DISSERTATION

INVESTIGATING POLICY TOOLS AND VARIABLES TO SUPPORT COLLABORATIVE GOVERNANCE AND COLLECTIVE LEARNING: A PROGRAMMATIC ASSESSMENT OF THE COLLABORATIVE FOREST LANDSCAPE RESTORATION PROGRAM

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ABSTRACT

INVESTIGATING POLICY TOOLS AND VARIABLES TO SUPPORT COLLABORATIVE GOVERNANCE AND COLLECTIVE LEARNING: A PROGRAMMATIC ASSESSMENT OF THE COLLABORATIVE FOREST LANDSCAPE RESTORATION PROGRAM

Collaborative governance has increased in prominence as a potential policy tool to support natural resource management within forest contexts. Until recently, there has been little formal space within the governance regime to support collaboration. The Collaborative Forest Landscape Restoration Program (CFLRP) was authorized by Congress in 2009 to facilitate large landscape restoration projects on federal forest lands through a focus on fire-adapted ecosystems, a mandate to monitor, and a mandate to collaborate throughout the lifetime of the project. In 2017, we conducted a third-party programmatic review of the CFLRP program to assess both theoretical and applied implications of this policy within the collaborative forest restoration context. This dissertation seeks to examine policy that supports collaboration and collective learning within US forest management contexts, and answer questions regarding whether collaborative policy innovations garner collaborative benefits. I also examine the challenges groups face, the factors that influence collaboration, and what types of collective learning activities occur under collaborative policy innovations.

Using qualitative research methods including participant observation and interviews, I address these practical and theoretical research questions through three chapters (Chapters 2, 3, and 4). In

Chapter 2, I assess to what extent the CFLRP program supported collaborative governance and seek to identify the variables that influence and support collaboration. This chapter reports on the theoretical research questions regarding collaborative benefits interviewees attributed to the program and the various top-down, structural and local, contextual variables that influence collaboration on projects. From these findings, I draw conclusions regarding policy tools and policy implementation to support collaborative governance in forest management.

Chapter 3 addresses to what extent the CFLRP program supported collective learning activities and outcomes and the variables that may influence successful collective learning across the program. Collective learning is closely related to collaborative governance and critical to ensuring collaboration and adaptive governance are successful in terms of sharing lessons learned. We identify a variety of activities occurring on each project and then across projects that indicate a level of collective learning within the CFLRP program and ultimately a system of multi-level network governance. These findings have larger implications for building public-private partnerships in an era of decreasing agency budgets and staff capacity.

Lastly, Chapter 4 addresses our more applied research objectives regarding the benefits and challenges reported under the CFLRP program. This chapter specifically seeks to identify the value-added and challenges of the program as reported by participants. I report on the practice and policy implications from the CFLRP program in terms of collaborative forest restoration policies within US natural resource governance contexts.

The CFLRP program provided a unique opportunity to programmatically assess whether policy can effectively support collaboration, the various local, contextual and top-down, structural variables that were influential in terms of collaborative success, and whether the program was supporting collective learning activities and outcomes. This dissertation sought to fill these research gaps and contribute to the collaborative governance and forest management literature. Within my conclusion, I review the major themes across my chapters and propose future research directions and questions regarding forest management and collaborative governance. Ultimately, my chapters show that there are variety of variables both top-down, structural and local, contextual that both support and facilitate collective learning and collaborative governance, which has implications for crafting more effective natural resource policies. Our research indicates that the CFLRP program effectively supported collaboration and collective learning, and generated a variety of valuable benefits that contributed to the accomplishment of more holistic restoration work and indicated that collaboration can be a valuable policy tool for natural resource management in the future.

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Chapter 1: Dissertation Introduction

Dissertation Introduction

Collaborative governance has become more prevalent in natural resource governance over the past several decades for a variety of reasons, including growing dissatisfaction with top-down, agency-led management, increasing scientific uncertainty and management complexity, and decreasing agency capacity in terms of staff and funding. Specifically, in the United States, the need to accomplish collaborative forest restoration has increased due to conflict over the legacy of past forest management, including fire suppression and timber harvesting, as well as a demand from community forestry groups for more active stakeholder participation in resource management (Stephens and Ruth 2005; Calkin et al. 2015; USFS 2018). The challenges of accomplishing forest restoration have been compounded by decreasing agency budgets, staff capacity, and an overall decrease in management resources (Goldsmith and Eggers 2005; Kettl 2006; USFS 2018). Scholars and land managers alike have called for more collaborative restoration policies that leverage external resources, such as funding and expertise to build agreement around a restoration vision, provide collaborative capacity to design treatments and accomplish work, and build social license to accomplish more work with less conflict and litigation. A critical question, then, is how policy can be designed to support collaborative governance approaches within forest management contexts.

There have been a variety of US federal forest policies that allow for or require collaboration and partnership with local and state groups including the Good Neighbor Authority and the Joint Chiefs Landscape Restoration Partnership, and the 2012 National Forest Management Act regulations (also known as “the planning rule”) (USFS 2018). One of the most promising

policies to be authorized to support collaborative governance was the Collaborative Forest Landscape Restoration Program (CFLRP). The CFLRP was authorized for ten years by an omnibus public lands law passed by the US Congress in 2009 (P.L. 11-111) and reauthorized for another five years in the 2018 Farm Bill (P.L. 115-334). The CFLRP provides federal funding for collaboratively designed, implemented, and monitored restoration projects on US national forests (PL 11-111 sec. 4003(b)(2)). This policy is unique for a variety of reasons including the mandate to collaborate for the lifetime of the project, the mandate to monitor, and the attention to large, landscape restoration with a focused long-term investment of federal dollars (Schultz et al. 2018; Butler and Schultz 2019).

Because of these unique policy attributes, including the mandate to collaborate throughout the lifetime of the project, this program presented an ideal opportunity to ask several important theoretical questions including assessing how collaborative governance can be supported by policy, and what structural and contextual factors support effective collaboration among state and non-state entities. These theoretical questions have practical importance for a variety of reasons. Because of the mandate to collaborate on each project, the CFLRP program provided an opportunity to assess whether participants were reporting benefits in terms of collaboration and what those benefits were. This question regarding benefits has important implications for assessing whether these types of collaborative policy innovations are worth continuing and whether they are leading to improvements related to collaborative governance around forest management in the United States. Additionally, it was important to investigate whether this program facilitated collective learning, what types of collective learning activities groups reported and their outcomes, and the policy variables that supported collective learning under the

program. These collective learning-focused questions have larger implications for, not only the learning literature, but for the scholarship on collaborative and adaptive governance, in which learning is an important and valuable variable. The question of how to facilitate collective learning through policy is more relevant than ever before given decreasing agency resources and increased ecological complexity and uncertainty.

In this introductory chapter, I review the literature I drew on for my dissertation, including the scholarship on the growing need for forest restoration, theoretical and applied scholarship on collaborative governance, policy tools and variables to support collaboration and effective policy implementation, collective learning, and the specific context of collaborative forest restoration. I will then review the structure of this dissertation including three empirical chapters and a concluding chapter synthesizing implications from my research, research limitations and considerations, and potential future research questions.

Literature Review

This dissertation draws on several bodies of scholarly literature including work on collaborative governance, adaptive governance, policy implementation, and collective learning. As collaborative policy tools have grown in prevalence with community groups advocating for more formal influence over decision making and management decisions (Cromley, 2005; Schultz et al., 2012; Enzer and Goebel, 2014; USFS, 2015b; Maier and Abrams, 2018), assessing how we can improve and support collaborative policy innovations is pertinent and an important gap in the literature. As we continue to develop more collaborative approaches to resource management, questions regarding the challenges groups are facing and how they are overcoming these challenges are important to understand for future policy iterations. Collective learning is closely

tied to effective collaboration and adaptive governance (Wondolleck and Yaffee 2000; Folke et al 2005; Hasselman 2017). It is important to understand whether collective learning occurs under these types of collaborative policies, what collective learning activities groups engage in, and what variables, contextual or structural, support collective learning. These questions are particularly important in an era with decreasing agency capacity and increasing scientific and management complexity and uncertainty, when collective learning can lead to efficiencies in terms of lessons learned and the adaptability of policy and organizations (Kettl, 2006; Lemos and Agrawal, 2006; Sikor, 2008).

Collaborative Governance in US Forest Management

Collaborative governance involves the pooling of resources by multiple actors or stakeholders to solve problems (Ostrom, 1990; Berkes, 2010). In the US forest management context, collaborative governance typically has been understood as a type of governance where multiple stakeholders come together in common forums with public agencies to develop consensus-based agreement regarding management decisions, although more recently the term has expanded to include cross-sectoral and multilevel work among state and non-state actors (Ansell and Gash, 2008; Emerson et al., 2012).

Collaborative governance emerged in a variety of global natural resource contexts as a potential governance tool for several reasons, including public distrust in government decision making, congressional gridlock, and increased complexity and uncertainty in environmental problems (Wondolleck & Yaffee, 2000; Kylza & Sousa, 2008). Wondolleck and Yaffee (2000) consider the rise in collaboration a direct reaction to an increased distrust of government. Ansell and Gash

(2007) suggest that collaborative governance emerged as a response to failures of implementation and the high cost and politicization of environmental regulation. Others suggest previous decades of environmental policy had over-promised regarding government's ability to make scientifically sound decisions about environmental issues. The primary decision-making and political paradigm of the early 20th century had roots in the Progressive Era and was known as scientific management (Wilkinson, 1992; Wondolleck & Yaffee, 2000). Scientific management emphasized efficiency, a focus on scientific knowledge over other knowledge types, centralized decision-making, and top-down management (Brunner & Steelman, 2005). However, as issues became more complex, the scientific management paradigm became less appropriate. Uncertainty arose from an incomplete understanding of ecological processes, compounded by the fact that ecological systems are not in equilibrium and inherently dynamic (Brunner & Steelman, 2005). These factors have led scholars and stakeholders alike to make normative claims about the need for a shift towards adaptive management and collaboration with multiple stakeholders in networks across public and private sectors (Newman et al., 2004).

Stakeholders in the late 20th century became less satisfied with policies and legal outcomes. During the 1960's and 1970's there was a proliferation of national environmental lawmaking with promulgation of more than 30 environmental statutes including: The National Environmental Policy Act, the Endangered Species Act, the Clean Water Act, and the Clean Air Act (Klyza & Sousa, 2008). This new legal and regulatory regime aimed to limit agency capture by assigning clear planning requirements and compliance goals and deadlines. Deemed the "green state", the top-down planning and regulatory framework was a reaction to previous decades of "policy without law" (Lowi, 1979). "Policy without law" was Lowi's (1979)

terminology, referring to a time in US politics dominated by interest group capture, when policies were made without opportunities for democratic deliberation or appropriate representation. However, with time, the strict regulations of the "green state" were seen as inefficient, costly, and entrenched in adversarialism, pitting industry, communities, and regulators against each other (Klyza & Sousa, 2008). In response to the perceived-to-be inflexible regulations generated by "the green state" and the inability of the scientific management paradigm to account for complexity and local knowledge, there has been movement towards more collaborative governance.

Scholars have identified a variety of benefits and critiques of collaborative governance. Collaborative governance in public lands management increases levels of trust and forges stronger relationships among participants, which in turn, results in greater levels of accountability and transparency among parties (Wondolleck and Yaffee 2000; Gunningham 2009; Innes and Booher 2010). For federal land management, this can lead to the development of longer-lasting, more robust management agreements that include diverse perspectives and result in decreased conflict, increased capacity to accomplish work, and shared financial investment (Innes and Booher 1999; Wondolleck and Yaffee 2000; Daniels and Walker 2004; Margerum 2008; Innes and Booher 2010). In terms of collaborative outcomes, some scholars consider first-order indicators of collaboration to be increased trust, improved communication and relationships, and decreased conflict (Innes and Booher 1999). These can yield second-order benefits, which include faster and better implementation of collaboratively designed work, diffusion of practice, and innovation and learning (Innes and Booher 1999).

Collaboration also faces critiques and challenges. Many participants consider collaboration time and resource-intensive due to diverse stakeholder participation often with stakeholders that hold opposing viewpoints and values, which can lead to watered-down solutions that are not amenable to any particular stakeholder (Coggins 1999; Wondolleck and Yaffee; Innes and Booher 2010). Participants may have conflicting goals and missions, which can complicate achieving agreement. In economically depressed communities, power imbalances can lead to co-optation of local collaborative groups by industries with significant financial resources and the promise of employment (Coggins 1999; Innes and Booher 2010).

While collaborative governance is not without challenges, ultimately, the green state and layering of environmental policies led to an outcry for more adaptive, flexible governance regimes that often focused on collaboration as a key policy tool. Since the early 1990's there have been increasing attempts to incorporate adaptive management and collaboration in national forest policies. For example, in 1998 Congress passed the Herger-Feinstein Quincy Library Forest Recovery Act (HFQLFRA) that enabled the Quincy Library Group, a collaborative group, to work with the Forest Service on national forest management decisions in the Sierra Nevada mountain region (Mangun, 2007; Cheng et al. 2016). The Quincy Library Group formed in 1992 during the controversy over public land management and the California Spotted Owl (*Stryx occidentalis*). The group crafted collaborative recommendations for forest restoration and timber production that were subsequently rejected by the local Forest Service office. The Quincy Library Group worked with their congressional representatives to ensure passage of the HFQLFRA at the national level, a first attempt at place-based legislation focusing on land management and restoration. Because the agency retained decision-making authority and had to

comply with overlapping laws, it failed to honor the agreements reached by the Quincy Library Group, despite the legal mandate to do so (Cheng et al. 2016).

Collaboration with community-based stakeholders has become increasingly common in US forest management since the 1990s due to decreased trust in scientific management, a need to leverage non-federal resources, and a general increase in the democratization of information (Wondolleck and Yaffee 2000; Wilson 2003; Koontz et al. 2004; Cromley 2005). However, until recently, there has been little formal policy change to support more collaborative approaches. The canon of environmental law was designed to limit the influence of organized interest groups on agency decision-making, making it difficult to find the policy space for collaboration (Koontz et al. 2004; Sousa and Klyza 2007). Past efforts involving place-based legislation mandating implementation of collaborative agreements have met with limited success (Cheng et al. 2016). More recently, community-based forestry advocates have promoted nationwide policy changes to support greater collaboration with local partners, leverage external capacity, and encourage holistic implementation of collaboratively designed projects (Gray et al. 2001; Baker and Kusel 2003; Cromley 2005; Enzer and Goebel 2014). During this time, in partnership with community-based forestry groups, the Forest Service has implemented a suite of policies and internal initiatives to support restoration with a focus on collaborative engagement with diverse stakeholders (Cheng and Sturtevant 2012; Schultz et al. 2012; USFS 2015). These policies emphasized the importance of collaboration, but many do not include explicit requirements to engage collaborators at all stages of project planning, implementation, and monitoring. This changed, however, with the passage of law that created the Collaborative Forest Landscape Restoration Program. In light of this development, key theoretical questions regarding effective

policy tools to support collaboration and whether policy can, in fact, support collaboration are pertinent and, as of yet, unanswered.

Policy Tools to Support Collaboration and the Importance of Policy Implementation

Howlett (2009) outlines the difference between policy design and policy tools. Policy design is the larger governance framework that then defines the policy tools that are appropriate for achieving identified policy goals (Howlett 2009). Policy design involves the deliberate attempt to define policy goals and link them with policy tools to achieve these identified goals and outcome (Howlett et al. 2015). For example, in the case of the CFLRP program, collaboration would be a policy tool used to meet the larger policy goal of forest restoration. To date there has been little research on understanding the efficacy of the CFLRP program as a type of policy tool and the benefits it generates in terms of meeting policy goals such as increased and improved forest restoration.

In the face of wicked environmental problems that are value-based, span multiple temporal and spatial scales, and involve increasing numbers of stakeholders, along with rapid environmental change, many scholars are exploring policy design to address new types of environmental governance challenges. Scholars have argued that top-down bureaucratic policy design is ill-adept at providing adequate decision space for stakeholders and managers, let alone providing solutions for these intractable challenges (Kettl 2006; Craig et al. 2017). This has led to a call for more adaptive, flexible policies that balance stability and flexibility through local, place-based decision-making mechanisms, including collaboration and adaptation (Craig et al. 2017; DeCaro et al. 2017). Similarly, because wicked problems involve multiple stakeholders in multiple

organizations across multiple jurisdictions no single organization can act alone; this necessitates collaborative governance (Emerson and Nabatchi 2015). DeCaro et al. (2017), working in the adaptive governance scholarship, which also emphasizes collaboration, networking, learning, and adapting to change, outline various legal and institutional design principles to support adaptive governance, including well-defined project boundaries, participatory decision-making processes, tangible support in the form of dedicated funding, and legally binding authority to make decisions and implement chosen solutions. Many other scholars for decades have identified a general need for clear resource boundaries, local monitoring of resource use, and clear recognition of stakeholder rights (Ostrom 1990; Cox et al. 2010). Lastly, to build trust and effectively foster co-management, the policy environment must require some level of commitment from higher-order institutions, including an assurance to go beyond traditional public involvement methods (Berkes et al. 2007). These types of policy structures have become increasingly relevant as natural resource management challenges grow in complexity due to competing interests and uses, layered mandates and policies, and evolving management paradigms (Weber and Khademian 2008; Emerson and Nabatchi 2015). These principles in theory should create sufficient resources, opportunity, and authority to support collaboration and adaptive governance (Craig et al. 2017; DeCaro et al. 2017).

When discussing policy design and policy tools, one must consider the variety of variables that can influence policy implementation. In terms of policy implementation, Moseley and Charnley (2014) identify variables that influence effective policy implementation including top-down structural variables and local, contextual variables. Top-down, structural variables are the larger institutional dynamics at play within a governance system including bureaucratic pressures from

above such as budget appropriations from Congress, policy direction from the agency executives, and legal mandates and requirements (May and Winter 2007; Moseley and Charnley 2014). Funding, budget priorities, performance measures and targets, and performance evaluations are also likely to be among the pressures from above that can influence management (Hirt 1994; Moseley and Charnley 2014). Conversely, local, contextual variables are the local environmental, economic, social, and political conditions external to the agency that make up the on-the-ground context that local agency staff work within (Moseley and Charnley 2014). Ultimately, a combination of both top-down structural and local, contextual variables impact and influence whether a policy is effectively taken up and implemented at the local unit level (Palumbo et al. 1984; Steelman 2010; Moseley and Charnley 2014).

Collaboration, Collective Learning, and Adaptive Governance

In natural resource governance, learning plays an important role in shaping goals, available solutions, and problem-solving capabilities of key actors, particularly when management uncertainty and scientific complexity are high (Heikkila and Gerlak 2013; Moyson et al. 2017; Rietig and Perkins 2018). Collaborative governance scholars note that trust and relationships form the basis for open dialogue, which allows for mutual understanding, the sharing of information, and collective problem solving (Emerson and Nabatchi 2015). For learning to be successful it must be inclusive and interactive, drawing from many groups, knowledge sources, and perspectives (Gray et al. 2001). A diverse group of stakeholders with various skills and expertise support knowledge sharing, which enhances learning and ultimately improves the collaborative experience (Wondolleck and Yaffee 2000; Armitage et al. 2007). Many of the

activities that facilitate collaboration, such as dialogue, field trips, monitoring, and workshops, also facilitate learning (Gray et al. 2001).

The literature on learning encompasses a variety of diverse definitions and frameworks for observing and characterizing learning. Perspectives on learning in environmental governance range from collective learning (Heikkila and Gerlak 2013), policy learning (Fiorino 2001; Rieteg and Perkins 2018), governance network learning (Pahl-Wostl 2009; Newig et al. 2010; Crona and Parker 2012; Armitage et al. 2018), and social learning (Keen et al. 2005; Berkes 2009), among others. Herein, I focus on the process of collective learning, a kind of policy learning, that involves individuals within a group setting acquiring information, assessing or translating information, and disseminating knowledge within a group setting. Collective learning products—both cognitive and behavioral changes—result from this process and include shared ideas, strategies for progress, or policy recommendations and changes (Gerlak and Heikkila 2011; Heikkila and Gerlak 2013).

Learning is central to adaptive governance—a form of environmental governance that responds to ecological and social change as well as management and scientific uncertainty and complexity and can adapt in the face of evolving conditions over time (Chaffin et al. 2014; Chaffin and Gunderson 2016; Cosens 2018). An important component of adaptive governance is its emphasis on learning primarily through experimentation, monitoring, and adaptive management (Olsson et al. 2004). Adaptive governance approaches integrate multiple forms of knowledge to advance common interests and shape institutional change (Brunner et al. 2005; Folke et al. 2005; Hasselman 2017). Actors may draw on multiple types of knowledge, diverse participation,

inclusive and iterative discussions, and monitoring to strengthen understanding of the social-ecological system and possible changes to governance (Brunner et al. 2005; Folke et al. 2005; Chaffin et al. 2014; Hasselman 2017). The adaptive governance literature has multiple similarities with collaborative governance scholarship; both emphasize participation and inclusion of diverse actors in order to support emergent solutions to difficult environmental governance and potentially intractable problems (Wondolleck and Yaffee 2000; Folke et al 2005; Hasselman 2017).

