrary to ALM's large landscape approach, AFR started small but has expanded; this research contributes to the idea of ALM found by (Spies et al. 2017) that it can both start small (and expand), or start at a large scale (WKRP). The WKRP exhibits a large landscape as the group's planning extent is expansive and complex, with greater numbers of partners, which better matches national fire managers' aims to scale-up ALM. Large areas treated by restoration have the potential to save millions of dollars in fire suppression. This economic impact, if demonstrated, could incentivize ALM as a more cost-effective approach to fire management. Already AFR is instructive to learn from, particularly in how it has more than doubled its original footprint due to significant progress partners have made.

To engage in shared decision-making, agency members are tasked with countering agency culture of sole decision-making authority and to reexamine their entrenched, decision-making protocol because of the potential benefits. Incentives for ALM to the USFS I found were: overwhelming costs of suppression management crippling restoration programs thus incentivizing partnerships to reduce project costs; ongoing decrease of agency workforce capacities since the de-emphasis on extractive management encouraging partnerships to supplement the loss; and conflict halting agency projects due to distrust of intentions by citizens and environmentalists which is largely remedied with their inclusion and seat at the decision-making table. To overcome the inherent challenges within the above incentives, the USFS must have partners they can trust and have confidence in, particularly when outside parties will conduct high risk

based projects on federal lands, that the agency is held legally liable for (e.g. prescribed burns).

Challenges and problem solving of ALM by local stakeholders

As discussed, both the AFR and WKRP are part of long-time social networks involved in building social capital through collaboration with diverse partners since the early 1990s. This collaborative history has built capacity for ALM projects helping to overcome some of the challenges stated in the previous section. For example, the City of Ashland has partnered long-term with the RRSNF since their 1929 joint cooperative agreement. This agreement and collaborative environment have enabled the conditions for stakeholders to engage in shared decision-making.

The cooperative agreement has been critical for formalizing joint management of the City's watershed, but the long collaborative history, and steadfast interest the public has had in forest management has elevated local managers' capacity to be an influential partner. The relationship between the USFS and the City has fostered trust and confidence among both parties to work with one another; enhanced local capabilities to engage with federal partners; garnered political recognition with the City for their work with the agency; grown public support for projects with the USFS through City outreach efforts and partnerships with trusted organizations such as TNC and Lomakatsi (public survey¹); and built local workforce capacities by broadening partnerships.

¹ Shibley, Mark A., and Michael Schultz. 2012. "Public Perceptions of AFR and Forest Restoration; ~~1001~~Results from an Opinion Survey of Ashland Residents." The Nature Conservancy.

Through AFR joint planning and completed restoration work on-the-ground, I found significant support for project efforts which resulted in project expansion and a broadened view of the landscape planning area. The AFR expansion project AFAR incorporated private lands adjacent to AFR, and did so because of AFR's success in completing work which attracted funding from the ODF and NRCS. Accomplishing joint planning and work on-the-ground is a complicated, long-term investment by many partners. AFR partners met accomplishments by: having skilled partners (local and TNC) at the table which garnered trust and confidence from the USFS; focusing efforts on including the public throughout planning, implementation, and monitoring - fostering support from the sector; and an organization like Lomakatsi, able to implement on-the-ground work. An important geographic distinction between AFR and WKRP is southwest Oregon's remaining intact forest industry infrastructure, which Lomakatsi can marshal for restoration work. WKRP pilot projects (2017), whose partners don't have access to the same kind of infrastructure, will provide an important lesson on alternatives for ALM project implementation as the group develops strategies to complete work.

The WKRP is addressing broad fire management issues similar to the AFR, but also problem-solving issues specific to the western Klamath region. Particular incentives for ALM in the region were: overwhelming costs of suppression management incentivizing partnerships to identify locally relevant solutions; limited agency workforce

<http://www.ashland.or.us/Files/Public%20Perceptions%20of%20AFR%20Forest%20Restoration.pdf>.

capacities and desire of WKRP partners to ramp-up local restoration workforces; and overcoming conflict halting agency projects due to distrust by area residents, particularly on the KNF (versus the SRNF, which had more devolved decision-making processes).