The literature outlines a number of factors that affect learning, many of which coincide with factors that affect adaptive governance, collaboration, and policy implementation more generally (Ricco and Schultz 2019). For example, to promote collective learning, as well as effective collaboration, it is crucial to have strong relationships and trust amongst participants to form a mutual understanding of an issue and ensure respect for individual opinions (Heikkila and Gerlak 2013; Emerson and Nabatchi 2015). In addition, diverse stakeholder participation ensures various forms of expertise and knowledge are available for consideration, which can enhance learning and collaboration (Armitage et al. 2007; Pahl-Wostl 2009; Heikkila and Gerlak 2018). Bridging organizations and information brokers often play important roles in terms of fostering learning through networks (Berkes 2009). Brokers are individuals that act as boundary spanners facilitating information dissemination amongst and across participants and groups—or even within organizations (Sabatier 1987; Heikkila and Gerlak 2013). Bridging organizations are groups that provide a forum for interaction and enable groups to build trust, overcome conflict, share information, and access resources (Berkes 2009). Additionally, scholars note qualities such as strong interpersonal communication, reduced organizational hierarchy, and strong managerial

leadership and commitment to learning are critical to facilitate collective learning (Garavan and McCarthy 2008; Heraty and Morley 2008). Leadership must promote learning to ensure processes incorporate learning mechanisms and participants engage in reflection, transparency, and open communication (Heikkila and Gerlak 2018).

Fostering collective learning is not without challenges. Groups lacking transparency, frequent and productive dialogue, or accountability will struggle to achieve collective learning (Popper and Lipschitz 2000). Groups that are unable to develop a shared understanding of the issues, may not be able to articulate a shared vision for their work, which is necessary for subsequent collective learning (Heraty and Morley 2008). The development of a supportive learning climate is essential to collective learning. Two barriers to this include a lack of productivity and group member turnover (Bates and Khasawhen 2005). Ultimately, groups that have frequent member turnover, particularly in critical leadership roles, and are unable to accomplish tasks and goals will likely be unable to facilitate a learning climate and collective learning (Kaiser and Holten 1998; Bates and Khasawhen 2005). In terms of leadership, groups that lack strong leaders committed to learning and developing a learning culture will struggle to produce, share, and apply knowledge in meaningful ways (Iles 1994; Watkins and Marsick 1996; Popper and Lipshitz 2000). Lastly, to facilitate collective learning, risk taking must be tolerated and encouraged. Groups that are risk averse and complacent will be less likely to embrace collective learning and potential innovation (Iles 1994). An interesting and as-yet largely unexplored area of scholarship is how policy can be written to facilitate collective learning by creating the conditions under which it can flourish.

The Collaborative Forest Landscape Restoration Program: Background and Policy Context

As noted above, there have been several policies that incorporate the principles of collaboration to accomplish forest restoration work in the United States, including the Good Neighbor Authority, the Joint Chiefs Partnership, and the 2012 Forest Planning Rule (USFS 2018); however, until the passage of the Collaborative Forest Landscape Restoration program, none were providing the formal space for collaboration through a mandate to collaborate. The Collaborative Forest Landscape Restoration Program was an innovative policy tool to support collaborative, landscape restoration in fire-adapted ecosystems on federal forest lands (Schultz et al. 2012). Authorized in 2009 and reauthorized in 2018, the CFLRP competitively awarded funding for large landscape restoration projects on federal forested lands that were planned, implemented, and monitored collaboratively (Butler and Schultz 2019; Schultz et al. 2018; Schultz and McIntyre 2019). The program was unique for a variety of reasons including the mandate to collaborate, the mandate to monitor, and the focused strategic investment of funding for the lifetime of the project (McCarthy, 2019). To date, research has focused on various aspects of the CFLRP program including: multi-party monitoring and adaptive management (Schultz et al. 2014; Cheng et al. 2017), collaborative governance approaches at the case level, with a focus on collaborative implementation (Butler 2013; Butler et al. 2014; Monroe and Butler 2015), access to and use of best available science (Colavito 2016), and challenges and barriers project groups face in identifying objectives (Urgenson et al. 2016; Walpole et al. 2017).

While the majority of prior CFLRP research focuses on case studies, my dissertation research is unique because of the program-wide approach, gathering data from all 23 projects nationwide,

with input from both agency staff and external stakeholders associated with each project. I addressed questions regarding the overall benefits of CFLRP policy approaches, which was important for understanding whether the policy, in fact, produced desired outcomes in terms of collaboration. My research also is unique because I assessed the programmatic challenges and barriers to success and the various factors, both contextual and structural, that influenced success, and I used my data to inductively identify evidence of collective learning across the program. My research contributes to the broader CFLRP scholarship by exploring these more systemic issues and variables that influence policy implementation under the program. From my research I was able to draw conclusions regarding policy design and policy variables to effectively support collaboration and collective learning.

Summary and Research Questions and Objectives

Collaborative governance is prevalent in natural resource management contexts as a potential environmental governance tool (Cromley, 2005; Schultz et al., 2012; Enzer and Goebel, 2014; USFS, 2015b; Maier and Abrams, 2018). Scholars have identified a variety of benefits attributed to collaboration including increased trust amongst participants and stronger relationships, which potentially leads to decreased conflict and more robust management plans and agreements (Wondolleck and Yaffee 2000; Innes and Booher 2010; Emerson and Nabatchi 2015). A critical component of collaboration and adaptive governance is an emphasis on learning, particularly the inclusion and of multiple knowledge types and expertise, the incorporation of monitoring and adaptive management, and routinized meetings (Wondolleck and Yaffee 2000; Folke et al 2005; Hasselman 2017). With this is mind, community forestry groups in the United States have historically worked to incorporate more collaboration into forest restoration work on public lands. While several agency policies have incorporated various collaborative governance

principles, it was not until the passage of the CFLRP program that there was formal policy space to work together through the mandate to collaborate. Because this policy was the first of its kind to formally require collaboration, questions regarding whether policy effectively supported collaborative governance to inform the broader scholarship on policy tools for collaborative and adaptive governance had not been addressed. Below I review my research objectives based on these questions and outline how my research speaks to both applied and theoretical questions.

In this dissertation, I address the following research objectives and questions:

1) Determine to what extent the CFLRP program supported collaborative governance (Addressed in Chapters 2 and 4);
    a. What were the benefits in terms of collaboration reported under the CFLRP program?
    b. What were the challenges in terms of collaboration reported under the CFLRP program?
    c. What aspects of the CFLRP as a policy tool supported or impeded collaboration?
    d. What are the implications for policy design for collaboration generally and specifically with regard to the future of the CFLRP?
2) Identify the variables that influence and support collaborative governance (Addressed in Chapters 2 and 4);
    a. What local, contextual factors influenced collaborative governance under the CFLRP program?
    b. What top-down, structural factors influenced collaborative governance under the CFLRP program?

c. What are the implications for implementation of policies to support collaboration generally and specifically in the context of US forest restoration?

3) Determine to what extent the CFLRP program supported collective learning activities and outcomes (Addressed in Chapter 3).
    a. What collective learning activities did groups participate in and what were their outcomes?
    b. What local, contextual factors influenced collective learning under the program?
    c. What top-down, structural factors influenced collective learning under the program?

Methods Overview

A philosophy of science is comprised of several variables including: a scholar's worldview, their research paradigm, and their chosen epistemology, ontology, and axiology (Patterson and Williams, 2005). There are multiple worldviews that fall along a spectrum between rationalism and relativism. These worldviews can best be described by a spectrum from positivism to relativism. At the positivist end of the spectrum, researchers believe there is only one approach to science, while the relativist end of the spectrum maintains that no rules of science can ever be applied (Patterson and Williams 2005). I have adopted a pragmatic worldview to my research. With that, I do not necessarily commit to any one system of philosophy and reality. I recognize that different research questions require different methodologies and ways of thinking, and I believe that researchers have a choice in methods, techniques, and procedures depending on needs and purposes. I relate to a pragmatic worldview because it addresses real-world problems with a focus on solutions. A pragmatic worldview allows me to use whatever methods are necessary depending on the question I am asking. As an inquirer, this view allows me to draw

from both qualitative and quantitative methods in an attempt to best understand my research question (Creswell, 2009). My research is grounded in a pragmatist approach derived from Pierce et al. (1992) (see Creswell, 2009 citing Cherryholmes, 1992). Pragmatism emphasizes a concern with application and solutions to problems as well as using all approaches necessary to understand a problem or question (Creswell, 2009).

As noted above, a philosophy of science is made up of several variables, one being the researcher's paradigm. Paradigms define the nature of the world for the researcher, the individual's role within that world, and the range of relationships between subjects and objects. These paradigms then dictate which epistemologies, ontologies, and axiology a researcher adopts. Epistemology refers to what a scholar believes is acceptable knowledge, how that knowledge should be acquired, and how it should be interpreted. Epistemologies fall along a continuum from positivist to interpretivist (Patterson and Williams 2005; Schuh and Barab 2007). A researcher's ontology constitutes what the researcher believes is reality and how that reality can be understood. Ontologies, like epistemologies, fall along a spectrum between objective and subjective (Grix 2002; Patterson and Williams 2005). Lastly, a researcher's axiology refers to the goals underlying a particular approach to science (Patterson and Williams 1998). The two types of goals are terminal and instrumental. Terminal goals refer to the ultimate aim of a specific paradigm (e.g. predictive explanation or universal laws of human function), while instrumental goals refer to the criteria by which by which research efforts will be evaluated as good or bad science (e.g. for acceptability in a peer-reviewed journal) (Patterson and Williams 1998).

My epistemology aligns closely with that of an interpretivist in that I do not necessarily believe there are any universal laws and truths as it applies to social science. For example, in my research, I believe facts are based on participant perception of the world and phenomena that they experience. This interpretivist view also relates to my ontology, in that, I believe the nature of being is subjective and, with that, social phenomena are created from perceptions and actions of social actors. Lastly, as a social scientist I ascribe to an interpretivist axiology and believe that the goal of my research is to understand the perceptions of my participants as defined by my pragmatic worldview. These beliefs led me to address my research questions through qualitative research methods including semi-structured interviews and participant observation because I was interested in identifying and analyzing the CFLRP participants' perceptions regarding the overall program.

It is important to discuss and address my positionality and potential bias. There is a level of potential bias I bring to my research as an embedded participant within the CFLRP project and a scholar of collaborative governance. Because I was a researcher embedded within the CFLRP system it was important for me to maintain a level of impartiality and professionalism with all interviewees and during site visits. Likewise, I used memoing as an opportunity to reflect on what I heard, and potential follow up questions for interviewees to investigate overly positive or negative themes. Another potential bias I bring to my research is that my scholarship was funded by the agency. I worked hard to remember this potential bias and maintain a critical eye to my data and findings. This allowed me to continuously check my bias and ensure I was working impartially to provide a balanced programmatic review.

For this dissertation, I utilized a qualitative research study format including participant observation and semi-structured interviews. Qualitative research emphasizes the importance of the social context for understanding the world, providing the researcher with an intimate understanding of the overall phenomena (Neuman, 1997). In 2017 we conducted a third-party review of the CFLRP program in conjunction with the Forest Service-Washington Office. I conducted participant observation, which included project visits in three Forest Service regions (1, 5, 6). Meeting observation provides the researcher with first-hand experience with participants (Creswell, 2009). This participant observation allowed me to build rapport with participants and identify questions that would be pertinent to a full programmatic review.

In order to conduct a programmatic review of the CFLRP program, we chose to conduct interviews with participants across the entire program on each project. Interviews are beneficial because they yield a high quantity of data quickly and allow for immediate follow up or clarification (Gibson & Brown, 2009). Interviews were conducted with both internal agency staff and external stakeholders, with a goal of interviewing two internal agency personnel and two external stakeholders on each project. We were not seeking to reach saturation on each project, but rather to assess views from participants across the whole program who could represent project experiences for multiple participants. We began by contacting and interviewing the CFLRP coordinator on each project as we felt these would be the most knowledgeable and intimately involved in the day-to-day restoration work. We requested recommendations from the CFLRP coordinators of both additional internal agency staff and external collaborators that could speak to the successes, challenges, and history of each project.

We tried to identify individuals that were closely related to the CFLRP project, had been with the project for an extended period of time, and would be able to speak to the challenges, successes, and next steps on each project. With each interview we asked for additional recommendations, and then through these recommendations and conversations with participants and scholars we worked to triangulate the most knowledgeable and involved partners, both internal and external. External partners that were interviewed included individuals that were closely related to the project for an extended period of time, that could speak to the challenges and successes of the program, and that represented groups such as non-profits, universities, county commissioners, and industry.

Some limitations of this method would be that we did not speak to individuals at the most polarized ends of the spectrum (those highly supportive versus those that completely opposed CFLRP). Additionally, we can assume that individuals who were the least dissatisfied with the program were potentially not participating anymore and therefore would not be recommended for interviews. With this, we potentially missed interviewing the individuals who were least satisfied with the program.

We were able to conduct 89 interviews across all projects. Interviews lasted approximately 60-90 minutes, were transcribed, and cleaned of personal identifiers. Interviews were semi-structured and included questions regarding the successes achieved under the CFLRP program, the value-added of the CFLRP program, challenges and barriers to restoration work, how groups overcame or are working to overcome those challenges, and next steps or recommendations for future policy iterations.

We utilized qualitative data analysis techniques, including interview coding and memoing (Glesne, 2011; Saldaña, 2015). We had several, general, predetermined codes that were based on the practical questions in our interview guide (e.g. challenges encountered, recommended policy changes); we used these codes to begin to organize our data (See Appendix A and B for Interview Guide and Code Book). We also inductively coded excerpts of text, creating codes for emergent themes and sometimes assigning multiple codes to the same excerpt, in an iterative process as we read and re-read interview transcripts. The coding was an on-going process that involved continual reflection about the data, question design and intention, and memos. Initial analysis was conducted concurrently with data collection. I would analyze previous interviews and memos, which allowed for interpretation and further refinement of interview questions and codes. We used Dedoose, a software package, to code transcripts and then used a memoing strategy to further organize and analyze our excerpts for each CFLRP project and for different codes (Glesne, 2011). As we reviewed our memos, we strove to answer practical questions about topics such as challenges faced under the CFLRP, and we also engaged in dialogue as co-authors and as a broader research team (see Authors 2018) to identify themes in our data that both converged with the literature we drew upon to design our study and that offered new, unexpected findings. As I noted above, I have adopted an interpretivist epistemology and ontology, which indicates I believe facts are based on participant perception of the world. Ultimately, adopting a qualitative approach to my research that included semi-structured interviews, participant observation, and memoing allowed me to build rapport with the participants and uncover underlying participant beliefs and perceptions regarding the CFLRP program. Glesne (2011) outlines a variety of techniques to build trustworthiness into data collection and analysis

including triangulation, peer review, and sharing of drafts with members of the research team as well as participants. I employed many of these techniques throughout my data collection and analysis including triangulating potential interviewees with other CFLRP scholars and practitioners, triangulating data between interviews and site visits, and sharing drafts and memos of findings with the research team and colleagues familiar with the program.

Prior work, research funding, and outline of empirical chapters

Prior work and research funding

My dissertation work builds on my previous research opportunities during my Master's degree at the University of Michigan and during my PhD at Colorado State University. While at the University of Michigan, I participated in a Master's project that focused on collaborative governance for watershed management in the western United States. It was during this time that I developed my interest in collaborative governance. Through my Master's project I developed four case studies of collaborative watershed groups throughout the West, focusing on their organizational structure, facilitating factors that supported collaboration, and their various challenges. I also developed, two separate case studies that focused specifically on education and outreach campaigns and efforts around watershed health and protection. This project led to a 700+ page, multi-author report on various western watershed groups, cross-case analysis of the most effective organizational structure and supporting factors, a review of effective education and outreach programs, and lastly, several presentations including one to our client, the Roaring Fork Conservancy.

During my PhD at Colorado State University, I began my work with my lead advisor, Dr. Courtney Schultz, on a project that focused on the Forest Service's Integrated Resource Restoration (IRR) budget line item pilot program. This project was a third-party review of the IRR pilot in U.S. Forest Service Regions 1, 3, and 4. Through this project I was introduced policy analysis, working with the Forest Service, and continued to hone my interviewing skills with agency personnel and stakeholders. From this project we developed a technical report and a Journal of Forestry article, and I was a co-author on both.

Because of my previous research experiences with collaborative governance and the Forest Service, I chose to focus on the CFLRP program for my dissertation, which combines my theoretical interest in the collaboration with my more applied interest in forestry and the Forest Service. My dissertation work was funded by the Forest Service. This project was part of a larger assessment of restoration authorities that included both interview and survey data. There were multiple deliverables from this project, including several technical reports, a book chapter, and multiple conference presentations as products aside from my dissertation chapters; I was a co-author on these many products (Schultz et al. 2017; Schultz et al. 2018; Schultz and McIntyre 2019; McIntyre and Schultz in review). First, I contributed to a technical report that assessed the successes, challenges, and recommendations for future policy change of both the CFLRP program and the Joint Chief's program (Schultz et al. 2017). This report included both interview and survey data. This was followed by a presentation to US Forest Service-Washington Office leadership. We published a peer-reviewed journal article including the interview and survey data on both programs. This paper included 151 interviews and a survey of 425 Forest Service staff, investigating how these programs affected governance regarding forest restoration and the

various factors that influenced success (Schultz et al. 2018). We also wrote a book chapter based on our interview and survey data regarding CFLRP (Schultz and McIntyre 2019). This chapter is part of a larger book regarding the CFLRP program (Butler and Schultz 2019). Additionally, my research contributed to another peer-reviewed article on policy tools to address scalar mismatches in forest management (Schultz et al. 2019). To date, I have co-authored two technical reports, three peer-reviewed papers, one book chapter, and conducted four presentations (one at the Forest Service-Washington Office and three at professional conferences).

Summary of empirical research chapters

My work focused primarily on what were the benefits of collaborative governance under the CFLRP and what policy variables supported collaboration and collective learning, with the aim of understanding how we can better craft policy to support collaboration, learning, and adaptive governance. My first chapter provides a broad assessment of the collaborative governance benefits reported by stakeholders and the structural and contextual factors that affected collaboration. From these findings, I draw larger conclusions regarding policy design to support collaboration. My second chapter focuses on collective learning under the CFLRP program. This chapter reports on the collective learning activities and outcomes reported by stakeholders and the various factors that would influence whether learning occurred. From these findings, I draw larger conclusions regarding how to support collective learning through policy design. Lastly, my third chapter is a practical reporting of the value-added and challenges under the CFLRP program intended for a manager or practitioner-based audience.

Chapter 2: Facilitating Collaboration in Forest Management: Assessing the Benefits of Collaborative Policy Innovations

Co-Author: Courtney Schultz

This chapter has been submitted for review to the *Journal of Land Use Policy*. This paper draws on the collaborative governance and policy implementation literatures to assess reported benefits under the CFLRP program and structural and contextual factors that influenced collaborative success. We found that the program generated a variety of benefits related to collaboration, including increased trust and stronger relationships, increased collaborative partner influence, decreased litigation and conflict, and increased capacity to accomplish work, and also led to challenges such as issues with the time intensive nature of collaboration and the lack of industry or contractors. Additionally, various local factors affected collaborative outcomes under the policy, including staff turnover and capacity, local leadership, and collaborative history. Successful collaborative outcomes were widespread under the CFLRP, and from this, we draw implications for the broader environmental governance literature about the policy characteristics that facilitate collaboration and the other institutional variables that may require attention in this context.

Chapter 3: Collective Learning in Collaborative National Forest Management

Co-Author: Courtney Schultz

This chapter will be submitted to the *Journal of Environmental Policy and Planning* and draws upon our qualitative research approach paired with an inductive coding strategy to identify collective learning activities under the CFLRP program. We believed the CFLRP program was likely to support collaboration and learning due to several policy variables, including: a mandate

to collaborate, setting the stage for collective learning (16 U.S.C. 7303 (b)(2)); a mandate to monitor, which is important for knowledge generation and translation to support learning (16 U.S.C. 7303(g)(4))); and, long-term financial investment, which can facilitate multiyear relationship building and project implementation during which learning can occur (16 U.S.C. 7303(f)). Because of this, we sought to identify collective learning activities that were reported under the program as well as the variables that may support collective learning. Through data analysis including multiple rounds of coding, we sought to identify instances and emergent themes related to collective learning under the CFLRP program. Our goal was to utilize this context to understand how policy and other governance institutions influence collective learning activities. In this paper, we discuss our findings, which were derived through an iterative analytical process described in more detail in the chapter, on two major aspects of learning: 1) Purposes and processes of learning under the CFLRP; and, 2) Factors that affected learning occurring during the CFLRP.