In ten fire seasons between 2000-2015 over \$450 million was spent on fire suppression in the western Klamath mountains (Harling 2015). Simultaneously, local managers have invested in developing alternative strategies to suppression (in partnership with TNC), that saves costs while adhering to Cohesive Strategy principles. The group has displayed Lurie and Hibbard's (2008) finding that as geographic scales of bottom-up resource management increase, there is a greater need to expand networking capacity (i.e. utilization of partnerships for social capital gains). An example of this is WKRP's work with the TREX program – in addition to demonstrating cost savings it has connected the group to national training programs. Interviewees spoke about recruiting trainees from across the country to gain skills and to conduct work in the region - drawing in resources from outside the area while ramping up restoration training nationwide.

WKRP's restoration plan exhibits the utility of expanding its networking capacity. Guided by Cohesive Strategy principles, the Orleans-Somes Bar CWPP, and WK-FLN (among others), the restoration plan outlines alternative strategies for the reintroduction of beneficial fire, prioritization of cultural resources, containment of wildland fire (managed wildfire), and protection of residential areas and firefighter safety (Harling and Tripp 2014). The group is taking a locally-relevant approach on a large scale, while TREX is helping demonstrate cost savings of applying a resilience based approach to fire management as well as building workforce capacities.

Long-term, management cost savings projected by the WKRP partly involve capacity development of local fire restoration crews, expanding restoration work in the area - already a major economic driver, and scaling-up projects to meet landscape needs. Significantly assisting these is the SRNF, an ardent supporter instilling trust and confidence in the partnership by engaging in shared decision-making. SRNF contributed funds to meet partners' planning needs leading up to pilot projects – a dramatic shift in traditional agency culture. Regional and national support from the SRNF and TNC have aided long-term planning as well as gathered support from other entities such as with the USFS Region 5 and NRCS, but the group is still in the preliminary stages of ALM.

A significant challenge facing the WKRP is upcoming pilot project implementation because of the implications it may have for shared decision-making with the KNF. To reiterate, the KNF contains two of three WKRP community-based project areas, but has proven to be more reticent in its willingness to include local partners in decision-making.

Interviewees spoke about the reluctance of the KNF to prioritize a partnership with the WKRP. Obtaining trust and confidence between these entities has been challenging. Reasons, in part, include the forest's prioritization of commercial logging, constituents in support of extractive management, and agency culture locked in Butler and Goldstein's (2010) "rigidity trap" - resistant to going outside standard protocol.

Lessons provided by challenges to ALM

Existing social capital among both ALM groups have enabled partners to meet common challenges of a new fire management model rooted in local level capacities,

involving: meeting costs of restoration management; shoring up lacking agency workforce capacities; and, building public support to avoid conflict and legal actions through education, landowner programs, and local participation in planning. Landowner programs that provide funding and education, build public support, and formally include these stakeholders in ALM. Public support, largely built by local stakeholders and managers, is critical for recruiting landowners. It also helps to meet another significant challenge - fostering receptivity to smoke-producing prescribed fire treatments. I found that trust is at the heart of ALM. If local managers do not gain trust from their multi-scalar partners, they will not likely foster public support either. Without public support, as shown historically, conflict is likely and uncooperative relationships are the predicted outcome (Bergmann and Bliss 2004; Gruber 2010; Kellert et al. 2000).

Persistent challenges facing both ALM groups and likely other similar efforts, include limited workforce capacities; public exposure and resistance to smoke-producing restoration treatments; and, attainment of stable funding whether through investment and/or economic generation of restoration by-product utilization. Additionally, interviewees conveyed an overreliance and unsustainable demand on local groups and workforces to shore up lacking capacities within the USFS agency.