Chapter 4: The Collaborative Forest Landscape Restoration Program: Successes and Challenges and Implications for Agency Practice

Co-Author: Courtney Schultz

This chapter will be an assessment of the reported value-added of the CFLRP program and challenges and barriers to success under the program. It is intended for land managers and practitioners with a focus on the practical implications of the CFLRP policy, and it will be submitted to the *Journal of Forestry*. This is a review of the reported perceptions of value-added under the program including ecological, social, and economic benefits. We identified a variety of benefits accrued under the CFLRP program including, but not limited to, an increased pace and

scale of restoration work, increased trust and stronger relationships amongst participants and with the agency, decreased litigation and overall conflict, increased external capacity and the ability to leverage external dollars, and monitoring. While there were a multitude of benefits under the CFLRP program, there were various reported internal and external barriers and challenges that made achieving successful restoration difficult. Barriers reported included inadequate agency capacity and continuous staff turnover, a lack of industry infrastructure and markets, and unexpected disturbance such as wildfire or insect and disease. These findings ultimately indicate that the CFLRP was achieving its goals and successful in facilitating collaborative landscape restoration, but we note that the barriers reported need to be addressed if the agency is to continue to pursue collaborative restoration work. For example, continuous staff turnover and inadequate agency capacity hindered collaboration, bred distrust, and made it difficult to accomplish work in a timely fashion. Ultimately, the agency will need to address these issues through policy changes whether it be promotion in place or ensuring capacity is present through the proposal review process. Our research shows that the CFLRP program generated a variety of valuable outcomes, particularly in terms of helping the Forest Service accomplish more work in less time.

Conclusions

This dissertation seeks to examine policy that supports collaboration, collective learning, and adaptive governance and answer questions regarding whether collaborative policy innovations garner collaborative benefits. I also examine the challenges groups face, the factors that influence collaboration, and what types of collective learning activities occur under collaborative policy innovations. The literature on collaborative governance, policy implementation and design, and collective learning, while providing a variety of factors necessary for each, fails to

identify how policy variables can support these concepts simultaneously. This dissertation seeks to advance knowledge on this topic. As outlined above, my three empirical chapters follow in order below and are designed to contribute to both the applied and theoretical literatures and target both academic and practitioner audiences. The final chapter synthesizes findings across my three main chapters and discusses the larger implications of this dissertation as a whole for the scholarship on collaborative forest restoration. I will review the limitations to this dissertation research and pose several potential future research questions that present themselves as logical next steps in this research.

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Chapter 2: Facilitating Collaboration in Forest Management: Assessing the Benefits of Collaborative Policy Innovations

Overview: Collaborative governance and landscape approaches have become a more prevalent in public land management in the United States in the face of increasing ecological and societal complexity and decreasing government resources and capacity. In this era of devolution and social-ecological change, there is a growing need for policy approaches that facilitate partnerships and participatory approaches to land management. One unique policy that emphasizes collaboration and large-landscape restoration on US federal forestlands is the Collaborative Forest Landscape Restoration Program (CFLRP), established in 2009 to accelerate the pace and scale of forest restoration. The policy included novel characteristics such as a decade-long commitment to landscapes and formal requirements for collaboration. This policy presented an opportunity to assess how this policy affected collaboration and the factors that led to differential policy implementation. We conducted 89 interviews across all CFLRP projects with internal agency staff and external collaborators on each project. We found that the CFLRP generated a variety of benefits related to collaboration, including increased trust and stronger relationships, increased collaborative partner influence, decreased litigation and conflict, and increased capacity to accomplish work, and also led to challenges such as issues with the time intensive nature of collaboration and the lack of industry or contractors. Various local factors affected collaborative outcomes under the policy, including staff turnover and capacity, local leadership, and collaborative history. Successful collaborative outcomes were widespread under

the CFLRP, and from this, we draw implications for the broader environmental governance literature about the policy characteristics that facilitate collaboration and the other institutional variables that may require attention in this context.

Introduction

In the face of complex natural resource management issues, the scholarship suggests a need for greater formal decision-making space for local stakeholders to navigate tradeoffs among multiple values and to tailor solutions to local contexts (Lemos and Agrawal, 2006; Yung et al., 2010; Emerson and Nabatchi, 2015). Implementing such approaches may require new policy tools and capacities, particularly in places like the United States where large tracts of land are managed by the federal government, and where policy tools have been designed to allow for public input but also to constrain outside influence on agency decision-making (Howlett, 2009; Kamensky, 2018). Adding to the challenge is the fact that US federal land management agencies, consistent with a global trend towards devolution and neoliberalism, face decreased funding and capacity (Goldsmith and Eggers, 2005). They also operate in a world of increased political partisanship, and both of these factors can make partnerships and collaborative capacity critical to accomplishing agency missions (Kettl, 2006; Lemos and Agrawal, 2006; Sikor, 2008).

The US Forest Service oversees 193 million acres of public land in the United States. Informal, multi-party collaborative planning efforts among Forest Service staff and other stakeholders and partners have become prevalent in national forest governance (Maier and Abrams, 2018). An ongoing challenge has been to find space within policy to support the inclusion of collaboratively developed agreements in agency planning processes (Enzer and Goebel, 2014; Cheng et al., 2016). Both the Forest Service and community-based partners have advocated for policy changes to facilitate collaboration with local stakeholder groups, particularly to accomplish landscape restoration (Cromley, 2005; Schultz et al., 2012; Enzer and Goebel, 2014; USFS, 2015b).

In 2009, the US Congress established the Collaborative Forest Landscape Restoration Program (CFLRP), which provides federal funding for collaboratively designed, implemented, and monitored restoration projects on national forests (PL 11-111 sec. 4003(b)(2)). The CFLRP is the first policy to put in place explicit requirements for collaborators to participate in all stages of project implementation and was written by members of the place-based forestry community based on years of dialogue with collaborative partners about their policy needs (McCarthy, 2019). We investigated whether the CFLRP facilitated collaboration as expected, or resulted in undesirable or unforeseen outcomes, and what factors influenced participants' experiences working collaboratively under the CFLRP. Research to date on the CFLRP has focused on various aspects of the program, including: processes for multi-party monitoring and adaptive management (Schultz et al., 2014; Cheng et al., 2017); how collaborators and agency partners have navigated legal requirements and worked together through the process of collaborative implementation (Butler, 2013; Butler et al., 2015; Monroe and Butler, 2015); access to and use of science (Colavito, 2016); and challenges project groups face in defining restoration goals (Urgenson et al., 2016; Walpole et al., 2017). Our research contributes to this literature with an assessment of the CFLRP as a policy approach for facilitating collaborative governance on public lands, with the goal of contributing to a broader understanding about how policy can support collaborative land management.

Literature Review

Understanding Collaborative Governance

Collaborative governance involves the pooling of resources by multiple actors or stakeholders to solve problems (Ostrom, 1990; Berkes, 2010). In the US forest management context, collaborative governance typically has been understood as a type of governance where multiple

stakeholders come together in common forums with public agencies to develop consensus-based agreement regarding management decisions, although more recently the term has expanded to include cross-sectoral and multilevel work among state and non-state actors (Ansell and Gash, 2008; Emerson et al., 2012). Collaborative governance in public lands management has been found to increase levels of trust and improve relationships among stakeholders and resource managers (Wondolleck and Yaffee, 2000; Innes and Booher, 2010; Bjärstig, 2017). This can result in greater participation, accountability, and transparency among these parties (Wondolleck and Yaffee, 2000; Gunningham, 2009). For federal land management, some have found this leads to the development of longer-lasting, more robust management agreements that include diverse perspectives and result in decreased conflict, increased capacity to accomplish work, and shared risk and financial investment (Innes and Booher, 1999; Wondolleck and Yaffee, 2000; Daniels and Walker, 2004; Margerum, 2008; Innes and Booher, 2010). When looking at collaborative outcomes, some scholars consider first-order indicators of collaboration to be increased trust, improved communication and relationships, and decreased conflict, which in turn can yield second-order benefits, which include faster and better implementation of collaboratively designed work, diffusion of practice, and innovation and learning (Innes and Booher, 1999). Agreements and plans may straddle these two categories, documenting agreement, supporting progress, and representing learning that occurs over time, in what are often long-term and iterative processes among stakeholders and land managers.

Collaboration also faces critiques and challenges. It is time and resource-intensive due to diverse stakeholder inclusion and participation, frequently including stakeholders with opposing viewpoints and values. In some cases, it can lead to watered-down solutions that are not

amenable to any particular stakeholder (Coggins, 1999; Wondolleck and Yaffee, 2000; Brosius et al., 2005; Innes and Booher, 2010). Diverse stakeholders may have conflicting goals and missions defined by statutes, traditions, or politics, which can complicate achieving agreement. Fragmented interests and authority may affect the incentives for individual stakeholders to work together and make it challenging to build trust amongst participants (Faysse, 2006). Collaborative processes can reflect and even exacerbate power imbalances; particularly in economically depressed communities, power imbalances can lead to co-optation of local collaborative groups by extractive industries with significant financial resources and the promise of employment (Coggins, 1999; Colfer and Capistrano, 2005; Berkes, 2010; Innes and Booher, 2010). For these many reasons, efforts to engage in collaboration might lead to undesirable results.

In this article, we consider a policy designed to support collaboration, keeping in mind that as policies that promote collaboration are implemented, policy implementation will be affected by multiple factors. For example, structural variables (i.e. those that are agency-wide and sometimes referred to as "top-down"), like a lack of government agency resources (e.g. time, money, and personnel), practices that lead to personnel turnover, or performance management systems, can make collaborative efforts tenuous (Wondolleck and Yaffee, 2000; Koontz et al., 2004; Brosius et al., 2005). Additionally, local or bottom-up conditions affect policy implementation and include variables both internal and external to the agency (Sabatier and Mazmanian, 1983). Local contextual factors, including economic (e.g. the presence of contractors and markets), biophysical (e.g. topography, biodiversity, history of disturbances), and social and political conditions (e.g. local collaborative groups' capacity and history, community leadership, and

political support) interact with factors internal to the agency at the local level, like leadership, capacity, or incentives, to affect how policies are implemented in specific locations and contexts (Moseley and Charnley, 2014; Bergemann et al., 2019). Therefore, for a policy like the CFLRP, understanding its effects on collaboration will also require attention to how structural, agency-wide variables and how local variables affect how the policy is implemented.

A Brief History of Collaborative Landscape Restoration on US National Forests

Due to the legacy of past forest management, including fire suppression and in some cases patterns of timber harvesting (DellaSala et al., 2003; Agee and Skinner, 2005), the US Forest Service and many in the scientific community have promoted forest restoration activities, including thinning of trees, reducing fine fuels, and restoring natural processes such as fire (DellaSala et al., 2003; Agee and Skinner, 2005; North et al., 2012; USFS, 2012; Hanberry et al., 2015). Ecosystem restoration activities often require work over longer periods of time and across larger spatial extents than is typical in US forest management (Agee and Skinner, 2005; North et al., 2012; USFS, 2012). To accelerate activities and work across larger landscapes, the Forest Service emphasizes public involvement to support collaboration with organized stakeholder groups (USFS, 2006; USFS, 2012; USFS, 2015b). Collaboration with community groups ideally affords the agency an opportunity to move beyond conflict to develop a shared vision for forest restoration, ideally allowing for more work to be accomplished (Wondolleck and Yaffee, 2000; Koontz et al., 2004).

Collaboration with community-based stakeholders has become increasingly common in international and US forest management since the 1990s due to decreased trust in scientific

management, a need to leverage non-federal resources, and a general increase in the democratization of information (Wondolleck and Yaffee, 2000; Ribot, 2002; Wilson, 2003; Koontz et al., 2004; Cromley, 2005; Berkes, 2010). However, it has mostly been done informally, and, until recently, there has been little formal policy change to support more collaborative approaches. The canon of environmental law in the United States was designed to limit the influence of organized interest groups on agency decision-making, making it difficult to find the policy space for collaboration (Koontz et al., 2004; Sousa and Klyza, 2007). Past efforts involving place-based legislation mandating implementation of collaborative agreements have met with limited success (Cheng et al., 2016). Over the last two decades, community-based forestry advocates have promoted policy changes to support greater collaboration with local stakeholders, leverage partner capacity, and encourage holistic implementation of collaboratively designed projects (Gray et al., 2001; Baker and Kusel, 2003; Cromley, 2005; Enzer and Goebel, 2014). During this time, in partnership with community-based forestry groups, the Forest Service has implemented a suite of policies and internal initiatives to support restoration with an emphasis on collaborative engagement with diverse stakeholders (Cheng and Sturtevant, 2012; Schultz et al., 2012; USFS, 2015a). These policies emphasized the importance of collaboration, but they do not all include explicit requirements to engage collaborators at all stages of project planning, implementation, and monitoring.

The Collaborative Forest Landscape Restoration Program was a unique kind of policy tool meant to support collaborative, landscape restoration in fire-adapted ecosystems on federal forest lands (Schultz et al., 2012). Authorized by Congress in 2009, the policy allocated funding to be competitively awarded, based on proposals co-written by collaborative groups and the Forest

Service and selected by the Secretary of Agriculture based on recommendations from a Federal Advisory Committee, for "landscape-scale" restoration projects on US Forest Service lands. Never before the CFLRP had there been a national policy requirement and program to prioritize investments in landscapes based on collaboratively developed proposals. Primary objectives under the CFLRP, each of which had to be addressed in proposals, included: ecological, economic, and social sustainability; leveraging local resources and industry to accomplish goals; reducing fire management costs through reestablishment of natural fire regimes and local industry capacity; and including community-based groups through collaboration during the lifetime of a project (Schultz et al., 2012). One of the most unique aspects of the CFLRP is the explicit requirement to collaborate throughout all stages of projects (PL 11-111 sec. 4003(b)(2)). The program also committed funding to selected landscapes for 10 years, with an attendant commitment to collaboration for the duration of the project and funding that could be used for a variety of purposes. In contrast to typically annual funding cycles with budget lines for specific types of activities, this funding approach created a potential for planning and implementation across larger landscapes and longer timeframes, along with flexibility to implement collaboratively developed agreement to engage in multiple types of restoration activities. Among these activities was project monitoring—something that was also required under the CFLRP and that historically had been difficult to accomplish, despite emphasis on the importance of monitoring for forest restoration (Schultz et al., 2014).

With 23 projects nation-wide, and after eight years of implementation, investigating the CFLRP in 2017-2018 offered an opportunity to assess whether this policy approach facilitated collaboration. There was reason to believe the CFLRP might lead to improvements for

collaboration, given its origins with the community forestry partners. It also incorporated policy approaches suggested in the governance scholarship to support local participation and more adaptive forms of governance, including tools that provide stability from higher levels of government, but allow increased flexibility for local, participatory decision-making, include clearer rights for stakeholders, and provide dedicated funding to implement collaboratively forged agreements (Lemos and Agrawal, 2006; Craig et al., 2017; DeCaro et al., 2017). At the same time, the presence of older institutions was likely to impede progress under the CFLRP (Abrams et al., 2018). In addition, while the program mandated collaboration throughout all stages of project planning, implementation, and monitoring, it was unclear whether there were any accountability mechanisms to ensure this would happen, and it was possible that collaborators would be unsatisfied with the policy approach (Schultz et al., 2012).

Summary and Research Questions

Policies that allow for collaboration among government and non-government actors are becoming increasingly relevant as forest management grows in complexity, due to political disagreement over competing interests and uses, layered mandates and policies, and a growing reliance upon collaborative governance approaches (Weber & Khademian, 2008; Emerson and Nabatchi, 2015). Because the CFLRP was a new type of policy tool in US forest management with specific requirements for collaboration, we sought to understand its efficacy in supporting collaboration. We investigated two questions regarding the CFLRP: 1) Did the program lead to improvements associated with collaboration or have unintended consequences? And 2) What factors significantly influenced implementation of the mandate to work collaboratively under the CFLRP?

Methods

The research in this paper is part of a larger, mixed methods project investigating Forest Service restoration policies (authors 2018). We report herein on the piece of our study that relied on qualitative research, which allowed for a detailed investigation into our research questions and included semi-structured interviews. During Summer 2017, we conducted semi-structured interviews for all 23 projects in the program. We aimed to speak with four participants from each project, including two internal and two external collaborators who were actively involved with the project at the time of our work. We completed 89 interviews and spoke with participants on all 23 projects; numbers associated with individual interviewees are included with our data excerpts below. Potential interviewees were identified by first contacting the Forest Service CFLRP coordinator for each project, who, for this study's purposes, was a key informant for our research questions. We then asked this person for recommendations for another agency staff person and a collaborative partner who could speak about the project's implementation and represent the range of perspectives on project progress. We solicited interview recommendations from each interviewee and used these recommendations to triangulate recommendations to the extent possible. External interview participants included individuals that were not federal agency employees, had participated consistently in the CFLRP project, and represented groups that had active roles in the project for an extended period of time. Examples of external collaborators contacted and interviewed included national or regional environmental groups and other non-governmental organizations (NGOs), timber industry representatives and local contractors, and community and municipal groups such as county commissioners, with multiple participants from across these major groups in our sample.

Our goal was not to conduct case studies of every project but, rather, to get a perspective from all projects about the CFLRP as a policy approach. A limitation of our sampling approach is that coordinators would potentially only recommend those stakeholders most active with the project or the collaborators that represented common viewpoints, leaving out more divergent opinions and voices. Additionally, some individuals did not respond to email or phone requests; we recognized that some people had been interviewed about their projects five to ten times, so we limited ourselves to three attempts to contact people. We also recognize that interviewing stakeholders that are active in the collaborative group excludes dissatisfied participants that may have dropped out of the group and sought influence through alternative venues, including litigation. We tried to reduce this bias by triangulating potential recommendations through informal conversations with regional practitioners, collaborators, and scholars. However, we likely did not reach those less satisfied with the program if this was a reason for their non-response to our requests, non-participation in projects, or that they were not recommended to us for interviews. While we gained a range of perspectives about the program by talking to multiple people on the 23 projects across the nation, we also recognize that it is for future researchers to identify more divergent viewpoints on individual projects and about this program from people who were not participating in a CFLRP project.

Interviews lasted between 60-90 minutes and all interviews were recorded and transcribed. While interview direction was flexible, based on interviewee responses and expertise, we used a semi-structured interview guide, with questions across several primary categories, including: the value of the CFLRP as a policy approach, the challenges associated with the program that groups faced, factors that supported or impeded success, lessons learned, and suggestions for future

policy changes. We utilized qualitative data analysis techniques, including interview coding and memoing (Glesne, 2011; Saldaña, 2015). We had several, general, predetermined codes that were based on the practical questions in our interview guide (e.g. challenges encountered, recommended policy changes); we used these codes to begin to organize our data. We also inductively coded excerpts of text, creating codes for emergent themes and sometimes assigning multiple codes to the same excerpt, in an iterative process as we read and re-read interview transcripts. We used Dedoose, a software package, to code transcripts and then used a memoing strategy to further organize and analyze our excerpts for each CFLRP project and for different codes (Glesne, 2011). As we reviewed our memos, we strove to answer practical questions about topics such as challenges faced under the CFLRP, and we also engaged in dialogue as co-authors and as a broader research team (see Authors 2018) to identify themes in our data that both converged with the literature we drew upon to design our study and that offered new, unexpected findings.

Results

We report on the major benefits and challenges associated with collaboration under the CFLRP, working from our most to least common themes in our data. We then address our second research question, looking at the factors that influenced the CFLRP's implementation specifically with regard to collaboration. We present a subset of our data for illustrative purposes; additional excerpts can be found in a supplemental appendix (Appendix 1).

Did the program lead to improvements associated with collaboration or unintended consequences?

Almost all interviewees reported building trust and stronger relationships among stakeholders and the Forest Service over the course of their CFLRP project. For example, one interviewee stated, “One benefit has really been around trust-building and the social aspect . . . the social relationships around the program (44).” The majority of interviewees noted that increased trust led to better working relationships among participants. For example, a Forest Service interviewee stated, “The trust that they have created is amazing, and they know how their working relationships can be, and how to talk to each other (12).” Interviewees said this trust allowed groups to negotiate and address disagreements constructively. Another interviewee reflected on how the CFLRP program allowed typically polarized groups to forge relationships, stating, “We started out with contention between environmental groups and loggers. Those relationships were pretty much non-existent at that time and what was there was not good because of the history of the forests. . . . [T]he conversations were difficult for a couple of years. Breaking through that and getting levels of trust between those groups was a huge accomplishment (36).”

Most stakeholders felt that the CFLRP gave them a formal seat at the table and influence over projects on federal lands. When asked what the CFLRP offered, one interviewee stated, “A voice. And the opportunity to influence projects to a greater degree. It gives the interested stakeholders a proactive responsibility, rather than a reactive responsibility (43).” People said the mandate to collaborate throughout the lifetime of a project, and particularly in the planning phase, gave them influence. For example, one collaborator reflected on this, stating, “I think having the input of a larger group of stakeholders in the treatment design process and the way in

which treatments are implemented has been really important, because I do think that the [group of collaborative partners] has influenced the way that treatments are designed (41)."

Stakeholders also were able to influence efforts through field-trips. One agency interviewee discussed this stating, "They go out two or three times a year to look at implementation on the ground and then have after-trip discussions. That's something that through the implementation they helped us refine that here's places where that works, here's places where we don't think it works so well (79)."

Under the CFLRP, interviewees on all but several projects said they experienced decreased litigation and conflict on their project or forest. For example, one interviewee stated, "We haven't had any litigation on the projects that we've worked with the collaborative. Whereas prior to [CFLRP], we did have significant litigation from some of the collaborative members (20)."

Stakeholders often said they work to engage litigants or objectors and sometimes act in court on behalf of the agency. For example, one Forest Service interviewee reflected on the value of their collaborative group in court proceedings stating, "They filed [friend of the court] briefs for us on projects. And so, it's really cut down our deliberation time, and our objection process (5)."