Both ALM groups are facing the challenges listed above and continuously seeking solutions to them. Lomakatsi members emphasized the need for adjusting short-term grant funding, that supports year-round local workforces, compared to part time seasonal work. Seasonal work involves high turnover, frequent training, and unsustainable demands placed on organizations like Lomakatsi and MKWC responsible

for workforce management. Regarding smoke production, both the WKRP and AFR partners have brainstormed solutions involving distributing home filters, as well as planned and widespread notification to residents of upcoming project actions. As a result, public receptivity to smoke related issues has largely been positive – given the presence of public support and trusted relationships.

Funding challenges are a particularly complicated and challenging issue. I observed partners’ problem solving in a variety of ways. A consistent approach was an “above-all” strategy considering and evaluating all ideas. Interviewees noted that with group progress while being tied into a national network through national partners, policy and decision-makers were more likely influenced to invest in ALM. As illustrated, incentives for restoration include a USFS agency in a budgetary crisis due to the increasing costs, occurrences, and risk of severe wildland fire. These factors are incentivizing federal and national fire managers, and policy and decision-makers to seek out innovative solutions that not only address crippling suppression costs, but counteract this compounding problem plaguing U.S. national forests.

Sustaining ALM by Formalizing Communication and Coordination

ALM, as encouraged by the Cohesive Strategy, is a paradigm shift from an old model to a new model in the institution of fire management. As illustrated, I’ve equated ALM to the all-lands, all-hands approach that the Cohesive Strategy suggests and that support a resilience model. By the institution of fire management, I mean the governmental and non-governmental organizations that fire managers work from, but

also the rules and procedures they follow. By engaging in ALM, like the groups in this study, these organizations are addressing modern management crises and aiding the paradigm shift that is restructuring the institution of fire management. Instead of suppression that both excludes fire and local stakeholders from fire management – which has been detrimental, the resilience approach unites fire and local managers so that mutual benefits can result.

Simply put by interviewees - a resilience model is a proactive (or preparatory) mode rather than a reactive mode of fire management. However, making this shift means breaking free from Butler and Goldstein's (2010) "rigidity trap", which has exacerbated and reinforced an entrenched, dominant suppression model. This study demonstrates through the ALM groups it is based, that there are case examples breaking free from this rigidity by efforts to restructure fire management into a jointly-administered approach rather than an agency-administered one. Previously, I stated ALM is differentiated from CBNRM through formal partnerships that include local, regional, and national partners – exemplifying joint-administration. I found a key component for engaging in joint-administration was a formal mechanism that allows groups to communicate and coordinate.

An extensive study by Yaffee (1996) reviewed 77 partnership efforts consisting of diverse stakeholders (local to national) engaged in ecological management. The author found the most common insights from participants were the need for better organizational and decision-making processes, and doing so through improved communication and coordination. A necessity for this was creation of new decision-making structures.

Because fire knows no boundaries, and its management is cross-jurisdictional by nature, as well as fire management being a subject of national concern – programs and policies have encouraged development of formalized mechanisms for all stakeholders to engage in. The need for joint-administration of fire management is clear and policy is supporting it, however it is up to local stakeholders to marshal capacities to engage in it.

I found that two primary components must exist to engage in joint-administration of fire management. A willingness and support of the USFS to engage as an equal partner in a partnership, and local level capacities so these different entities can effectively partner and simultaneously build trust and confidence in one another. As illustrated, TNC played a role in bringing these willing partners together and facilitating collaboration and agreement, although quite different in both cases.

The Fire Learning Network, that WKRP worked directly with, is not only enabling joint-administration by facilitating the OSP, but is working on a broader, national level to assist in the restructuring of the fire management institution. In comparison, AFR partners have uniquely, and over a long-time period, engaged in joint administration through the decades old cooperative agreement with the USFS, but also through a CWPP that largely drew the parameters of AFR's plan. Additionally, AFR partners' engagement in a Master Stewardship Agreement which contractually binds partners as well as being a cost share agreement enabled joint administration. Both the WKRP and AFR offer frameworks for other ALM efforts and do so by displaying alternative methods.

Cumming et al. (2013) finds that accomplishing landscape resilience requires flexible institutions that incorporate social learning processes that can adapt and change with findings and innovation – effectively breaking free from the rigidity trap. The ALM groups in this study are exemplifying more flexible institutions by integrating local stakeholder concerns and problem-solving mechanisms, but are also doing so by adhering to Ostrom’s polycentric concept. Both groups are engaging in social learning through: US-FLN annual meetings, the OSP’s prioritization of monitoring / learning / integration, and TNC’s multi-party monitoring program (AFR program involving local forest professionals). These social learning processes provide space for adaptation and integration of new ideas which reinforces social capital and further builds capacities of the groups. These mechanisms are dismantling the rigid structures that reinforce the troubled suppression model, and are contributing to the renewed vision of forest management being defined equally by both local and national managers.

CHAPTER VI. CONCLUSION

This study sought to answer the research question: How is ALM implemented in fire-adapted landscapes? To answer this I focused on two main aspects of these projects: planning and implementation. Because ALM is a method of management without any blueprint and reliant upon creativity and innovation of project partners, each case, although they shared similarities, offered different lessons. In the introduction of this thesis my stated hypothesis was that: for large-scale, cross-boundary coordination to endure there must be institutions, programs, and policies to support them. In addition to these three aspects, I linked other researchers' analyses on institutional factors that contribute to accomplishing resilient landscapes. Although each case offered different lessons for ALM planning and implementation, they both shared the need for a supporting framework (i.e. institutions, programs, policies) and resulting infrastructure for carrying out this new management approach.

I mainly focused on the social, human, cultural, and financial capital present in both ALM groups, and the interaction of these among their institutions, programs, and policies they are situated. My findings describe how both the AFR and WKRP groups, who each had various forms of capital, marshalled them to expand the infrastructure for ALM.

This comparative case study discussed different groups engaging in ALM offering different lessons for instituting a forest resilience model. The AFR – a small, four-partner collaborative working on a relatively small planning area, and in a semi-urban

environment, with a somewhat intact forest industry workforce was compared to the WKRP. The WKRP – a larger collaborative working on a large planning area, in a remote environment, without the robust workforce desired by managers faced different barriers. Both groups devised creative ways to problem solve around challenges to ALM, whether it was a small landscape-scale or the need to expand a workforce. By working to solve these barriers, both groups aimed to attain similar goals – to expand implementation of ALM in order to increase the pace and scale of restoration. This singular goal is shared by fire managers nationwide. These groups are addressing this and providing policy and decision-makers with alternatives to suppression.

Not surprisingly, funding is a main barrier to the expense of ALM, however it is also incentivizing it. Support for instituting ALM as an alternative is great since costs of wildland fire management are only projected to increase while funding for other vital programs decrease. This reality is driving alternatives to fire management that decrease costs while maximizing benefits. The AFR and WKRP are exhibiting these alternatives and are at the forefront of the paradigm shift out of suppression management. Both groups dealt with funding challenges differently. AFR's expansion to AFAR occurred because of partners' ability to attain various and significant sums of funding while the WKRP, through TREX, showed the cost savings of managing with prescribed fire compared to suppression.

Lastly, the biggest challenge to instituting ALM is likely the reshaping of national forest management which supports it as an approach to wildfire management, rather than its current focus on suppression. Upending the status quo of suppression management to

prioritize ALM instead, will redefine the institution of fire management. Interestingly, the regions that are home to the WKRP and AFR have been at the forefront of innovative changes in forest management for decades. Perhaps, it is not so surprising these places are where solutions to new fire management practices are being found.