However, there were a few projects that continued to face litigation. When asked whether the CFLRP decreased conflict, an interviewee stated, "It's probably created more controversy than it's solved or reduced. We have a couple other players, environmental groups here, that absolutely hate the idea that we're doing this, and they are challenging stuff to spite collaboration (2)."

In addition, interviewees noted that while they experienced these first-order benefits of collaboration, this cost time. One Forest Service interviewee, reflecting on the time it takes to collaborate, stated, “I'm a supporter of collaboration overall, but there are times when I wonder what the trade-off looks like in terms of operations in the planning realm of this, because it does add a lot of complexity and it does get frustrating for my staff to go on one more field trip and do one more presentation and prepare one more PowerPoint when they could be doing work (62).” Another interviewee reflected on the challenge of keeping all stakeholders at the table, stating, “Well, one challenge we constantly have is keeping members active. You really need to keep particularly the industry and the environmental sides together talking and agreeing to this stuff. The rest of us are in the middle trying to keep it flowing and keep those agreements alive. But, if those two extremes weren't there, this wouldn't be going anywhere (51).” Another interviewee reported, “The conservation groups are struggling to make collaboration a priority. It's been hard to keep them at the table because they don't have the resources to engage on some levels. That’s my biggest fear is they won't collaborate in the future because they're getting stretched too thin. Without their name on these recommendations, I'm not sure what value it has for the Forest Service if it doesn't say that they agree that this project needs to move forward (51).”

Beyond the reports of improved relationships and influence, a majority of interviewees reported that the CFLRP increased their capacity to accomplish work and leverage external funding. In essence, people said the commitment of federal funding to a landscape for ten years indicated to external stakeholders that the agency was dedicated and committed to the project; this made partners more willing to invest their own financial resources and subsequently more competitive for other resources. One stakeholder said, “The federal money is basically leveraged like crazy . .

. by the non-profits . . . .When those organizations see a big investment, they're like 'Well, our $100,000 then goes a lot further than if it was just a stand-alone.' Everybody piles on because then you can leverage that money against this [CFLRP] money (32)." Stakeholders also often provided scientific or policy expertise, as well as implementation or monitoring capacity. For instance, one agency interviewee discussed using external capacity to coordinate their monitoring program stating, "We've basically built this model so that third-party organizations are doing all of our monitoring for us . . . . [W]e had these high-school intern programs, and we really are relying heavily on [our non-profit partner] to help manage the monitoring and manage these groups to do all this monitoring (3)."

A little more than half of interviewees reported that collaborative partners had developed agreement regarding a restoration vision and indicated this led to efficiencies or innovative approaches. For example, one project reported developing zones of agreement they could use across all projects, not only within the CFLRP boundary, but across the national forest. An interviewee explained, "We have shifted towards basically condition-based zones of agreement. So, the idea is when you go to a project area, you revisit the zones and see if they apply, and if they do, you do that, and if they don't then the Forest Service comes back to the collaborative, where they talk about it and we figure out what we should do. So, our process has allowed for us to have a much broader reach and not to visit every single acre (44)." Others said they were able to accomplish larger and more flexible planning documents under the CFLRP, due to the increased funding, stronger relationships amongst participants, and increased trust. One Forest Service employee said, "With the collaborative group's help, we've gained a tremendous amount of social license to expand our projects to encompass larger areas and take away some of the risk

(5).” Another interviewee reflected on their large landscape NEPA stating, “Biggest success to date, well, one that I think we've already forgotten and are taking for granted is that NEPA at that [large] scale got knocked out. We had so much buy-in (58).”

About half of interviewees mentioned they were innovating in terms of improved outreach and education to local communities. One interviewee explained, “We started outreaching to different groups. . . . [W]e went to the bike shops. We went to all the outfitters and guides and just talked to them about what's coming and why. . . . We've got a little bit of a beer culture. The collaborative took advantage of that. They made coasters that sell the collaborative and . . . they went and passed those out at bars and breweries. Now you get a beer and it comes on a [Collaborative Forest Project] coaster (62).”

In addition, about half of participants reported using their model of collaboration under the CFLRP on other projects and landscapes. One agency interviewee reflected on how CFLRP stakeholders are participating in the land and resource management plan (i.e. forest plan) revision stating, “We're in the middle of forest planning revision, so it's constant that we're getting reflections back on the [CFLRP] project in pulling from solid communication skills, and ways to collaborate . . . . [The CFLRP project] established a lot of those relationships . . . . (71).” Another agency interviewee noted the spillover of collaboration into other areas stating, “We have really good relationships with our stakeholders, so that's been excellent and that really has spilled over into other projects (3).”

Other than project-specific challenges, we did not identify other benefits or unexpected, negative consequences of the CFLRP as a policy approach to support collaboration that were consistent themes in our data. On some projects there were challenges with contractors or individuals, and we discuss in the next section the factors that were common across projects that affected implementation of the CFLRP.

What factors significantly influenced implementation of the CFLRP mandate to work collaboratively?

Our research uncovered a variety of factors that influenced collaborative efforts including local agency, biophysical, economic, and social conditions. Again, we report on themes in our data from most commonly reported to least. First, the majority of interviewees reported that a track record of successful collaboration and a mature collaborative group were critical to success. For example, one interviewee stated, "We have a long history of collaboration in [the region] and I think that one of the reasons our [CFLRP] landscape is so successful is because there was that history in place and a lot of those folks that have been working on difficult issues together converged in [the collaborative group]. There's been a ton of dialogue and I think our [collaborative group] was ripe for success because of that background work and those personalities knowing each other for a long time. In that way, we had a very mature collaborative [group] ready to hit the ground running (14)."

Almost all interviewees noted lack of agency capacity and staff turnover, particularly in agency leadership roles, was detrimental to achieving success because it disrupted project continuity and eroded trust with stakeholders. As one interviewee explained, "There's a lot of turnover and

every time a key position turns over, you have to start from ground zero really rebuilding those relationships cause that's kind of what it all comes down to (15).” Almost all interviewees reported agency capacity limitations, which were frequently compounded by staff turnover. One external stakeholder explained, “They are stretched beyond capacity. They can't do the work. They don't have enough people or resources (36).” An internal agency interviewee explained that this was in part a result of the demands of the CFLRP, stating, “The more you ask me to do these strategy documents or whatever, the less time my people are going to be implementing. Because the people who are there working with the collaborative, the people whose responsibility it is to implement projects, they are way overstretched (20).”

People on a few projects reported that strong agency leadership ensured capacity was available as needed. For example, one Forest Service line officer requested resources from the regional office to have four planning interdisciplinary teams and ensure planning was complete ahead of receiving the CFLRP funding for implementation. Likewise, interviewees noted it was critical for forest-level leadership to build a culture of collaboration internally and externally with partners. For example, an external stakeholder reflected on the importance of strong agency leadership in setting a collaborative tone stating, “They also have been very clear from the top that this is how we do business and that we collaborate and work together and we do science and work in a large scale and we monitor. So local Forest Service leadership has been phenomenal (44).”

A few groups working in landscapes with high levels of unexpected disturbance struggled to achieve success in terms of collaboration. One interviewee reflected on the challenge associated

with rapidly changing conditions and unexpected disturbance stating, “There's been a number of challenges that have come up since [our] goals were submitted [to the Forest Service], such as a major drought, and a huge mortality event due to drought, and the beetles that followed. That has stolen a great deal of thunder. . . . A number of fires have really changed the way that we can do work and the way that we view the landscape. It's also changed priorities (74).” Additionally, interviewees noted that wildfires disrupted progress and redirected agency resources. For example, an interviewee stated, “Well one thing that slowed us down was the wildfire season in 2015. Because much of the resources then for the next year were [diverted] towards fire salvage and doing something in those areas. So that's been one inhibitor to getting some things done (16).” In short, these types of unexpected disturbances made restoration and agreement difficult to accomplish, which made successful collaboration harder to achieve.

Lastly, several interviewees noted the importance of industry capacity and infrastructure to overall collaborative success. For example, one interviewee stated, “We have the local timber industry on board, and we also have wood processing facilities available, and I think that has hindered some CFLRPs where either industry isn't on board or you don't have the infrastructure to process the material once it comes off the landscape (44).” Another interviewee stated, “A challenge has been starting from zero on industry in a place. So, you build a mill here and a part breaks in your mill. You can't get that part in this state [because there’s no industry]. So, you have to go to Georgia or Oregon or a place like that. The industry part is difficult (58).” Additionally, the presence of smaller, multi-generational industry was helpful in ensuring project success. For example, one interviewee noted, “So that [company] was third-generation family in the area. They wanted to stay in that business and be in the area because it's home. So, they

gutted their plant and retooled it into a mill. If it had not been for that family doing that, taking that risk, I think . . . [the project] . . . wouldn't have grown and succeeded like it has to date. That company deserves a lot of credit. They've had to make a lot of capital investments with a high level of uncertainty of what's going to happen annually with [the CFLRP], but because of their commitment to the community, they've taken that risk (29)."

Discussion

Our research investigated the CFLRP's effects in regard to collaboration, including unintended consequences or challenges, and the factors that significantly influenced collaboration under the CFLRP. We found a variety of positive collaborative outcomes associated with the CFLRP that were common across a strong majority of projects, including increased levels of trust, stronger relationships, higher levels of perceived stakeholder influence, decreased litigation, and more robust agreement regarding a restoration vision for each landscape. We expected to find increased levels of trust, stronger relationships, and more robust agreements, as these are prevalent benefits attributed to collaboration in the collaborative governance literature (Innes and Booher, 1999; Wondolleck and Yaffee, 2000). Our data also indicate that these initial benefits led to more significant impacts such as decreased litigation and higher levels of perceived stakeholder influence in phases of project development and implementation on most projects. We also found evidence of various second-order outcomes under the CFLRP, including increased pace and scale of restoration work (i.e. accomplishing more work, more quickly, across larger contiguous areas), the diffusion of practice beyond project boundaries, and leveraging of resources including external funding and capacity. Lastly, we identified a variety of variables that influenced the mandate to work collaboratively under the CFLRP program including a history of collaboration, adequate agency capacity and limited staff turnover, strong

agency leadership, and the presence of industry capacity and infrastructure. Survey data as part of our broader study was consistent with these findings (Authors 2018).

Despite local variability and other institutional challenges, the evidence across projects that the CFLRP is generating collaborative benefits suggests that this policy has been effective at facilitating collaboration. Our data suggest these benefits are attributable in part to several aspects of the CFLRP program including the long-term commitment of funding and the mandate to collaborate with stakeholders. The long-term commitment of funding indicated to collaborators that the Forest Service was committed to a landscape, which, in turn, allowed partners to feel comfortable investing resources. Human and financial investments ultimately build upfront collaborative capacity and ensured groups had the time and resources to engage in collaborative implementation. These findings are consistent with findings from the scholarship on adaptive governance, and our work builds upon this with examples of specific policy tools from forest governance (Sikor, 2008; Ojha et al., 2013; Authors 2019). Our work also indicates that the extended time frame of the CFLRP set the stage for joint learning, which others have found often results from sustained investment and longer timeframes for project implementation (Ojha et al., 2013). For instance, the diffusion of practice beyond project boundaries indicates evidence of collective learning on these projects (Gerlak and Heikkila, 2011; Heikkila and Gerlak, 2013). This is important because collective learning is linked to developing more collaborative, adaptive governance regimes that are integral for dealing with increased levels of ecological and social uncertainty and change (Fisher et al., 2007; Newig et al., 2010; Gerlak and Heikkila, 2011; Crona and Parker, 2012). However, to truly understand learning, additional research will be necessary to uncover evidence of learning and contextualize how it occurred.

The efficacy of the CFLRP also is likely a result of a policy framework that affords stability and legitimacy while providing space for flexibility and adaptation at the local level, something that the literature indicates is important for successful governance approaches adapted to local conditions (Fabricius et al., 2004; Fiorino, 2004; Armitage et al., 2007; Craig et al., 2017; DeCaro et al., 2017). For example, in terms of well-defined boundaries, the CFLRP established parameters projects had to meet in the proposal process (e.g. ≥50,000 acres, collaborative involvement, fire-adapted landscapes), but it left a significant level of discretion for projects to define boundaries based on local resources and needs. Likewise, while the CFLRP required participatory decision making, it allowed flexibility for local collaborators and agency participants to define exactly what this looked like for their landscape. While there was some concern about whether the Forest Service would maintain accountability with and engagement of stakeholders without formal procedures ensuring this, we found that most stakeholders said they maintained influence over their projects and engagement with the Forest Service throughout the life of the CFLRP. This may be a result of the political power stakeholders are able to exercise in other venues and the capacity and efficiencies they afforded the Forest Service; more research would be needed to understand this dynamic in greater detail. Nonetheless, the literature notes that these type of policy attributes are more important than ever to address increasingly dynamic and complex natural resource governance management issues (Burger et al., 2001; Steelman, 2010; Craig et al., 2017; DeCaro et al., 2017).

Beyond benefits, we found a variety of factors that influenced whether collaboration was successful or not under the CFLRP. This is to be expected and is important to understand how to

facilitate desired collaborative outcomes under a policy like the CFLRP, particularly because new policy tools almost always need to be coupled with changes to other policies or institutions (Howlett, 2009; Kamensky, 2018). In terms of internal agency factors, variables such as staff turnover, capacity, and local leadership had significant impacts on whether collaboration was successful; these challenges have been well-documented elsewhere in the literature and will need to be addressed to make the most of collaborative governance efforts (Wondolleck and Yaffee, 2000; DiBari and Randall, 2018; Authors 2018). As the agency continues to make strategic investments in landscapes, it will be critical to address these factors, specifically in terms of maximizing and ensuring a return on investments.

In addition, contextual factors such as presence of industry and infrastructure, collaborative maturity and experience, and unexpected disturbance affected levels of collaborative agreement and the ability to collaboratively accomplish restoration work. As the literature would predict, projects with less mature or experienced collaborative groups were generally less successful (Pretty and Ward, 2001; Lockwood et al., 2009). While the mandate to collaborate helped formalize collaboration on projects, ultimately, there needed to be a level of informal collaboration in-place before project selection to be competitive for funding and find success through project implementation. This finding indicates that the CFLRP acted as a policy tool to formalize collaboration, but it probably is not the right tool to foster collaboration where it does not already exist.

Further, people on several projects reported struggling with rapidly changing conditions on the ground, specifically due to unanticipated disturbance such as wildfire or insects and disease.

These findings have implications for collaborative groups' capacity to facilitate proactive versus reactive adaption to change. Our findings indicate that collaboration was useful for engaging in proactive adaptation or dealing with existing conditions. However, the evidence that collaborative groups struggled to deal with rapidly changing conditions and unanticipated disturbances indicates they were less successful at reactive adaptation; in these instances, authoritative bureaucratic organizations, such as agencies, may be necessary to address immediate issues (Palmer et al., 2008). In addition, groups indicated that the CFLRP and their efforts were thwarted by a lack of industry capacity. Reestablishing this in places where it does not exist may also require government action beyond what is offered by the CFLRP.

In summary, given that outcomes were common across the CFLRP, our work indicates this was a successful policy strategy for supporting collaborative governance and engendering both first and second-order collaborative outcomes. In addition, the reported leveraging of external resources and capacity was a common theme under the CFLRP. This is important in an era of devolution and cross-sectoral management challenges for allowing government agencies to meet their missions (Kamensky, 2018). This has significant implications for not only accomplishing more restoration work but also building greater institutional capacity within community-based organizations and governance networks (Healey, 1997). The more resources leveraged from varying partners, the more potential for successful implementation and accomplishment of work. This, in turn, can strengthen levels of group legitimacy and practical authority to tailor institutions to community needs and develop "power in practice" to overcome local barriers and challenges such as those documented above (Cleaver, 2001; Abers and Keck, 2012; Abrams et al., 2015; Abrams et al., 2017). Additionally, the development and support of these governance

networks can lead to the development of informal communities of practice that facilitate overall flexibility, innovation, and learning capacity building a level of resilience in the management system (Capra, 2002; Fisher et al., 2007). These communities of practice and increased local capacity have implications for empowering rural communities and local resource users in the management of resources, particularly in more centralized authoritarian systems (Brosius et al., 2005; Fabricius et al., 2004; Fisher et al., 2007).

Conclusion

We investigated a new policy approach in US federal forest management, designed to capitalize on collaborative agreement and institutionalize the practice of collaborative governance for forest restoration projects. The evidence that this policy led to both first and second-order benefits associated with collaboration indicates that this policy has been effective at supporting collaborative governance, with implications for forest management and environmental governance more broadly. In an age of decreasing budgets and capacity, and increasing complexity, these benefits are necessary as agencies must partner with external groups and cross boundaries to accomplish large-scale work in the face of rapidly changing conditions (Goldstein and Egger, 2004; Kettl, 2006; Sikor, 2008). More generally, in the context of environmental governance that allows for local participation and greater adaptiveness in the face of environmental change and complexity, policy approaches like the CFLRP offer new paths forward, although not without attendant challenges. We found, like others, that other institutions stymie progress and that the pace of environmental change will necessitate further institutional change, likely along paths that have not yet been discovered (Abrams et al., 2018).

Our findings suggest several directions for future research. One limitation of our research is the potential bias introduced by only interviewing collaborators that actively participate in the projects. Future studies could address this by interviewing a wider variety of CFLRP partners, and stakeholders and Forest Service personnel not involved in CFLRP projects, to discern additional perspectives on the program and its effects. To our knowledge, only one study to date has looked at perspectives on this program from non-participants (Ellison et al., 2018). There is also ample opportunity to study more directly collective learning processes and outcomes on these types of multi-year projects. Future studies could also focus more directly on how groups are overcoming challenges and barriers at the local level. A particularly intractable barrier was that of industry capacity and lack of markets, and future research could focus on the barriers and challenges for industry under this program. Additionally, while agencies and practitioners continue to promote collaborative governance and more formal space in the governance system for stakeholders, it is important to remember that the CFLRP policy was most successful at formalizing already existing collaboration, but not necessarily supporting and developing new collaborative groups. This has implications for any governance regime seeking to stimulate new collaboration or utilize existing collaborative capacity to accomplish restoration work. Policies like this may favor some actors, resources, and landscapes over others, which will require an ongoing assessment of whether additional policy approaches are needed to build capacity in some locations that may be priorities for social or ecological reasons, engage participants that are not represented in existing collaborative processes, or attend to resource conservation that may be left behind by process that focus on landscape restoration of key ecological processes.

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Chapter 3: Collective Learning in Collaborative National Forest Management

Overview: Collective learning is a critical process that supports collaborative governance in natural resource management contexts. Collective learning includes both learning processes such as information acquisition, translation, and dissemination as well as learning products such as new protocols, plans, and agreements. A variety of variables that support collaborative governance simultaneously support collective learning including engaging diverse stakeholders with a variety of knowledge types, routinized meetings and interactions, and multi-party monitoring (Wondolleck and Yaffee 2000; Brunner et al. 2005; Heikkila and Gerlak 2018). One policy that we believed would potentially support collective learning was the Collaborative Forest Landscape Restoration Program (CFLRP). The CFLRP program was authorized by Congress in 2009 to support large landscape restoration on federal forested lands while mandating multi-party monitoring and collaboration throughout the lifetime of a project. We conducted a third-party programmatic assessment of the benefits, challenges, and lessons learned across the CFLRP program. From our interview data we identified evidence that collective learning activities and outcomes could be potentially occurring across the program. Through an inductive coding process we sought to answer whether policy can support collective learning, the activities groups participate in to achieve learning, and the learning outcomes generated. We were able to identify a variety of key themes including various collective learning activities that occurred on projects and potential outcomes from these activities as well as the factors that have the potential to influence collective learning. Ultimately, we found that the CFLRP program supported a variety of collective learning activities within projects and across projects. Our

findings have larger implications for designing policy to support collective learning as well as the importance of multi-level, network governance within natural resource management.

Introduction

Learning is an important process that facilitates collaboration and adaptive governance in natural resource management contexts, but the purposes and processes of learning are not well-understood (Gerlak et al. 2018). Collective learning across a group of participants is a type of policy learning (i.e. learning to improve policy or policy implementation) that includes both learning processes and products, including behavioral and cognitive changes within a group (Heikkila and Gerlak 2013). Collective learning is important in natural resource contexts for managing uncertainty and complexity and leveraging knowledge from diverse actors to support institutional change and adaptation across levels of governance (Folke et al. 2005; Moyson et al. 2017).

There are variables that simultaneously support adaptive governance, collaboration, and collective learning. These include diverse stakeholder participation, engaging a range of knowledge types, implementation of multi-party monitoring, and opportunities for actors to interact and share information (Wondolleck and Yaffee 2000; Brunner et al. 2005; Heikkila and Gerlak 2018). However, there is a lack of understanding regarding policies and policy implementation contexts that support these variables and in turn facilitate learning as part of an adaptive governance strategy.