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APPENDIX 1. Interviewees from the Western Klamath Restoration Partnership:
collaborators and associates

Interviewee affiliation	Associated number (#)
Local NGO member	1
Klamath Mountains resident	2
Karuk tribal member	3
The Nature Conservancy representative	4
Environmental organization representative	5
Forest Service agency member	6
Local NGO member	7
Local NGO member	8
Forest Service agency member	9
Karuk tribal member	10
Karuk tribal member	11
Forest Service agency member	12
Retired Forest Service person	13
Karuk tribal member	14
Local NGO member	15
Forest Service agency member	16
Forest Service agency member	17
Klamath Mountains resident	18
Klamath Mountains resident	19
Klamath Mountains resident	20
Klamath Mountains resident	21
Local NGO member	22
Klamath Mountains resident	23
Klamath Mountains resident	24
The Nature Conservancy representative	25
Local NGO member	26
Natural Resource Conservation agency member	27

APPENDIX 2. Interviewees from the Ashland Forest Resiliency Stewardship Project:
collaborators and associates

Interviewees' affiliation	Associated number (#)
The Nature Conservancy representative	28
Retired industry and agency member	29
Natural Resource Conservation agency member	30
Local NGO member	31
Forest Service agency member	32
Environmental organization representative	33
Retired agency member	34
Applegate resident	35
Non-profit organization member	36
Oregon State University	37
Applegate resident	38
Retired agency member	39
BLM agency member	40
Applegate resident	41
Forest Service agency member	42
Retired agency member	43
Ashland City employee	44
The Nature Conservancy representative	45
Applegate resident	46
Applegate resident	47
Local NGO member	48
Logging industry representative	49
Local NGO member	50
Local NGO member	51
Retired agency member	52
Applegate resident	53
Logging industry representative	54
Logging industry representative	55
Oregon Dept. of Forestry agency member	56
Applegate resident	57

APPENDIX 3. Interview question template for stakeholder participants

STAKEHOLDER-SPECIFIC	
<i>For private/tribal landowners</i>	
1.	Let's start with some background
a.	How long have you owned this land?
b.	Do you live here on the property? Year round?
c.	Are you from around here? (if no: when did you move here?)
d.	How big is your parcel?
e.	What percentage of your parcel would you estimate is forested?
f.	Who owns the land that borders your property? (need categories)
2.	I'd like to ask you questions about how you manage your land
a.	What are your particular land management goals? (e.g. wildlife, recreation, timber production, ranching, etc.)
b.	How do you achieve these goals?
c.	Have you received any assistance in reaching these goals?
i.	grants, cost-share programs, other financial assistance
ii.	technical support from natural resource professionals, agencies, NGOs
iii.	other?
3.	I am particularly interested in fire and fuels reduction management.
a.	On a scale of 1 to 5, with 1 being "not at all concerned" to 5 being "extremely concerned," how concerned are you about wildfire risk on your land?
b.	How concerned are you that conditions on nearby forestlands or properties are contributing to these risks? Please explain.
c.	How do you manage to address the risk of wildland fire and hazardous fuels, if at all?
d.	What has been effective in terms of fuels treatments to reduce fire risk?
e.	What constraints have you encountered in terms of fuels treatments?
f.	What would help you to achieve your fuels treatment objectives?
4.	Do you work with neighboring landowners to achieve your wildfire risk reduction goals? Do you:
i.	jointly discuss treatments?
ii.	jointly plan treatments?
iii.	jointly pay for treatments?
iv.	jointly implement treatments?
5.	Do you think about management of your property within the larger landscape?
<i>For agency members</i>	
1.	Let's start with your background – what is your job?

2. What is your role in this project?
3. What do you do regarding wildland fire/fuels reduction work? <ol style="list-style-type: none"> Direct treatments on the land? (mechanical, prescribed fire, use of wildland fire, suppression) Working with landowners/outreach? (e.g. technical, financial assistance)
a. How do you reach out to landowners? (if you do?)
b. Are there particular landowners that are harder to work with?
c. What landowner incentive programs are available through your agency?
4. What other agencies and groups do you work with on fuels reduction?
a. How is their approach similar/different to yours?