One innovative natural resource management policy that provides an opportunity to assess how policy can support collective learning is the Collaborative Forest Landscape Restoration Program (CFLRP) (Schultz et al. 2018). The CFLRP was authorized for ten years by an omnibus public lands law passed by the US Congress in 2009 (P.L. 11-111) and reauthorized for another five

years in the 2018 Farm Bill (P.L. 115-334). The CFLRP provides federal funding for collaboratively designed, implemented, and monitored restoration projects on US national forests (PL 11-111 sec. 4003(b)(2)). The CFLRP was likely to support collaboration and learning due to several factors, including: a mandate to collaborate, setting the stage for collective learning (16 U.S.C. 7303 (b)(2)); a mandate to monitor, which is important for knowledge generation and translation to support learning (16 U.S.C. 7303(g)(4))); and, long-term financial investment, which can facilitate multiyear relationship building and project implementation during which learning can occur (16 U.S.C. 7303(f)). We thought it was likely the CFLRP program would support collective learning within and across projects, within a variety of observable learning contexts. In light of this, we sought to identify instances and emergent themes related to collective learning under the CFLRP program. Our goal was to utilize this context to understand how policy and other governance institutions influence collective learning activities. In this paper, we discuss our findings, which were derived through an inductive analytical process described below, on two major aspects of learning: 1) Purposes and processes of learning under the CFLRP; and, 2) Factors that affected learning occurring during the CFLRP.

Literature Review

Collective Learning in Collaborative, Natural Resource Contexts

In natural resource governance, learning plays an important role in shaping goals, available solutions, and problem-solving capabilities of key actors (Heikkila and Gerlak 2013; Rietig and Perkins 2018). Learning is particularly important to environmental governance and policy when scientific uncertainty and management complexity are high (Moyson et al. 2017). It also is of central importance in collaborative governance contexts. Collaborative governance scholars note that trust and relationships form the basis for open dialogue, which allows for mutual

understanding, the sharing of information, and collective problem solving (Emerson and Nabatchi 2015). For learning to be successful it must be inclusive and interactive, drawing from many groups, knowledge sources, and perspectives (Gray et al. 2001). A diverse group of stakeholders with various skills and expertise support knowledge sharing, which enhances learning and ultimately the collaborative experience (Wondolleck and Yaffee 2000; Armitage et al. 2007). Many of the activities that facilitate collaboration such as dialogue, field trips, monitoring, and workshops also facilitate learning (Gray et al. 2001).

The literature on learning is vast and varied, riddled with diverse definitions and frameworks for observing and characterizing learning. Perspectives on learning in environmental governance range from collective learning (Heikkila and Gerlak 2013), policy learning (Fiorino 2001; Rieteg and Perkins 2018), governance network learning (Pahl-Wostl 2009; Newig et al. 2010; Crona and Parker 2012; Armitage et al. 2018), and social learning (Keen et al. 2005; Berkes 2009), among others. For this paper, we utilized Gerlak and Heikkila's (2011) framework for understanding and observing collective learning. This framework provides a coherent way to study learning processes and outcomes in group contexts and derives from the policy learning literature, which focuses on improving policy and policy implementation. This was appropriate for our work given that we were studying collaboration under the CFLRP, during which groups were working to learn through the process of policy implementation. With this in mind, collective learning is defined as both the processes and products of learning within groups. The process of collective learning involves individuals within a group setting acquiring information, assessing or translating information, and disseminating knowledge within a group setting. Collective learning products—both cognitive and behavioral changes—emerge from this process

and include shared ideas, problem conceptualizations, strategies for progress, or policy recommendations and changes (Gerlak and Heikkila 2011; Heikkila and Gerlak 2013).

Learning as a Facet of Adaptive Governance

Adaptive governance is an emergent form of governance that is responsive to change, uncertainty, and complexity and itself can adapt in the face of evolving conditions over time (Chaffin et al. 2014; Chaffin and Gunderson 2016; Cosens 2018). An important component of adaptive governance is its emphasis on learning primarily through experimentation, monitoring, and adaptive management (Olsson et al. 2004). Adaptive governance approaches integrate multiple forms of knowledge to advance common interests and shape institutional change (Brunner et al. 2005; Folke et al. 2005; Hasselman 2017). Actors may draw on multiple types of knowledge, diverse participation, inclusive and iterative discussions, and monitoring to strengthen understanding of the social-ecological system and possible changes to governance (Brunner et al. 2005; Folke et al. 2005; Chaffin et al. 2014; Hasselman 2017).

The literature outlines a number of factors that affect learning, many of which coincide with factors that affect adaptive governance, collaboration, and policy implementation more generally (Ricco and Schultz, in press). For example, to promote collective learning, as well as effective collaboration, it is crucial to have strong relationships and trust amongst participants to form a mutual understanding of an issue and ensure respect for individual opinions (Heikkila and Gerlak 2013; Emerson and Nabatchi 2015). In addition, diverse stakeholder participation and informal governance networks ensure various forms of expertise and knowledge are available for consideration, which can enhance learning and collaboration (Armitage et al. 2007; Pahl-Wostl

2009; Heikkila and Gerlak 2018). Bridging organizations and information brokers often play important roles in terms of fostering learning through networks (Berkes 2009). Brokers are individuals that act as boundary spanners facilitating information dissemination amongst and across participants and groups—or even within organizations (Sabatier 1987; Heikkila and Gerlak 2013). Bridging organizations are groups that provide a forum for interaction and enable groups to build trust, overcome conflict, share information, and access resources (Berkes 2009). Collective learning requires a shared understanding of the issues, which can be forged through frequent, quality dialogue amongst participants (Garavan and McCarthy 2008).

Additionally, scholars note qualities such as strong interpersonal communication, reduced organizational hierarchy, and strong managerial leadership and commitment to learning are critical to facilitate collective learning (Garavan and McCarthy 2008; Heraty and Morley 2008). Leadership must promote learning to ensure processes incorporate learning mechanisms and participants engage in reflection, transparency, and open communication (Heikkila and Gerlak 2018). Another important variable to promote learning and adaptive governance is institutional flexibility within the governance system to support experimentation and creative solutions (Craig et al. 2017; DeCaro et al. 2017; Hiekkila and Gerlak 2018). DeCaro et al. (2017) outline various legal and institutional design principles to support adaptive governance including well-defined project boundaries, participatory decision-making processes, tangible support in the form of dedicated funding, and legally binding authority to make decisions and implement chosen solutions. These principles in theory should create sufficient resources, opportunity, and authority to support collaboration and adaptive governance (DeCaro et al. 2017).

However, fostering collective learning is not without challenges. Groups that lack transparency, frequent and productive dialogue, and accountability will struggle to achieve collective learning (Popper and Lipschitz 2000). Additionally, if groups are unable to develop a shared understanding of the issues, they may not be able to articulate a shared vision for their work, which is necessary for subsequent collective learning (Heraty and Morley 2008). The development of a supportive learning climate is essential to collective learning. Two barriers to this include a lack of productivity and group member turnover (Bates and Khasawhen 2005). Ultimately, groups that have frequent member turnover, particularly in critical leadership roles, and are unable to accomplish tasks and goals will likely be unable to facilitate a learning climate and collective learning (Kaiser and Holten 1998; Bates and Khasawhen 2005). In terms of leadership, groups that lack strong leaders committed to learning and developing a learning culture will struggle to produce, share, and apply knowledge in meaningful ways (Iles 1994; Watkins and Marsick 1996; Popper and Lipshitz 2000). Lastly, to facilitate collective learning, risk taking must be tolerated and encouraged. Groups that are risk averse and complacent will be less likely to embrace collective learning and potential innovation (Iles 1994).

In summary, we know that learning is critical for successful adaptive governance and collaboration; however, we often do not know whether learning is occurring and for what purpose. Similarly, we do not know the policies and types of activities groups engage in to support collective learning and what outcomes these activities generate.

Study Context: The Collaborative Forest Landscape Restoration Program

The Collaborative Forest Landscape Restoration Program was an innovative policy tool to support collaborative, landscape restoration in fire-adapted ecosystems on federal forest lands (Schultz et al. 2012; Schultz et al. 2018). Authorized by Congress in 2009, the policy allocated funding to be competitively awarded, based on proposals co-written by collaborative groups and the Forest Service and selected by the Secretary of Agriculture based on recommendations from a Federal Advisory Committee, for "landscape-scale" restoration projects on US Forest Service lands. Never before the CFLRP had there been a national program to prioritize investments in landscapes based on collaboratively developed proposals (Schultz and McIntyre 2019). Primary objectives under the CFLRP included: ecological, economic, and social sustainability; leveraging local resources and industry to accomplish goals; reducing fire management costs through reestablishment of natural fire regimes and local industry capacity; and inclusion of community-based groups through collaboration during the lifetime of a project (Schultz et al. 2012; Schultz et al. 2018). There are several structural elements of the CFLRP that theoretically would support collective learning and adaptive governance including the mandate to collaborate, the mandate to monitor and emphasis on adaptive management, and the secure, long-term financial investment (Weber 2003; Keen et al. 2005; Edelenbos et al. 2011; Ojha et al. 2013). Because of these factors we hypothesize that the CFLRP program supported collective learning.

Methods

Our original research goals were to conduct a broad analysis of the CFLRP as a policy tool, its impacts, and the factors that influence success of projects funded under the program. During Summer 2017, we conducted semi-structured interviews for all projects in the program. Using a semi-structured interview guide, we strove to cover a set of interview questions across several

primary categories, including: what has worked about the CFLRP for projects, the challenges associated with the program that groups faced, factors that supported success, and lessons learned, along with suggestions for future policy changes.

We aimed to speak with four participants from each project, including two internal and two external collaborators who were actively involved with the project at the time of our work. We completed 89 interviews and spoke with participants on all 23 projects; numbers associated with individual interviewees are included with our data excerpts below. Potential interviewees were identified by first contacting the Forest Service CFLRP coordinator for each project, who we asked for recommendations for another agency staff person and a collaborative partner that could speak to project implementation and represent the range of perspectives on project progress. We solicited additional interview recommendations from each interviewee and used these recommendations to triangulate recommendations to the extent possible. External interview participants included individuals that were not federal agency employees, had participated consistently in the CFLRP project, and represented groups that had active roles in the project for an extended period of time. Examples of external collaborators contacted and interviewed included national or regional environmental groups and other non-governmental organizations (NGOs), timber industry representatives and local contractors, and community and municipal groups such as county commissioners, with multiple participants from across these major groups in our sample. Some individuals did not respond to email or phone requests; we recognized that some people had been interviewed about their projects five to ten times, so we limited our attempts to contact people. Everyone interviewed was on a funded project. A potential bias is that we may not have spoken to those least satisfied with the program if this was a reason for

their non-response or non-participation in projects. Interviews lasted between 60-90 minutes and all interviews were recorded and transcribed.

For our investigation of learning, we undertook an inductive, modified grounded theory approach to our analysis. We utilized a combination of holistic, structural, and inductive coding to identify emergent themes and patterns within our data related to collective learning (Saldaña 2015). First, we used holistic, structural coding to apply content-based codes to segments of data. These codes were developed from the Heikkila and Gerlak (2013) research on collective learning and included learning processes (acquisition, translation, and dissemination), learning products, and factors that affect learning. We used this first round of coding as an exploratory investigation to identify instances of learning in our data.

Once we conducted this first round of coding, we then reviewed these codes, and conducted a second round of inductive coding. In this second round we stayed open to potential emergent themes regarding learning, from which we held discussions and memoing sessions based on potential important patterns and themes to clarify what we were seeing in the data. This second round of coding revealed themes around activities that supported learning and perceived learning outcomes at different levels (e.g. within or across groups), and factors that influenced learning. We used Dedoose, a software package, to code transcripts and then used a memoing strategy to further organize and analyze our excerpts for each CFLRP project, across projects, and for different codes (Glesne 2011).

Every data point used in this paper and to support our analysis was identified as an instance of learning occurring within CFLRP groups across multiple participants. While it is difficult to know if reports of group learning resulted in learning understanding across multiple participants, we discuss where interviewees perceived group learning processes or outcomes (e.g. behavioral or cognitive changes across groups or tangible learning products). We recognize that additional case study work would be valuable, but our program-wide approach also has value for identifying trends across multiple projects with regard to learning that could be related back to program design characteristics.

Results

Below we review our results regarding major themes that emerged from our data analysis, focused around two primary aspects of learning: 1) activities that groups participated in and associated purposes and outcomes of collective learning that we identified, and 2) factors that influenced collective learning.

Activities that Facilitated Collective Learning

We identified a variety of activities that groups participated in for different purposes that involved collective learning. We first discuss the learning activities that occurred at the project level, which had two main purposes. The first was to reduce scientific uncertainty and complexity on projects, and the second was to build trust, strengthen relationships, and facilitate information dissemination amongst project participants. We then turn to learning that occurred across two or more projects.

Project Level: Activities that Reduced Scientific Uncertainty and Management Complexity

One main purpose of activities that occurred at the project level was to reduce scientific uncertainty and management complexity. These activities included engaging outside technical expertise, the development of best available science, monitoring, and experimentation with management design and implementation. Below, we review each of activity from most frequently to least frequently referenced by participants.

The majority of interviewees, including people across almost every project, reported engaging outside expertise to generate new information and help fill knowledge gaps at the project-level. For example, partners outside the primary stakeholder group conducted wildlife studies, economic assessments, or stand exams to establish baselines for monitoring and treatment design. One interviewee stated, "We actually paid for [a university] to do an economic study on our CFLR [project] so that we could report back on the economy side of things (16)." Another interviewee noted, "We had an agreement with one of our active partners do some stand surveys to determine what exactly we have out [in the project area], so we can really refine the goals of this project (15)." Groups indicated that they used this information to support their own learning about project goals and outcomes. For example, one interviewee stated, "[A local university partner] largely has been the lead organization in analyzing [monitoring data] and then interpreting it and then reporting it back out to the collaborative [group]. We go through a process of looking at that data and, relative to our desired conditions that were stated in the original monitoring plan, see how we did, and where we hit the mark, versus where we improved [or need to improve] (41)."

In landscapes with particularly high levels of management uncertainty [e.g. where scientific information to support restoration was limited or where there were new levels of disturbance like insects, disease, and fire], groups worked to research and develop desired conditions and management prescriptions, essentially developing best available science produces for their projects through collective learning processes. This was something that at least one interviewee mentioned on about half of the projects. For instance, one interviewee stated, “We brought in a research community to help us figure out the prescriptions and the [restoration] need and to talk about what it means to manage forests in [this region with fire] (65).” Another interviewee on a different project explained, “Most recently, [the collaborative group] worked through mixed conifer forest management recommendations. That was quite an undertaking and success in addition to what I'm pointing out, sort of this broader approach to providing recommendations to the Forest Service. But a real standout for me, in terms of success, was they had been introduced to this idea of learning about the development of best available science and how you incorporate that into management planning and consideration for best available science and looking back so you can look forward (14).” In essence, groups were using the CFLRP as an opportunity to create best available science pertinent to their restoration needs and reduce overall management uncertainty.

The process of designing monitoring protocols more broadly also played a large component in reducing management uncertainty on almost all projects and was something that most interviewees addressed. One interviewee stated, “Really what we wanted is the landscape-level perspective and suggestions on where the priorities would be, how the process should go, what the prescriptions should be, what this should look like when we're done, and then really adaptive

management and science-based monitoring that feeds back in and corrects things if they're going astray (25)." Additionally, on another project an interviewee reflected on learning under the monitoring program stating, "I think our monitoring is a huge success. We just completed the monitoring meeting, and we're noticing how our monitoring is being able to be used elsewhere to inform our decisions (9)." Lastly, an interviewee reflected on monitoring and learning stating, "We are doing a lot of adaptive management, a lot of monitoring, and that kind of learning has really gone a tremendous distance to allow stakeholders to understand issues better and to make decisions about how we should be managing landscape (44)." These examples were reports of iterative collective learning processes in most CFLRP project groups to address uncertainty.

About a third of the projects reported experimenting with innovative strategies to reduce management uncertainty and build agreement, including starting on smaller or easier projects or varying the intensity of treatments across a landscape. One interviewee reflected on starting small as a lesson learned for their group under the CFLRP program stating, "If there's a lesson it's try to start small and try to start simple and build that trusting relationship and then you will be able to grow and blossom and progress, because if you start with the really hard thing, it's hard to develop relationships when people are set in their position, and if you don't have a relationship to get people off of that position, that's difficult (52)." Another interviewee stated, "We purposely chose early on to focus on some easier ground because there was going to be a lot of support for it (18)." Lastly, one interviewee reflected on how their project used varying intensity of treatments to reduce uncertainty stating, "[So we] developed what's called a 'research salvage'. [T]his salvage was set up with an experimental design that had three different gradients. And you can just think of those as more or less aggressive treatments. Taking large

trees, taking logging trees and so on, to see how woodpecker species responded. And based on that, we'll be able to have . . . more consensus or unanimity around salvage (49).” Ultimately, groups were using the CFLRP projects as opportunities to experiment and innovate on restoration treatments and sizes to build agreement and understanding amongst participants. We considered this evidence of collective learning processes.

Project Level: Activities that built trust, strengthened relationships, and facilitated dissemination of information

The second group of activities at the project level that we identified had the main purpose of building trust, strengthening relationships, and facilitating dissemination of information. These activities included field trips and meetings, discussions, and increased transparency between the agency and collaborative partners. We review each of these activities below from most frequently to least frequently referenced by participants.

The majority of interviewees across all 23 projects reported field trips as an activity that facilitated learning. One interviewee reflected on field trips and frequent meetings stating, “Getting all these stakeholders talking and working together and seeing each other out in the field, hearing their side of the story. It's amazing, it's invaluable (12).” Another interviewee stated, “People can always go to the field and see what's being implemented on the ground and that causes a lot of really good conversations in the field that you don't necessarily get at a formal meeting. . . .We make sure that new people go with us to the field to see what's going on, and hear the whole story (28).” Additionally, groups participated in field trips to facilitate agreement and understanding of landscape needs. One interviewee discussed the importance of

field trips stating, " [Field trips] allow us to get out on the ground for the rest of the summer to look at some projects before they've been implemented, to learn from projects that have already been implemented, and create some opportunity for experimentation (69)." Another interviewee on a different project reported, "And on some of the projects we spent a lot of time in the field looking at different units, and then the approach that would be taken to different units that were representative of an approach over some chunk of the landscape. . . . So we definitely had field trips to review potential marks and units, and we were all pretty clear on where our trouble spots were. . . and we go out in the field and sort it out (56)." Ultimately, field trips acted as a mechanism to acquire and disseminate information amongst participants, which built agreement and facilitated learning.

Almost all groups reported a variety of meetings that involved in-depth dialogue regarding projects. An interviewee stated, "We had our all-hands meeting: we were looking at projects that were going to be contracted for in 2018. We have the proposal and the proposed list of things, any changes that have been made along the way, and then we lay all those out and then we have this big discussion. This is with 50-60 people in the room going over this and saying, 'does anybody have any problems with this? Here's the monitoring data so far and looking okay. It's kind of what we expected, so unless something else shows up, we're going to keep pushing ahead here.' Everybody gives their blessing and we're off and running (25)." At least one project reported hosting an implementation efficiency workshop. An interviewee from this project stated, "A member coordinated an implementation efficiencies workshop because a lot has come up in dialogue with the collaborative around what it takes to implement, why sometimes mistakes are made or there's misinterpretations on what the collaborative thought would happen

on the ground. What the challenges and barriers are to being successful. And so we hosted an implementation efficiencies workshop (14)." These types of meetings and discussions allowed collaborators to understand agency constraints, management alternatives and decisions, and build understanding and agreement. For example, an external stakeholder reported, "And because [the agency] is reporting out and sharing information back to stakeholders as they're working on their annual reports, and looking at the numbers of, 'How close are we to our goals?' They're sharing that back with us through meetings with a number of stakeholders involved. . . . I feel like there has been a lot of information sharing about where they are with the project goals, and it hasn't been something that we've had to actively seek out. They are actively trying to share that back with the public and with the stakeholders (47)." Another agency interviewee stated, "So, we discuss with them where they want to go next. Where do they want to optimize targets? And they help us weigh in on where our next large landscape project should be. Then the ID team goes out and does their analysis. And then we have another meeting with the group and say, 'Hey, this is what our findings are in this area.' All that kind of stuff we go over with every specialist from the ID team, they will stand up in front of the group and go over all of the findings and what our analysis is. Then the group weighs in on that afterwards (11)."

Several interviewees on about half of the projects reported collective learning processes that involved engaging with the agency to understand Forest Service functions, processes, assessments, and policies including the NEPA process. One Forest Service interviewee stated, "Through the project we were able to help them better understand what processes the Forest Service has to go through in putting a project on the ground. They got to see firsthand and engage with our specialists in discussions and deliberations over effects to different resource

areas and how one resource area might affect another and how do you weigh that one against the other (66).” A few interviewees mentioned engaging in discussions regarding Forest Service authorities, and how they could be used to increase efficiency on their projects. For example, one interviewee stated, “Most recently I sat in on a meeting where [the collaborative group] wanted to know what the appraisal process even looks like for timber sales or stewardship projects so that they can understand the economics of timber sales (14).”

These levels of transparency led to several successful projects reporting new roles for stakeholders in typically agency-only processes; these may be a type of learning outcome in the form of a behavioral change. For example, one interviewee stated, “Sometimes it almost feels like we're an informal member of their ID team, which I just love. We sit down and go out in the field and have very frank conversations about what's out there, while their resource specialists are also having frank conversations with us and each other about what should and shouldn't be done (73).” Another interviewee reflected on the importance of having collaborative members participate in ID team meetings stating, “They've allowed folks to participate on the ID team. . . . [T]here's three people at least on the collaborative that are part of that team now. They're not officially on the ID team, but they're invited, they're on the planning schedule, they can hear what's going on, and they can report back to the collaborative (72).”

Multi-Project Level: Activities that built trust, strengthened relationships and political influence, and facilitated dissemination of information

The last group of activities we review are learning activities that occurred across projects and had the main purpose of strengthening relationships and political influence, and facilitating

dissemination of information across projects, groups, or Forest Service organizational levels. These activities included information dissemination across organizational levels, information dissemination to local communities, and engaging with regional bridging organizations. We review each of these multi-project activities below from most frequently to least frequently referenced by participants.

Almost all projects were participating in communication across multiple organizational levels, groups, and throughout various venues. For example, an agency interviewee reflected on the diverse communication and meeting opportunities for agency personnel, stating, “Regionally, we had those joint meetings for a number of years that were really valuable. . . . We had monthly calls for a while. I love the national monthly call and the presentations that the call coordinator puts together. Those have all been valuable. I went to the national convention and that was really neat to meet the other CFLR coordinators and hear what's going on and see how many stakeholders there were. [Also] the collaborative, we meet every other month with them, and we provide them a CFLR update, they have a sub-committee and I meet with that subcommittee to go over what we're doing in the CFLRP (9).” Another interviewee stated, “The Washington office has been supportive, we have monthly calls with all of the 23 [projects] and we can see what other people are doing. And they do webinars that have been very helpful. Either every month or every other month there's a webinar on something, whether it's reporting or monitoring, there's always a topic and those are very helpful (79).” Lastly, another interviewee reflected on the multilevel communication among collaborative partners, stating, “ [The group] spends a lot of time and effort talking to folks at different levels, both locally and nationally on things like secure rural schools or they have gone to [Washington D.C.] on multiple occasions and put

together one-pagers and things like that for handouts and materials that they can take with them that are very specific to the CFLR, as well as the collaborative (77)." These examples showed evidence of communication across groups, i.e. collective learning processes, in order to share lessons learned and, among partners, advocate for particular policies they valued.

Almost all projects reported disseminating information out to their local communities engaging a broader group of actors in collective learning processes. Several interviewees on different projects reported creating novel instruments to disseminate their information including pub crawls, coffee klatches, PBS specials, op-eds, community field trips, podcasts, and fire learning trails. For example, one interviewee explained, "We developed this thing called the Fire Learning Trail. . . . Basically, it's an interpretive display that talks about the value of fire, and the need for restoration of fire, the role of fire in the landscape. There are panels that you can read, but they also have a podcast associated with them (43)." Additionally, interviewees across several projects reported communicating with local communities regarding restoration and their CFLRP project. One interviewee stated, "Another key success has been engaging the local community and the group's ability to educate and broaden the [community] understanding. They've done pub talks, they do outreach, they do a blog, they do panel presentations. They've developed several micro brews to promote things like prescribed fire (14)." This type of activity helped educate the public about the importance of restoration and get local communities on board with potential restoration work.

A little less than half of the projects reported networking through and within bridging organizations, which were frequently larger regional collaborative groups or non-profits, to share

information, knowledge, and lessons learned across projects. Organizations filling this role included Sustainable Northwest, Rural Voices for Conservation Coalition (RVCC), Montana Forest Restoration Committee (MFRC), Idaho Forest Restoration Partnership (IFRP), and Sierra to California All-Lands Enhancement (SCALE). One stakeholder discussed the importance of participating in regional collaborative meetings stating, "I go to [the meetings because] I want a networking opportunity with folks that work on similar projects. And it goes beyond that as well. And I go because I'm looking to see how and whether folks are being innovative, creative, efficient, strategic, and how they're addressing what I believe are similar challenges. And I believe there's a real dearth of opportunities for networking amongst practitioners that are dealing with public lands issues of this sort. Networking interpersonally, but also in a more technical sense around some technical issues. . . . Comparing notes on what those challenges are and attempting to resolve or create common problem-solving mechanisms around those issues (87)." Additionally, interviewees noted that these networking opportunities provided a chance for them to trouble shoot issues and develop best practices at a regional scale. One stakeholder reflected on the importance of networking at various scales stating, "So that's why [the regional collaborative forum of multiple CFLRP projects] was put together, so when there's a barrier, we go to the [Forest Service Regional Office] and say, 'Is this a barrier? It shouldn't be. Here's a way we can cut this down and deal with it.' But the folks on the forest weren't going to do that, because they weren't required to do it, and it was inconsistent with past practices. How about changing contracting? No one is going to change contracting unless you get some higher-ups to agree. . . . [Y]ou've got to work at different levels to achieve change. It's critical [to work at] dual levels . . . [the regions] have a lot of power in making change on forests (84)." This is evidence

of multi-group collective learning processes and also demonstrates how engaging with regional bridging organizations supports political organization and advocacy.

Factors that Influenced Collective learning

Below we report on various variables identified under the CFLRP program that would influence collective learning. Variables included the dedication of funding, the mandate to monitor, the mandate to collaborate, strong agency leadership, and group facilitation.

Dedicated Funding and Mandatory Monitoring

The majority of interviews noted funding was one of the most important factors that facilitated success, and in combination with mandatory monitoring under the CFLRP legislation, had the potential to support learning. One interviewee stated, “I think the money drives everything. . . . [And] the requirement for monitoring, for collaborative monitoring, it really has set up a more routine practice of doing monitoring and adaptive management. Now people know how to do it. All of us have known it's been a theory for a long time, and we say ‘Oh, yeah. We've got to do it.’ But then how do you actually do it? What does it actually look like on a year to year to year basis? It took us a few years to figure that out. The institutionalization of that cycle of that collaborative monitoring adaptive management [has been important] (32).” Another interviewee on a different project discussed the importance of funding and monitoring stating, “One thing the CFLR[P] money is very helpful on is we're dedicating a chunk of that to monitoring, and historically, in the Forest Service, monitoring is talked about but never funded. So, I think that's a success, actually getting the multi-party monitoring funding through the CFLR[P] Act, is really key, and actually the entire monitoring process and multi-party monitoring board (1).”

A Mandate to Collaborate

Under the CFLRP program there is a mandate to collaborate, which facilitates the participation of a diverse group of stakeholders. An interviewee reflected on the diversity of their group stating, “I think that we have a wide variety of stakeholders, collaborative members, from all the different agencies, the organizations, I think we have a pretty high-powered group (6).” The interviewee went on to say, “There's a lot of pretty great minds that come together in that group and I think we get a wide range of perspectives and opinions and ideas. And I think that's been a real big part of the success (6).” Another interviewee noted, “When we wrote the proposal we had a very engaged, broad group of potential industry partners, all the tribes, local communities, the State Forestry, US Fish and Wildlife, State Game and Fish, the State Land office, NRCS, local soil and water conservation districts, and several other organizations like that. And then some other nonprofits. . . . It just keeps growing and expanding (29).” The majority of projects reported having diverse stakeholder participation, which helped build collaborative capacity and facilitate learning with a wide-range of opinions and perspectives.

Agency Leadership

Several interviewees reported on the importance of strong agency leadership in fostering a learning environment. One interviewee stated, “I would say the local leadership is an important factor in being able to get things done. The willingness for the local units to partner, and to be in a position of being open to differing opinions. That's important (78).” Another interviewee on a different project reflected on continuity of leadership stating, “Having the support of the district ranger from start to finish, especially in those first couple of years, and then having the

consistency of [the coordinator] explaining how the program works and what the rules are and the budgeting . . . has been hugely helpful. I mean [consistency] as far as the leadership goes, I think has made a big difference (77)." One Forest Supervisor reflected on the importance of strong leadership to support collaboration, saying, "Well, as a forest supervisor, I had a lot of positional authority. I spent a lot of time talking about the value of collaborative processes. For me, I drew on past experience. I think you spend a lot of time talking about the why, both internally and externally, to start to move it. Then, you also say, 'This is the way our forest is going to work.' Then, having rangers who buy-in to it too was huge. That leadership, that local line officer leadership is really critical (82)."

Facilitation

Additionally, multiple interviewees reported the importance of third-party facilitation for facilitating collective learning processes. Facilitators helped groups stay on track, sort through disputes, and engage productively throughout the lifetime of their projects. An interviewee stated, "Having good outside facilitation of our group . . . has really kept us on track and kept us focused (6)." Another interviewee on a different project reflected, "Our first two facilitators were very helpful in keeping us focused and good at maintaining motivation. And in not driving an outcome but helping to sustain energy and focus when carrying forward with some things that were really complicated and exhausting, and hard for everybody to work on. So, they provided the glue [to keep the group together] (56)."

Discussion

Here we review our findings regarding collective learning activities identified under the CFLRP program and factors that supported learning. We then turn back to the broader literature,

reflecting on the value of collective learning processes, and policy and institutional factors that facilitate learning.

Overview of Strategies to support Collective Learning and Outcomes

Our research identified a variety of strategies to facilitate learning that groups are employing across the CFLRP. First, at the project-level, groups reported using strategies to reduce scientific uncertainty and management complexity including engaging outside expertise, monitoring and adaptive management protocols, and experimentation. These types of strategies often can lead to learning outcomes such as the development and adoption of best-available science, which has the potential to generate on-the-ground management changes. Likewise, we found that these strategies often helped form or strengthen agreement amongst participants, which was exhibited through development of agreed-upon restoration principles. Additionally, at the project-level, groups were participating in learning strategies to build trust, strengthen relationships, and facilitate dissemination of information within the group. These strategies included field trips, meetings, discussions, and increased transparency amongst participants. These strategies led to collaborative groups learning about agency constraints and administrative processes, and conversely, the agency learning about collaborative group goals and restoration priorities. These outcomes often had secondary repercussions such as increased trust and confidence in management. Lastly, we found evidence that groups are participating in multi-level learning strategies such as information dissemination and communication across organizational levels as well as to local communities and engaging with regional bridging organizations. These activities led to a variety of outcomes such as the diffusion of learning, development of educational tools, and network formation and cohesion. Most importantly, we found these activities led to a level

of increased political advocacy, with groups using these strategies to hone their political acumen and influence policy at higher levels of the governance system.

We found that several factors facilitated collective learning under the CFLRP program including dedicated funding, the mandate to monitor, the mandate to collaborate, strong agency leadership, and facilitation. As noted above, dedicated funding over the lifetime of a project provided a level of room for groups to innovate and experiment, as well as implement monitoring and adaptive management protocols. Our work also indicates that the extended time frame of the CFLRP set the stage for joint learning, which others have found often results from sustained investment and longer timeframes for project implementation (Ojha et al., 2013). This dedicated funding was particularly helpful in terms of the mandate to monitor, allowing groups to allocate a specific amount of money to monitoring and interpretation of data. The mandate to collaborate was critical to ensure diverse knowledge types and actors were included in the project. Likewise, projects with strong agency leadership that facilitated a learning culture and encouraged innovation and risk-taking were critical to ensuring collective learning took place. Lastly, engaging third-party facilitators provided groups a level of structure and increased communication amongst participants and with the agency. Below we discuss the implications of these findings in terms of collaboration, policy design, and adaptive governance.

Broader Implications of Collective Learning Under the CFLRP Program

Scholars note that collective learning is critical for adaptive governance and collaboration (Heikkila and Gerlak 2011: Heikkila and Gerlak 2013; Cosens et al. 2018). We identified an array of collective learning activities including frequent and regular meetings, engaging outside

expertise, and monitoring. These types of activities are typical of knowledge co-production scenarios where groups are engaging early and often to jointly develop an understanding of their management issues and potential solutions (Edelenbos et al. 2011). Knowledge co-production of this nature is important because it indicates traditional barriers between bureaucrats, experts, and stakeholders are beginning to dissolve, creating a more dynamic system of information sharing and learning, which lend themselves to increased resilience in the social ecological system (Hunt and Shackley 1999; Edelenbos et al. 2011). Ultimately, co-produced knowledge is considered more legitimate amongst participants, with higher scientific validity, and stronger relevance in terms of decision making and policy development (de Bruijn and Heuvelhof 1999).

One important implication of our research is that the CFLRP program set up a level of multi-level learning, in that, learning was not just occurring on projects, but across projects and at different levels within the governance system. As we noted above, there were a variety of learning activities occurring and at various levels within the governance system whether that be local, regional or national. Specifically, higher level learning structures and activities such as conferences and calls with the Washington Office, when combined with learning at lower organizational levels, support multi-scalar learning and adaptive governance and increased resilience (Tompkins and Adger 2004; Folke et al. 2010). In order to facilitate resilience within the governance system, with groups capable of adaptation and flexibility, there must be a level of self-organization and learning, with connections across levels (Tompkins and Adger 2004; Armitage 2005). We see these characteristics under the CFLRP program, where groups came together around a local landscape and are participating in a variety of collective learning activities to accomplish their goals.

Our findings indicate a level of networked, multi-level learning within the governance system in part as a function of the CFLRP program. Governance networks are decentralized, dense networks of institutions and actors that relay information, develop mutual trust and relationships, and interact for a common purpose such as collective management of natural resources (Newig et al. 2010). By instituting a program with sustained investment and collaboration across multiple sites at the same time, the CFLRP program facilitated learning processes by fostering local level projects, along with regional and national level activities to share information and lessons learned. Through mandated collaboration at the project level, the Program necessitated a level of diverse stakeholder participation, which brought with it a variety of knowledge types and expertise. Through the interaction of stakeholders at the local, regional, and national levels, the CFLRP program facilitated information transmission across levels. The development and support of these governance networks, in this case facilitated by the CFLRP, can lead to the development of informal communities of practice that facilitate overall flexibility, innovation, learning, and adaptive capacity building a level of resilience in the management system (Capra, 2002; Fisher et al., 2007, Armitage 2005).

Policy Variables that Support Collective Learning

It is worth further understanding the policy attributes associated with the CFLRP program that enabled collective learning including the mandate to collaborate, the mandate to monitor, and a commitment of resources over an extended period of time. First, the mandate to collaborate was critical to fostering collective learning under the CFLRP program. All projects had a collaborative group associated with them throughout all phases of the project (planning,

implementation, and monitoring). The requirement to collaborate forced stakeholders and the agency to work together and necessitated a level of communication and transparency not typical of traditional agency management (Argyris and Schon 1996). It also allowed for diverse stakeholder participation, which ensured various levels of expertise and knowledge were available and used (Wondolleck and Yaffee 2000; Armitage et al. 2007; Heikkila and Gerlak 2018). Having the collaborative mandate ensured a level of dialogue and information sharing, which are hallmark activities of learning (Armitage et al. 2007).

Additionally, the monitoring mandate under the CFLRP program facilitated a level of collective learning, which the scholarship would predict (Wondolleck and Yaffee 2000; Weber 2003; Fernandez-Gimenez et al. 2008). Under the CFLRP program, many projects chose to establish multi-party, collaborative monitoring protocols with an emphasis on adaptive management, best available science, and learning. The mandate to monitor usually led to reflection through monitoring meetings and field trips, another key component of adaptive governance and learning (Wondolleck and Yaffee 2000; Gray et al. 2001; Keen et al. 2005). Frequently, groups engaged various experts to not only craft their monitoring protocols, but to independently interpret the results. In combination with the mandate to collaborate, the mandate to monitor often led to multi-party monitoring, where groups combined their expertise and knowledge base to gather and interpret data, furthering their long-term learning goals.

The CFLRP program provided tangible financial resources over an extended period of time for implementation and monitoring of large landscape projects. The projects' longer temporal and larger spatial scale, which was facilitated by the long-term investment, ultimately provided space

for projects to try new things, monitor and deliberate, and collectively learn across the program. First, the dedication of funding guaranteed that participants had resources to implement experimental treatments, pay for technical assistance, and attempt more time and resource intensive activities on landscapes, ultimately encouraging some level of learning across projects (Gibson et al. 2000; Keen et al. 2005). Additionally, the length of time for projects ensured collaborators could design larger projects and treatments that may need more time for implementation. The importance of extended time frames to learning is supported by the literature (Weber 2003; Keen et al. 2005; Ojha et al. 2013). Based on our findings and the literature, we suspect the temporal scale and commitment of funding provided a level of comfortability to innovate and try new things; however, more research will need to be conducted to confirm this. This ability to take risks and innovate is well documented as important to learning in the literature (Weber 2003; Armitage et al. 2007).

These findings are important because they indicate that policy can be designed to facilitate collective learning and adaptive governance, while providing the local level flexibility necessary to allow adaptive governance and management to be successful. Ultimately, the CFLRP was a policy intervention that brought diverse parties together frequently and in a sustained pattern of interactions to facilitate adaptive governance and learning (Fischer and Jashy 2017). Additionally, we find that these factors contributed to developing an atmosphere ripe for knowledge co-production, where on-going interactions between experts, bureaucrats, and locals lead to development of usable knowledge and common understanding (Edelenbos et al. 2011). However, it is important to note, that we also identified strong agency leadership and facilitation as critical to collective learning efforts. While policy can foster a collective learning

environment, there still needs to be active leaders that establish a culture of collective learning and collaboration. Given the importance of learning, it is highly valuable to identify policy tools that support learning, and future work could look at the mix of tools, both substantive and procedural, and resources, skills, and knowledge that together add up to a policy system that promotes learning and adaptation (Howlett, 2009).

Conclusion

This study is unique because it reveals the importance of institutional design in supporting collective learning and adaptive governance. Our research highlights the policy variables decision makers can consider and incorporate to simultaneously facilitate collaboration, adaptive governance, and collective learning. In terms of limitations, the main focus of our initial research was to identify the successes, challenges, and lessons learned under this program and many of our interview questions focused on these areas of analysis. In retrospect, it would be beneficial to ask a set of focused interview questions regarding collective learning. Lastly, the variables that support collaborative governance, learning, and adaptive governance frequently overlap and share similarities, making it difficult to disentangle variables that supported collaboration from variables that supported learning. In the future, it would be helpful to identify specific cases of learning on several projects and delve deeply into the learning processes and perceptions of learning through interviews and document analysis, ideally through some longitudinal work. Additionally, future research should focus further on policy design to support learning, looking at how a compendium of policy tools and resources work together to facilitate learning. As we have demonstrated, learning is important to facilitate collaboration as well as adaptive governance, both of which are more relevant than ever before in the face of decreasing budgets, capacity, and increasing variability from climate change. Natural resource management policies

that can facilitate learning are critical to facilitate adaptive governance and it behooves agency personnel and policy designers to understand what key policy mandates can facilitate effective learning at not only the local level, but regionally and nationally to maximize return on investment, information and knowledge generation, and decrease management uncertainty where possible. Ultimately, there would be great value in tracking learning as a facilitator of adaptive governance over time to determine how these added capacities lead to a greater ability to respond effectively to environmental management challenges during this time of great complexity and rapid change.

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Chapter 4: The Collaborative Forest Landscape Restoration Program: Successes, Challenges, and Implications for Policy and Practice

Overview: The Collaborative Forest Landscape Restoration Program (CFLRP) was authorized by Congress in 2009 to facilitate large landscape restoration projects on Forest Service lands ((PL 11-111 sec. 4003(b)(2))). The CFLRP program was unique for a variety of reasons including a prioritization of fire-adapted landscapes, a mandate to monitor, and a mandate to collaborate throughout the lifetime of a project (Schultz et al. 2012; Schultz et al. 2018; Schultz and McIntyre 2019). In 2017, we conducted a third-party programmatic review of the CFLRP program to identify the benefits and value-added of the policy, challenges and barriers faced by projects, and lessons learned for future policy iterations. We conducted participant observation on several site visits as well as 89 semi-structured interviews with internal agency staff and external stakeholders on all 23 projects. Interviewees reported a variety of benefits from the program including an accelerated pace and scale of restoration, increased trust and stronger relationships, decreased conflict and litigation, and the ability to leverage external dollars on projects. Additionally, groups identified various challenges under the program including agency-related barriers such as staff turnover and inadequate capacity and context-related barriers such as unexpected ecological disturbance and a lack of markets and infrastructure. Our findings have implications for agency policy and practice and indicate that the CFLRP program was able to yield of variety of benefits, but that it is important for the Forest Service to address challenges prior to investing long-term funding in specific projects and

landscapes. Additionally, these types of collaborative policies have larger implications for natural resource management on public lands in era of increased scientific uncertainty and management complexity, when public-private partnerships will be critical to accomplishing restoration work.

Introduction

The need to accomplish collaborative forest restoration in the United States has increased due to the legacy of past forest management, including fire suppression and timber harvesting, as well as a demand from community forestry groups for more active stakeholder participation in treatment design and management (Stephens and Ruth 2005; Calkin et al. 2015; USFS 2018). One innovative policy that focuses on large landscape restoration with a mandate to collaborate throughout the lifetime of the project is the Collaborative Forest Landscape Restoration Program (CFLRP). Congress authorized in 2009 the CFLRP, which provided federal funding for collaboratively designed, implemented, and monitored restoration projects on US national forests (PL 11-111 sec. 4003(b)(2)). This policy was unique for a variety of reasons including the mandate to collaborate, the mandate to monitor, and prioritization processes that focused investment in >50,000 acre landscapes for 10 years (Schultz et al. 2012; Schultz et al. 2018; Schultz and McIntyre 2019). In 2017, we conducted a third-party assessment of the CFLRP program, which included the assessing the following research question: what was the value added of the CFLRP program and the challenges to restoration reported by participants? Below we review our findings regarding the benefits reported by groups across the program as well as the challenges and barriers groups reportedly faced. We follow with a discussion of the implications for collaborative forest restoration policy and the practical implications for the agency and land managers going forward.