PROJECT PARTICIPATION (All interviewees participating)
<i>History of the project</i>
I understand that you are currently participating in Project X. I'd like to learn more about your role in this project, your experience with it, and how it has worked.
1. When did you first get involved with the project?
2. Why did you get involved?
3. What were your previous experiences with similar projects? What did you learn from them?
4. What are the objectives of the group?
5. What kinds of fuels reduction or forest management activities has the project undertaken? Does it plan to undertake?
6. Could you list the ongoing treatments you are familiar with?
7. How many acres have been treated (approximately) or are planned for treatment?
<i>Membership</i>
1. Who is involved in the group?
2. Who is not involved in the project? <ol style="list-style-type: none"> Who should be involved? Why do you think they are not involved? Have you reached out to landowners who are not involved? What do you think could work to get others involved?
3. What were the specific things about this project that have helped you to participate, and that encouraged you to do so? (social, economic, policy, institutional)
4. <p>Were there any specific constraints that you had to overcome in order to participate, or that have kept you from participating more fully? (social, economic, policy, institutional)</p> <ol style="list-style-type: none"> How would you recommend overcoming these constraints in the future?

<p>5. Do you have any comments on what it has been like to work with other landowners in this project (private, federal, state, tribal),</p> <p>a. What makes it especially easy or challenging to collaborate with them and coordinate wildfire risk reduction activities with them?</p> <p>b. Are there landowner types (public, private, tribal) that you are more interested in/willing to cooperate with than others? Why?</p>
<i>Funding</i>
1. Where is funding for the project coming from? (varies by ownership)
a. For meetings, planning
b. For implementation of projects
2. Where could other funding come from in the future?
<i>Benefits to landowners of participating in project (ask to all landowners)</i>
1. What activities/treatments have you undertaken as part of this project?
2. How many acres would you estimate you've treated/plan to treat?
3. What treatment methods have you used? (e.g., prescribed fire, thinning, mastication, create fuel breaks, etc.)
3a. What treatment methods are you unable/unwilling to use, and why?
3b. Did any of these treatments cross ownership boundaries, or were they coordinated with treatments on neighboring properties? Explain.
4. Do you feel that this project is helping you to achieve your land management goals?
5. What has the project helped you to achieve that you wouldn't have achieved otherwise (without participating in the project) in terms of accomplishing your fire management objectives?
6. What are the benefits of working together (why do you do it)?
7. What are the disadvantages or the costs of working together?
8. What have been the costs/drawbacks to you of participating in this project?
9. Do you think the project will be effective in reducing the risk of fire to your property? Why or why not?
10. Have you been involved in projects in the past where you tried to coordinate with other landowners? What did you learn from that – barriers and what facilitated success? (or: why did previous projects succeed or fail?)
<i>Implementation of projects (ask to all partners)</i>
1. What are the different legal or regulatory requirements that affect the participation of different landowners? (e.g. NEPA, State laws, etc.)
2. What policies or programs have helped or hindered project implementation?
3. What would help you to implement this project more easily and to accomplish more/more effective fuels treatments on the ground?
4. Who is hired to work on the projects? (e.g. contractors, technical experts)

<i>Landowner participation (ask to all partners)</i>
1. What incentives do you see helping landowners to participate?
2. What disincentives do you see hindering landowner participation?
<i>Relationships among project members (ask to all partners)</i>
1. How do you work with other project members (federal, state, other public; private corporate, private non-corporate, tribal)
2. How do resources (financial, technical) move or get shared between you and other project members?
3. In what ways have you observed different landowners coordinate land management activities among each other? Do they: <ul style="list-style-type: none"> i. jointly discuss treatments? ii. jointly plan treatments? iii. jointly pay for treatments? iv. jointly implement treatments?

COORDINATION AMONG PROJECTS
1. What are other groups and projects that you coordinate with? (e.g. Fire Safe Councils, Watershed Councils, Resource Advisory Committee)
2. How do these groups work together or learn from each other? (e.g. for planning, implementation, funding)
3. Are there similar people participating in the different projects/groups?

COMMUNITY CAPACITY/RESTORATION ECONOMY
4. Can you tell me about who conducts the implementation work for this project on your lands/on the different ownerships?
5. Could you tell me about the capacity of the workforce around here to work on these fuel reduction treatments?
6. Are there jobs being created? What kinds of jobs?
7. Who are you selling wood products to? (e.g. mills, biomass facilities)
8. What is the role of this project in helping to maintain or create new forest products industry infrastructure or business capacity in this area?
9. Is there general community/social support for the project?