Literature Review

Early Forest Service policy prioritized full suppression of forest fires, which when combined with historical patterns of timber harvest that prioritized the largest trees for marketability, led to

increased fuel loads, homogenization of landscape structure, and departure from historical ranges of variation for many western forests (Ryan et al. 2013; Calkin et al. 2015). These issues are further exacerbated by climate change, which is lengthening fire seasons and contributing to greater flammability of fuels, increased extent of the wildland urban interface, and an overall growing complexity in terms of management decisions (Calkin et al. 2015). Scientists and land managers agree that there is a growing need to actively restore forests through fuels treatments, including mechanical thinning and prescribed fire, that help decrease fire severity while increasing the fire resiliency of a forest (Brown et al. 2004; Reinhardt et al. 2008; Stephens et al. 2012). Forest restoration ultimately involves restoring natural processes such as fire to the landscape and often requires work across larger spatial extents than is typical in US forest management (Brown et al. 2004; Agee and Skinner 2005; North et al. 2012; USFS 2012).

To accelerate activities and work across larger landscapes, the Forest Service emphasizes public involvement to support collaboration with organized stakeholder groups (USFS 2006; USFS 2012; USFS 2015b). The Forest Service has sought to increase collaborative restoration efforts in a variety of ways by adopting a more active management approach in conjunction with engaging and working with collaborative groups (USFS 2006; USFS 2012; USFS 2015b; USFS 2018). Collaboration with community groups affords the agency an opportunity to move beyond conflict to develop a shared vision for forest restoration, ideally allowing for more work to be accomplished (Wondolleck and Yaffee, 2000; Koontz et al., 2004). There have been several approaches and tools to accomplish the goal of more cooperative forest management on Forest Service lands including the Good Neighbor Authority, the Joint Chiefs Program, and shared stewardship agreements with states (USFS 2018). These policies emphasize working with local

and state partners to accomplish restoration work on larger landscapes and often cross-jurisdictionally (Bertone-Riggs et al. 2018; USFS 2018; Cyphers and Schultz 2019; Schultz et al. 2019).

One important policy to incorporate collaborative restoration on federal forested lands is the Collaborative Forest Landscape Restoration Program (CFLRP). The Collaborative Forest Landscape Restoration Program was an innovative policy tool to support collaborative, landscape restoration in fire-adapted ecosystems on federal forest lands (Schultz et al. 2012). Authorized in 2009 and reauthorized in the 2018 Farm Bill (P.L. 115-334), the CFLRP competitively awarded funding for large landscape restoration projects on federal forested lands that were planned, implemented, and monitored collaboratively (Butler and Schultz, 2019; Schultz et al., 2018; Schultz and McIntyre, 2019). The program was unique for a variety of reasons including the mandate to collaborate, the mandate to monitor, and the focused strategic investment of funding for the lifetime of the project (McCarthy, 2019).

To date, research has focused on various aspects of the CFLRP program including: multi-party monitoring and adaptive management (Schultz et al. 2014; Cheng et al. 2017), the collaborative governance component including the mandate to collaborate and collaborative implementation (Butler 2013; Butler et al. 2014; Monroe and Butler 2015), access to and use of best available science (Colavito 2016), challenges and barriers project groups face (Urgenson et al. 2016; Walpole et al. 2017), and case-specific lessons learned (Schultz et al. 2012). We sought to assess across the entire program whether and how this policy was valuable, as well as the challenges

groups were facing to accomplishing restoration goals. Information from our study is intended to inform future policy iterations and the practice of collaborative forest restoration more broadly.

Methods

We utilized a qualitative approach to our research that included participant observation and semi-structured interviews. We conducted participant observation sessions with Forest Service staff in 2016 with seven CFLRP projects across three Forest Service Regions (Rocky Mountain, Pacific Northwest, and Pacific Southwest), allowing us to build trust and rapport with potential interviewees and identify appropriate areas of investigation (Glesne 2011). Then, during Summer 2017, we conducted semi-structured interviews for all 23 projects in the program. While interview direction was flexible, based on interviewee responses and expertise, we strove to cover a set of interview questions across several primary categories, including: the benefits accrued under the program, the challenges associated with the program that groups faced, factors that supported success, lessons learned, and suggestions for future policy changes.

We aimed to speak with four participants from each project, including two internal and two external collaborators who were actively involved with the project at the time of our work. We completed 89 interviews and spoke with participants on all 23 projects; numbers associated with individual interviewees are included with our data excerpts below. Potential interviewees were identified by first contacting the Forest Service CFLRP coordinator for each project. We then asked this person for recommendations for another agency staff person and a collaborative partner who could speak about the project's implementation and represent the range of perspectives on project progress. We solicited interview recommendations from each interviewee and used these recommendations to triangulate recommendations to the extent possible. A

limitation of our sampling approach is that coordinators would potentially only recommend those stakeholders most active with the project or the collaborators that represented common viewpoints, leaving out more divergent opinions and voices. We tried to reduce this bias by triangulating potential recommendations through informal conversations with regional practitioners, collaborators, and scholars. Additionally, some individuals did not respond to email or phone requests; we recognized that some people had been interviewed about their projects five to ten times, so we limited our attempts to contact people.

Interviews lasted between 60-90 minutes and all interviews were recorded and transcribed. We utilized qualitative data analysis techniques, including interview coding and memoing (Glesne 2011; Saldaña 2015). We had several, general, predetermined codes that were based on the practical questions in our interview guide (e.g. challenges encountered, recommended policy changes); we used these codes to begin to organize our data. We also inductively coded excerpts of text, creating codes for emergent themes and sometimes assigning multiple codes to the same excerpt, in an iterative process as we read and re-read interview transcripts. We used Dedoose, a software package, to code transcripts and then used a memoing strategy to further organize and analyze our excerpts for each CFLRP project and for different codes (Glesne 2011). As we reviewed our memos, we strove to answer practical questions about topics such as challenges faced under the CFLRP, and we also engaged in dialogue as a team to identify themes in our data that both converged with the literature we drew upon to design our study and that offered new, unexpected findings.

Results

We begin in this section with a review of our results regarding the benefits of the CFLRP. We start with the most common benefits, working towards those that were slightly less common across projects. We then discuss common challenges we uncovered in our research.

What benefits were realized under the CFLRP program?

The majority of interviewees reported an accelerated pace and scale of restoration work under the CFLRP program, which we would expect based on the focused investment of additional funding for CFLRP projects. For example, one interviewee reported, “I would say we definitely have been able to increase our pace and scale over the years that we've had the CFLRP funding. I would say we have increased the pace and scale in terms of the overall, comprehensive treatment of the landscapes (82).” Another interviewee reported, “The value added of CFLRP is that it accelerated the pace and scale of what we can accomplish (16).” A more unexpected finding was that interviewees reported they were able to plan at larger scales than ever before. For example, an interviewee stated, “Well, the main thing on all of this is to do landscape level work, you have to plan the project as a landscape from the beginning. The real value now, not only once you start thinking that way, is you have to plan your NEPA that way (25).” In terms of planning, another interviewee stated, “So I think we scaled up [our planning] to a scale that's going to significantly improve the conditions once implemented (51).” Not only were groups reporting larger planning documents and an accelerated pace and scale, but almost all groups reported they were able to accomplish more types of restoration work. One interviewee reported, “The value added is it has allowed us to [get more work] accomplished on the ground, whether it be watershed restoration or vegetative restoration, fuels reduction, those types of things (45).” Additionally, several

groups reported a reduced risk of wildfire under the CFLRP program. One interviewee stated, “A few years ago [we had a wildfire] where mastication [under our CFLRP project] had been done the previous year, and it had really halted the wildfire in its tracks. And that's just a phenomenal example of exactly why they're doing what they're doing, and I think it really vindicated the idea. [The restoration work] was working, in other words (40).”

Additionally, almost all interviewees reported that the CFLRP program supported the development of stronger relationships and increased levels of trust amongst participants. For example, one agency interviewee stated, “CFLRP is strengthening our relationship with the collaborative group. Just working through CFLRP--they're excited about it, we're excited about it. It keeps us engaged with each other (18).” Another interviewee stated, “Breaking through that [contention that existed between partners] and getting levels of trust between those groups was a huge accomplishment [under this program] (36).” Frequently, these stronger relationships and increased trust led to more agreement regarding restoration vision, the development of restoration principles, decreased conflict, and decreased levels of litigation. One external collaborator stated, “I think the project has minimized conflict and has changed the nature of conflict. It has minimized conflict on a per-acre basis (87).” Another interviewee stated, “There hasn't been a single litigation on these forests by all the groups that had been targeting bad projects, since we began. Six years litigation-free (30).”

Additionally, over half of interviewees reported that stronger relationships and increased trust, particularly increased trust in the agency, led to increased leveraging of external funding. For example, external agency interviewees reported that the long-term agency investment and

commitment to a landscape indicated the agency was serious about restoration, and hence, the stakeholders felt more comfortable investing their own dollars in the landscape as well. One stakeholder reported, “The CFLRP acts like seed money to show that the Forest Service is making a capital investment in the health of the forest, which then attracts additional investors from the outside. This year we're going to bring in a little over 10 million dollars of outside funding to match some of the CFLRP work (52).”

Lastly, the majority of interviewees reported being able to invest in monitoring under the CFLRP program. An interviewee stated, “The requirement for monitoring, for collaborative monitoring. It really has set up a more of a routine practice of doing monitoring and adaptive management. That's been good, the institutionalization of that cycle of that collaborative monitoring adaptive management (32).” Interviewees felt the increased funding and mandate to monitor allowed them to invest in robust monitoring programs that incorporated adaptive management.

Challenges and barriers to accomplishing work reported under the CFLRP program

In this section we review the challenges and barriers to accomplishing work that were reported under the CFLRP program. We separate these into two categories of challenges: 1) external challenges not associated with the agency and, 2) internal, agency-related challenges. We discuss these separately and within each grouping from most common to least common themes.

External Challenges

Over half of interviewees reported issues with inadequate or non-existent markets and forest products industry partners to work with their projects. Issues with industry and markets usually

involved inadequate amounts of locally based contractors or mills, prohibitive haul distances to viable markets and mills, prohibitive treatment costs and low-value timber, and the lack of a biomass market. For example, an interviewee stated, “It is hard to find investors that are willing to put a ton in upfront and seeing the possibilities when you've got this low-value product. We're talking long term here, but 10 years goes fast. Even if you get a second contract, millions and millions of dollars has to go into infrastructure, I don't know how many people are really interested in investing that way (58).” Another interviewee on a different project reported, “We have lost two of our larger mills in the area and those are really the only ones that are capable of handling large saw logs. Where we've seen the decline on merchantable timber coming off of Forest Service lands, it has had a direct effect on the local economy and communities that are associated with logging (38).”

While overall satisfaction with the collaborative process was reportedly high, there were a few projects that reported issues with developing collaborative agreement. For example, a few projects reported issues with solidifying agreement amongst participants. One internal agency interviewee stated, “Really just getting people wanting to treat the same location in the same manner has been a challenge (8).” Another interviewee on a different project said, “Some of the value sets for individuals in the group can be a barrier in that some issues are just difficult to get past and some folks just don't want to talk through it. So, there are still values that are very strong, and sometimes that causes some derailment (14).”

Lastly, several projects reported struggling with unexpected disturbance such as drought, insect and disease, and wildfires. For example, one interviewee reported “We had big fires in 2015,

which burned up part of our planned project area. And set back efforts we had in motion (45)." Another interviewee on another project discussed issues with planning and unexpected disturbance stating, "The only challenge was when the fires hit, how to address projects that were going through NEPA and were three-quarters to almost done, or done, and the fire caused the changed condition (9)." Additionally, some interviewees reported struggling with high levels of landscape complexity whether that be proximity to an urban area or a large number of [threatened and endangered] species in their project boundaries. For example, an interviewee stated, "There's challenges on every landscape, so one part of our CFLRP is in the Northern Spotted Owl habitat, and so they take much more an intensive survey. It is a two-year protocol, so the minute you decide you want to work somewhere, it takes two years from then before you have enough information to move forward with an effects analysis. We have what is called a limiting operating period (LOP), and depending on where you are, there's different lengths for different species. But the bald eagle has almost a ten-month LOP, which really limits the number of months or days you have that you could actually implement or work in an area. That's a challenge (8)."

Internal Agency Challenges

Almost all interviewees reported challenges with agency staff turnover, particularly in leadership roles. An interviewee reflected, "We're on our second [District Ranger] with our CFLRP project, but over the ten years of our collaborative work we're on our seventh district ranger here. So that stinks. So we get to train one every two years. Some come in and take to the collaborative like a duck to water and some come in and kind of resent the fact that there's a collaborative there (16)." Another interviewee stated, "You see this issue consistently where the agency talks a great

game about how we value people and relationships and we want to work together, and we think collaboration is the way to go. But when it comes down to it, things like the turnover problem destroy that, and if you were serious about valuing relationships then you wouldn't move people around every 18 months. You wouldn't put people on acting assignments during critical planning periods like forest plan revision (44)."

Additionally, almost all interviewees across the program reported issues with agency capacity. One agency interviewee stated, "I think capacity certainly is an issue. I don't have enough people. And so, the collaborative has hugely high expectations of what my specialists can produce. And I'm constantly trying to reset those expectations (20)." Another interviewee reported, "The only thing that I could really think of that's been a barrier is finding people to do the work, to do the implementation. We have capacity issues (11)." Another interviewee reported on issues with staffing to complete contracts, "Everyone across the board in contracting is understaffed. It's painful to get contracts because they have so few people to get them out, get them on the street, get them awarded. Then we are painfully thin on the ground. When the contractor shows up, a lot of times we need to pull staff other projects and bump them around to keep things going. We don't have enough people on the ground (21)."

Relatedly, multiple interviewees reported issues with agency budgets and funding, particularly focusing on inadequate funding that frequently led to inadequate capacity. For example, one interviewee stated, "So our capacity to do work has been reduced, as well as funding, we're not getting the appropriated funding at the forest level to be able to fill some of these positions. We may have eight vacancies in the fire shop, we might only get filled two of them. Well, that still is

a barrier from a resource standpoint to be able to get work done (4).” Another interviewee reported, “We're having reductions every year in our budget. For example, they're cutting roads or engineering so then how do you access a timber sale site without that road, if you can't maintain that road? Or how do you do restoration work at this remote site if you don't have the funding to maintain the road? If we don't have the funding or the manpower to do it then I don't see a way around it (27).”

Lastly, a few interviewees reported challenges with agency processes specifically around contracting. For example, one external interviewee reported, “The contracting aspect of getting large landscape restoration work done is particularly problematic (44).” Another interviewee stated, “The slowness of the process including contracting, stewardship, purchase orders, all of that stuff. It was agonizingly slow. It took months to get anything done (25).” Several interviewees reported issues with the agency targets and reporting. For example, an agency interviewee stated, “Internally we have different targets handed down to us from our regional office that don't always align with our 10-year goals for CFLRP. Our forest has been hitting our fuels target year after year for prescribed fire and fuel, yet we've accomplished a fraction of what we were striving to do in our CFLRP for burning. That is a real internal challenge because to try to get the momentum and the support from line officers to put more fire on the ground when they've already hit their targets is difficult (3).”

Discussion

We identified a variety of benefits accrued under the CFLRP program including but not limited to an increased pace and scale of restoration work, increased trust and stronger relationships amongst participants and with the agency, decreased litigation and overall conflict, increased

external capacity and the ability to leverage external dollars, and monitoring. It is important to note that several of these reported benefits were intended consequences of the CFLRP policy. For example, the policy design was intended to meet goals such as increased pace and scale of restoration, decreased fire risk, the implementation of monitoring, and larger landscape visions and planning (Schultz et al. 2012; Schultz et al. 2018; Schultz and McIntyre 2019). These findings indicate that the CFLRP program was, to an extent, meeting its policy goals and effective, which has implications for future policies designed off of this template.

While there were a multitude of benefits under the CFLRP program, there were various reported internal and external barriers and challenges that made achieving successful restoration difficult. In terms of external challenges, we found issues with industry and infrastructure as well as unexpected disturbance and ecological complexity. Conversely, internal agency barriers included staff turnover and capacity issues. Many of these types of challenges have been well documented elsewhere, particularly staff turnover and agency capacity issues (DiBari and Randall 2018; Schultz et al. 2018).

In terms of value added from the CFLRP program, almost all projects reported increased trust and stronger relationships with participants, which led to more agreement regarding restoration and less overall conflict and litigation. These increased levels of trust, stronger relationships, and agreement led to increased external investment from stakeholders and an overall increase in collaborative capacity. These types of social benefits from collaboration are well-documented throughout the collaborative governance literature (Wondolleck and Yaffee 2000; Emerson and Nabatchi 2015). In addition, these types of benefits have cascading ramifications for restoration

and the agency overall. For example, it was reported elsewhere (Schultz et al. 2018; Schultz and McIntyre 2019; Authors, in review) that increased trust and stronger relationships often led to increased social license for the agency to try new, innovative things in terms of planning and implementation. Essentially, these benefits facilitated a level of risk-taking on behalf of the agency in the face of uncertainty, which has the potential to lead to innovation (Iles, 1994). Additionally, under the CFLRP program we identified reported increased capacity to accomplish work, both through added and leveraged external expertise and funding. These types of benefits have implications for bolstering the agency's adaptive capacity and ability to respond to dynamic and changing landscapes.

Value-added under the CFLRP program included ecological benefits such as increased pace and scale of restoration, more types of restoration work accomplished per project, monitoring, decreased fire risk, and larger planning documents. These findings are important because many of these values were goals of the CFLRP policy, which indicates that the policy is meeting its intended purposes. Additionally, these types of ecological accomplishments are important in an era marked by increased wildfire frequency and risk, a backlog of restoration work, and decreasing agency budgets to accomplish these tasks (Brown et al. 2004; Goldsmith and Eggers 2005; Kettl 2006; Reinhardt et al. 2008; Stephens et al. 2012). One particularly important benefit under the CFLRP program was the implementation of monitoring. We found that monitoring was important because it allowed the agency and the collaborative group to ensure their actions were meeting intended goals and adjust future management decisions based on findings. Additionally, monitoring provided a level of accountability for the group and the agency, which reinforced trust and relationships. This ultimately, facilitated better working relationships, the ability to

innovate and try new things on landscapes, and the accomplishment of more restoration work. These findings are documented elsewhere in scholarship on CFLRP (Schultz et al. 2012; Schultz et al. 2014; Schultz et al. 2018; Schultz and McIntyre 2019).

Our research shows that the CFLRP program generated a variety of valuable outcomes, particularly in terms of helping the Forest Service accomplish more work in less time. Not only did interviewees report increased pace and scale of restoration work with larger planning documents, but also, the majority of projects reported stronger agreement amongst participants and less litigation or conflict. These benefits are critical in terms of the agency meeting their mission, accomplishing large landscape restoration, and reducing delays in implementation. It is important to note that an outstanding question regarding the CFLRP program is whether the groups were able to accomplish more or better restoration work under the program given the additional funding in comparison to the traditional budget and management approach. Additionally, we found that under the CFLRP program, collaborators were more willing to invest external dollars on federal forest lands. This has larger implications for developing strong public-private partnerships to accomplish work, particularly in an age of decreasing agency budgets and capacity (Goldsmith and Eggers 2005; Kettl 2006). Ultimately, we found the suite of reported beneficial outcomes under the CFLRP program helped develop collaborative capacity to accomplish more restoration work.

As noted above, the most frequently reported external challenge to accomplishing work dealt with a lack of infrastructure, industry, and markets on different projects. This challenge has been identified elsewhere (USFS 2006; USFS 2012; USFS 2015b). We found that if industry was

gone from an area, the CFLRP program did not reestablish or bring back industry, which was an intent of the policy. This issue with industry and markets indicates this policy might work best in areas with already established industry or valuable timber that can pay for restoration treatments. Additionally, from a policy perspective, the CFLRP program might work best in conjunction with other policies and authorities that support rural, local development and investment in industry. With this in mind, the agency needs to consider how various authorities or programs can invest in or incentivize new development and industry, particularly in these rural areas with low-value timber and no infrastructure or industry (USFS 2006; USFS 2012; USFS 2015b; USFS 2018). Additionally, multiple interviewees reported issues with unexpected disturbance, which complicated planning, agreement development, and restoration vision. This type of challenge has the potential to become more challenging as the social-ecological system becomes more complex and dynamic in the face of climate change. This will pose significant issues for adaptation to evolving circumstances and subsequently issues for building resilience.