PROJECT PARTICIPATION: INTERVIEWEE NOT PARTICIPATING
1. I understand you are not currently involved in Project X <ul style="list-style-type: none"> a. May I ask why not? b. Are there specific constraints that have kept you from getting involved? c. What would encourage you to participate?

ALL LANDS MANAGEMENT
1. I am particularly interested in forest management that is conducted at large, landscape scales, which often involves working across land ownership

boundaries. This has been termed “All Lands Management” or the “All Lands Approach.”
2. Does the term “All Lands Management” mean anything to you? If so, what?
3. Does this large, landscape approach address some of the challenges you see with wildfire?
4. Do you see policies or programs supporting All Lands Management?
5. What kinds of policies or programs or changes would you like to see, if any, to encourage All Lands Management?

WRAP UP
1. What is the current life span of this project and where do you think it is headed in the future? Where will it lead?
2. Do you think that as a result of this project experience you are likely to pursue an “all lands”/or cross-ownership boundary approach to managing fire, other environmental threats, or natural resources in the future? Why or why not?
3. Any final comments?
Do you have any project documentation that you can share or refer me to? (e.g., NEPA documents, website, flyers they’ve developed, etc.)
4. Do you have any project documentation that you can share or refer me to? (e.g., NEPA documents, website, maps, materials they’ve developed, etc)
5. Questions for me?

APPENDIX 4. Code list created from content provided by interviewees. List does not contain sub-codes but can be provided with interest.

Collaborative management codes	
ALM favorable	ALM unfavorable
1. aspects of success collaboration	12. collaboration fundamental changes
2. capacity building	13. disincentives to collaborate
3. collaboration among partners	14. time constraints
4. governing strategy	
5. collaboration experience	
6. high level collaboration	
7. incentivized collaboration	
8. interagency collaboration	
9. investment in collaboration	
10. overcoming collaboration challenges	
11. strategic collaboration	
Ecological codes	
15. fire restoration outcomes	21. ecological constraints
16. restoration meanings	22. high risks
17. restoration strategy	
18. scaling up	
19. strategies land treatments	
20. TEK	
Economic codes	
23. alternative economics	31. economic constraints
24. economic factors	
25. economic feasibility	
26. economic strategies	
27. funding mechanisms	
28. funding strategies	
29. funding collaboration	
30. local economy	
Land management codes	
32. alternative management mechanisms	47. alternative management challenges
33. assess partner opportunities	48. implementation concerns

34. communications	49. planning challenges
35. creative management approaches	50. traditional management
36. creative problem solving	
37. effective programs	
38. implementation strategies	
39. importance of partnering	
40. innovation/alternative perspectives	
41. innovative thinking	
42. interagency coordination	
43. lessons learned – past	
44. models alternative management	
45. place-based planning	
46. strategic planning	
Political codes	
51. agency procedures	56. legal constraints
52. institutional change	57. problematic policy
53. institutional support	
54. policy enabler	
55. political realities	
Private landowner codes	
58. landowner partnerships	66. private landowner disincentives
59. partnering with private landowners	
60. private land fire management	
61. private landowner learning	
62. private/independent management	
63. private landowner assistance	
64. private landowner incentives	
65. strategies to gather landowners	
Social relations codes	
67. agreement	92. community disconnection
68. build relationships	93. community exclusion
69. build social license	94. community makeup
70. build trust	95. conflicting viewpoints
71. changing natures (of USFS)	96. disagreements
72. community connection	97. distrust
73. common values	98. lack of institutional support
74. common vision	
75. community building	

76. community driven	
77. community inclusion	
78. community needs	
79. gathering public support	
80. information sharing	
81. inclusion of stakeholders	
82. learning	
83. local capacity	
84. local expertise	
85. new fire paradigm	
86. personal values	
87. roles of leadership	
88. socio-ecological thinking	
89. trail blazer	
90. training - education	
91. tribal perspective	