We also identified a series of internal agency challenges to success under the CFLRP program including staff turnover and lack of capacity. These challenges are well documented elsewhere within the literature (DiBari and Randall 2018). We found that staff turnover eroded collaborative trust and relationships, and frequently set back restoration efforts. Staff turnover was particularly detrimental in leadership roles such as the CLFRP coordinator. This is to be expected as individuals in these leadership roles set the tone for the project and interact regularly and frequently with the collaborative group. Agency practices need to be better aligned to support the emphasis on prioritization and collaboration under the program. If the agency is going to continue to make long-term investments in landscapes, they need to work to limit staff

turnover whether that be through promotion in place or longer work assignments. Collaborators and agency partners could also develop on-boarding documents or meetings for new staff that help smooth transitions and capture the important aspects of each role.

Additionally, we found that many of the projects were reporting issues with agency capacity whether that be current staff stretched too thin or vacancies in critical positions. Again, agency capacity issues are well documented throughout the literature (DiBari and Randall 2018). These types of capacity issues pose a challenge to collaborative efforts as well. For example, insufficient staffing makes accomplishing restoration slow and can pose issues for building trust in agency management. Collaborative participants may question whether the Forest Service is truly committed to restoration if they do not provide adequate capacity to accomplish restoration work. Similarly, capacity issues can pose problems for ensuring a return on agency investment. Going forward if the agency continues these large landscape, long-term, focused investments, it needs to ensure local agency offices have enough capacity in place to accomplish the work.

Conclusion

The CFLRP program led to a variety of ecological and social benefits on each project. One of the most important findings of our work was that the Program was helping groups leverage external funding and build collaborative capacity, which led to increased pace and scale of restoration and more types of restoration work across their landscapes. However, there were significant challenges, particularly those associated with agency capacity and staff turnover that will need to be addressed as these types of collaborative forest management policies become more prevalent. Additionally, as CFLRP has been reauthorized, it will be important for the agency to consider the presence of infrastructure and markets when determining where to prioritize financial

investments. Ultimately, our research indicates that the CFLRP program was successful at accomplishing a variety of management goals, while supporting collaboration, and facilitating large-landscape restoration. This has larger implications for natural resource management on public lands, specifically in contexts with increasing scientific uncertainty and management complexity and decreasing agency budgets. These types of policies that can effectively support public-private partnerships have cascading effects in terms of leveraging resources, building trust and strengthening relationships amongst participants, and increasing overall collaborative capacity to get more restoration accomplished collaboratively.

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Chapter 5: Conclusion

Introduction

Within this chapter I will explain how my previous three empirical chapters respond to the research objectives I outlined in my first chapter. In my introduction, I outlined for my dissertation three research objectives, which were to do the following: 1) Determine to what extent the CFLRP program supports collaborative governance; 2) Identify the variables, both contextual and structural, that influence and support collaborative governance; and 3) Determine to what extent the CFLRP program supported collective learning activities and outcomes. By drawing on the literature regarding collaborative governance, policy design and implementation, and collective learning, and reflecting on the lessons learned in my research, I identify in this chapter several key themes across the previous chapters and identify future research opportunities. I will summarize with a brief conclusion.

Key Themes and Future Research Questions

Across my three dissertation chapters there are several crosscutting themes that I report on below including: the importance of policy variables to support collaboration and collective learning; how local, contextual variables influence policy implementation and collaboration; how flexibility in policy can ensure local, contextual variables are considered and provide space for institutional adaptation; the first and second order benefits attributed to collaboration; the persistent challenges that simultaneously affect collective learning and collaboration; and. the importance of multi-level networked governance in addressing challenges and supporting collaboration and collective learning activities.

Policy Can Effectively Support Collaboration and Collective Learning

There are a variety of policy principles that in combination support collaboration and collective learning, including the mandate to collaborate, the mandate to monitor, a guaranteed funding source, and a long timeframe for planning and implementation of projects. I found these variables were particularly important for supporting successful collaboration and allowing groups to engage in collective learning activities. The extended time frame for the CFLRP was particularly critical to facilitate collective learning and the diffusion of practice across landscapes and project boundaries. This has been identified elsewhere within the literature (Ojha et al. 2013) and has implications for developing a more adaptive governance regime that can respond to increasing uncertainty and complexity in management decisions (Kettl, 2006; Lemos and Agrawal, 2006; Sikor, 2008; Weber & Khademian 2008; Emerson and Nabatchi 2015). Additionally, my findings are unique because they indicate these policy variables were both simultaneously supporting collaborative governance as well as collective learning activities. While this is not surprising due to the fact that collaboration and learning are closely intertwined, it does have implications for crafting policies that serve multiple valuable purposes with cascading effects. For example, a policy that effectively supports collaboration can also potentially support the leveraging of external funding and capacity to accomplish more work. Additionally, a mandate to collaborate facilitates engaging multiple knowledge types and expertise and potentially facilitate collective learning amongst participants.

Future research should work to confirm and expand upon these findings and identify which policy variables, in which contexts, are the most critical to facilitating and supporting

collaboration and collective learning. Additionally, longitudinal or quantitative research that can further identify which policy variables were critical for collaborative restoration outcomes could strengthen our initial findings and have implications for crafting more adaptive, collaborative natural resource policies.

Local Contextual Variables Influence Policy Implementation and Collaborative Success

I found that a variety of local, contextual factors influenced whether projects and participants were reporting successful collaboration and restoration work. Contextual factors that proved influential were the presence of markets and infrastructure, inadequate capacity or continuous staff turnover, unexpected disturbance, and strong local leadership. Adequate staff capacity, limited staff turnover, and strong local leadership were particularly critical to ensuring successful collaboration and building a collective learning environment. I found that groups who lacked adequate capacity and were continuously dealing with staff turnover struggled to maintain collaborative relationships and build trust, which are both necessary to support collective learning. Additionally, if strong leadership was not in place prioritizing collaboration and collective learning, groups struggled to effectively work together, share ideas and knowledge, and accomplish work. Thus, consideration and management of these local, contextual variables must be addressed from the beginning of a project before significant financial investment is made.

Future research should seek to identify which contextual variables are the most influential and pose impediments to accomplishing collaborative restoration work. Research that focuses on the contextual variables, perhaps on a case-by-case basis, would be critical to understanding the

larger implications of these variables for nation-wide policies and how groups can overcome them if they are challenges. Lastly, in terms of contextual variables, it will be important to consider how decisionmakers can effectively support collaborative capacity across a program where local variability can be high. I found that several projects were using their collaborative partners and capacity to accomplish more work whether that be through leveraging external partner dollars, expertise, or resources. Future research should focus on how to support this collaborative capacity and ensure groups have the ability to address these local issues or challenges appropriately.

Top-Down Structural Flexibility is Necessary to Deal with Local and Contextual Variables

As I identified above, policy principles can facilitate effective collaboration and collective learning activities and that local, contextual variables play an influential role in policy implementation and whether collaborative restoration can be successful. Together, these findings indicate it is important for policy to allow for a level of local flexibility to account for local, contextual factors. DeCaro et al. (2017) identified this type of policy flexibility as critical for building adaptability into the governance system, and my work lends support to this notion with an example of how this can manifest in a specific policy and administrative context. Ultimately, the CFLRP program, to an extent, proved capable of providing the top-down stability necessary for projects to be successful, while allowing for adaptability at local levels to contextual needs, which has been highlighted by previous scholars as important (Craig et al. 2017; DeCaro et al. 2017). Policies that can effectively support collaboration and collective learning have larger implications for supporting adaptive governance and providing a level of flexibility and

resilience in the management system (Craig et al. 2017; DeCaro et al. 2017). This is important as management decisions become more complex due to climate change, scientific uncertainty, and resource scarcity (Weber & Khademian, 2008; Emerson and Nabatchi, 2015).

Going forward, future research should focus on other policy implementation contexts to reinforce and confirm my findings that flexibility is integral to overcoming and adapting to local, contextual variables. Additionally, research should identify similar types of policies associated with different resource contexts, whether that be rangeland or water resources, and identify if this level of flexibility and adaptability is needed in all resource types, or if it is specific to forest restoration.

The CFLRP Program Generated a Variety of First and Second Order Collaborative Benefits

Until recently, policy has not formally provided space for formal collaboration and the influence stakeholders have been seeking in the collaborative forestry context. My dissertation provides empirical evidence that policy can effectively support collaboration, leading to a variety of benefits directly related to collaborating as well as a multitude of cascading indirect outcomes. Additionally, while theoretical scholarship has identified a variety of benefits attributed to collaboration (Wondolleck and Yaffee 2000; Innes and Booher 2010; Emerson and Nabatchi 2015), our study not only empirically validates these theoretical assertions, but indicates that these benefits can be facilitated through top-down policy interventions. Interviewees reported increased pace and scale of restoration work, more types of restoration work that would not be typically accomplished, increased levels of trust and stronger relationships amongst

participations, and decreased levels of conflict and litigation. These findings have been reported elsewhere in our publications (Schultz et al. 2018; Schultz and McIntyre 2019). Additionally, groups were reporting they were leveraging external dollars within project boundaries and that collaborative practice was dissemination outside project boundaries, both of which indicate second order benefits (Innes and Booher 1999; Innes and Booher 2010). These benefits are particularly important in a time when agency budgets are diminishing, and public-private partnerships are critical to accomplishing work (Goldsmith and Eggers 2005; Kettl 2006; Sikor, 2008). These benefits also have implications for accomplishing more cross-boundary restoration work, which is an important competent of large-landscape restoration and increasingly becoming an important goal of land management agencies (Schultz et al. 2018; USFS 2018; Cyphers and Schultz 2019).

It is important to note that is difficult to disentangle whether benefits were directly related to collaboration versus the CFLRP program. For example, how can we know that collaborative benefits reported were because of collaboration versus other variables under the program? While, this question is challenging, we assume that benefits reported that directly aligned with theoretically identified benefits of collaborating were indeed, at least in part, due to the mandate to collaborate under the CFLRP program. Similarly, many times interviewees responded regarding the mandate to collaborate they reported benefits similar to those that have been documented elsewhere in collaborative governance literature. Going forward, a future research study should work to refine our initial research with direct interview questions regarding the benefits from collaboration.

Future research should focus on confirming these reported benefits through quantitative data collection including surveys with external stakeholders. We were able to survey Forest Service personnel regarding benefits but were unable to use funding to contact external stakeholders (see Schultz et al. 2018 for more details). Future research could compare external stakeholder survey responses to agency personnel to assess whether different groups indicate different benefits and potentially why. Additionally, there is a still a large research gap regarding whether the CFLRP produced better outcomes for the additional financial investment. Our research focused on perceived benefits under the program, but there needs to be a quantitative assessment of the agency reported outcomes and whether or not this program is successful based on these reported measures versus financial investment.

Persistent Agency Challenges: Staff Turnover and Inadequate Capacity

As identified elsewhere (DiBari and Randall 2018), agency related challenges are continuous impediments to accomplishing restoration work, collaboration, and supporting collective learning activities. We found that staff turnover and an overall lack of capacity continue to the plague the agency and are even more detrimental when associated with policies that have long-term investments of funding and a mandate collaboration. These challenges have implications for collective learning activities and outcomes as well. If projects are not implemented or key staff are continuously turning over it will be difficult for groups to build the trust and routines that facilitate collective learning. Additionally, I found that strong local agency leadership was critical to facilitating collaboration as well as collective learning. Ensuring the agency is focused on engaging individuals that find value in collaboration and support a collective learning culture will be even more important in times when budgets and staff capacity are limited. These

individuals can help the agency engage with necessary external collaborative capacity to accomplish more work, while simultaneously recognizing the value in open communication, sharing lessons learned, and developing a learning culture more broadly throughout the agency (Iles 1994; Watkins and Marsick 1996; Kaiser and Holten 1998; Popper and Lipshitz 2000; Bates and Khasawhen 2005).

Future research needs to focus on how collaborative groups are overcoming challenges and within what level of the policy system they work to address these barriers. This could have larger implications for collaboration internationally, specifically the opportunity to share lessons learned from different collaborative governance regimes and tailor solutions to various contexts. Additionally, scholars should work to identify which challenges can be overcome with simple procedural changes on-the-ground versus challenges that need to be addressed through formal policy change. These types of research questions could focus on whether challenges faced in collaborative contexts vary depending on resource type, and then ultimately compare how these challenges and the ways in which groups overcome them vary by resource type.

Networked Governance and the CFLRP Program

I found the CFLRP program was also supporting networked governance across and within projects. My dissertation research indicates the importance of networked governance with a diversity of actors and organizations working towards local goals, while sharing results, lessons learned, and trouble-shooting issues regionally and nationally. Additionally, there were a variety of learning activities occurring and at various levels within the governance system whether that be local, regional or national. Networked governance has larger implications for building

collaborative capacity and flexibility into the governance system, while ensuring learning that occurs at the local level is being disseminated across the network, with the potential for ramifications in other locations and projects (Newig 2010). The development and support of these governance networks can lead to the development of informal communities of practice that facilitate overall flexibility, innovation, and learning capacity building a level of resilience in the management system (Capra, 2002; Fisher et al., 2007).

Future research should include a network analysis of how individuals and groups across the program interact within projects and across projects. This would help scholars and practitioners understand which groups are the most important or influential within the system, where groups may need more resources or capacity to operate effectively, and the various roles groups are filling within the governance system. For example, several organizations were acting as conveners, communicators, facilitators, and implementers. This would allow researchers to identify the high capacity groups that are most critical to supporting and accomplishing collaborative restoration work in natural resource contexts.

Conclusion

Collaborative governance has become more prevalent as a policy tool for natural resource management for a variety of reasons including a growing demand for influence by community forestry advocates, increasing management uncertainty and scientific complexity, and decreasing agency budgets and staff capacity (Kettl 2006; Lemos and Agrawal, 2006; Sikor, 2008). Until recently with the passage of the Collaborative Forest Landscape Restoration Program, there has been little formal space within the policy system to collaborate on natural resource management within the U.S. forest policy context. The CFLRP program provided a unique opportunity to

programmatically assess whether policy can effectively support collaboration around forest management, the various local, contextual and top-down, structural variables that were influential in terms of collaborative success, and whether the program was supporting collective learning activities and outcomes. This dissertation sought to fill these research gaps and contribute to the collaborative restoration literature.

In terms of forest management this research indicates there are further questions regarding whether this type of policy model can apply to other forest management contexts, such as, within an international arena. Particularly, implications and consequences of agency capacity and limited staff turnover are critical factors to consider in various governance contexts with different bureaucratic structures and regimes and is an important question that needs to be addressed in the future. If the CFLRP program is a model for future policy, it will be important to think about the implications for future forest management as resources are directed towards forests, projects, and landscapes with high collaborative capacity that are capable of accomplishing work. Additionally, for an international context, it is important to think about whether this program model is relevant in areas that may have less resources and capacity. For example, the CFLRP program includes a long-term, strategic investment of federal dollars, which may not be available in other countries or countries with more devolved management authority at the state or local levels. However, we do see that collaborative capacity is critical to accomplishing work under this program, so in areas where collaborative capacity and resources were high, there might be potential to utilize a similar approach to restoration work. Also, as mega fires become the new normal in forest management, it is important to consider whether a program like the CFLRP that emphasizes an investment over a longer time frame in combination

with time intensive collaboration is really appropriate in this political and ecological environment. Political priorities may focus more on fast-paced tree removal with little room for collaboration.

Our findings reported within the previous chapters have implications for crafting more effective natural resource management policies that support collaboration, restoration, and allow for adaptation within the management system. Ultimately, my research indicates that the CFLRP program effectively supported collaboration and collective learning and it was able to generate a variety of valuable benefits that contributed to the accomplishment of more holistic restoration work and indicated that collaboration can be a valuable policy tool for natural resource management into the future.

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Appendix A- Interview Guide

Introduction and Project Overview (20 min estimated) "In this section, we want to gain an understanding of your role in the project and your perspective about project accomplishments."

1. Can you tell me about your current role and how you engage with the Joint Chiefs/CFLRP project?

2. This program has multiple goals, including "providing funding to landscapes that are [list program goals for legislation or guidance]." In what ways did this program create new opportunities or have new emphases that were important to you and your partners?

3. To date, what have been your biggest successes?

4. **Are there other accomplishments you would attribute to** [program name or project collaboration], **aside from program/project goals?** What about how the program affected how stakeholders are involved in decision-making or relationships (w stakeholders or the agency)? What about other work on the forest or how people understand management challenges?

5. (If needed) Has this program affected the level of agreement, conflict, or litigation in your project area?

6. To date, what have been the biggest disappointments under this program, given your original goals?

Facilitators of and Barriers to Success (30 min) "In this section, we want to understand what factors have supported or inhibited success."

7. What factors have allowed your project to be successful?
    a. Did you receive other prior or ongoing investments that allowed you to be successful?
    b. What about your collaborative process and history has supported success?
    c. What other agency variables locally have supported success, like capacity, local leadership? Support from higher levels?
    d. Have you used any public communication strategies that have supported success?
    e. Are there any strategies your project took for navigating legal requirements that you would highlight as being key to your success?
    f. For JC: Are there any specific strategies that have helped you implement work on private lands?
8. Have you had access to the scientific information and partners you needed to be successful?

9. **What factors have inhibited success on your project and in what ways?** *Potential responses: federal policies, agency mission/mandate, agency culture, inertia to change and collaboration, lack of trust, lack of relationships, lack of communication, staff turnover within the collaborative or within the agency, lack of leadership, capacity issues associated with staff, time, money, lack of infrastructure, scientific/technical expertise, litigation and appeals, different management goals and objectives, etc.)*
    a. Are there aspects of your collaborative history or process that have been challenging?
    b. Are there any aspects related to community or public support or communication that have proven challenging?
    c. Are there any aspects of legal requirements that have been particularly challenging?
    d. What about other agency variables, like capacity, leadership, support from within the agency? Specifically for cross-boundary work, did you have the support from grants/agreements staff you needed?
    e. For JC: Are there specific challenges in working across fragmented ownerships? Any additional strategies for success you'd highlight?
10. **Are there strategies you and/or your group have utilized or are trying to overcome the barriers you mentioned previously?** Do you have additional ideas of how you could overcome these barriers in the future?
    a. Have you worked with groups outside of your CFLRP to advocate for your project in terms of money, time, communication, knowledge, staffing, etc.? (example could be engaging an outside entity such as RVCC)
        i. If so, which groups and why?

    b. Have you worked with groups at different scales such as regional or national to communicate and/or advocate for your project in terms of money, time, communication, knowledge, staff, etc.? (example could be tapping your national office for support)

    c. Did you work to bring different high-capacity or knowledgeable groups to your project? (example could be engaging a University for technical expertise)

    d. Were you instrumental in deciding who would be included in the collaborative and project? If so, how so? How did the group decide who would have a seat at the table? Were you strategic in bringing certain groups?

    e. Have you participated in lobbying at the local, state, regional, or national level?
        1. If so, for what purpose and at what level of government?

    f. Have you engaged political representatives in field trips, presentations, or informational sessions?

g. *Do you or your collaborative group engage the USFS at other levels than the forest or district? For example, communicate frequently with the RO or WO regarding CFLRP and your project? If so, for what purpose?*

h. *Do you maintain the option to litigate and appeal USFS decisions associated with your project?*

i. *Have you co-created and co-managed any documents including (assessments, protocols, agreements, etc) with the USFS?*

11. What were your goals specifically for fire management? Were you successful in these areas? Have you seen any changes in staff or community perceptions/acceptance of fire?
12. Has your project affected other programs or areas on your forest?
13. How engaged have your forest staff and leadership been with partners? To what extent has this affected success?
14. Did this project help you move towards goals in your land management plan?

The Future (15 min)

15. How do you see your project developing or continuing without additional investments?
16. (If needed) what does the future look like for sustaining your collaborative effort?
17. **Do you have any ideas for how to improve CFLRP or JC in the future?**
18. For JC: What else do you think can be done to support increased restoration efforts on private land?
19. What have you learned about scales for planning? Are there reasons you might "go bigger" or smaller or do the same thing again?

Conclusions (5 min)

20. Is there anything else you want to tell me or that we should talk about?
21. I am looking for both agency staff and partners who can give me good perspective about your project. I only will be able to interview 3-4 people. Who would you recommend?

Appendix B- Code Book and Guide

Code Book CFLRP

Barriers-External- Reported challenges to the project that are unrelated to the agency. Could be collaborative related, context related, etc.

Barriers-Internal Agency- Reported challenges to the project that are related directly to the Forest Service

Collaboration- Anything that related to collaboration amongst participants. This code acts as a catch all for any information relating to collaboration, or quotes that exemplify collaboration.

Facilitating Factor- External- Factors external to the agency that facilitated success and work.

Facilitating Factor- Internal Agency- Factors internal to and related to the Forest Service that facilitated success and work.

Next Steps- Program Recommendations- These are reported recommendations and suggested changes that should be made to the policy and overall CFLRP program.

Next Steps- Project Level- These are reported recommendations, next steps, and suggested changes that should or will occur at the project level.

Project and Program Successes- Reported value-added and success of individual projects and the overall program.

Learning Process:

- Acquisition - Active dialogue and deliberation amongst organizational partners and members
- Dissemination- Transmission and communication of information and knowledge between individuals, within the group, and across multiple groups.
- Translation- Seeking out sources of expertise to help interpret data and understand what is occurring.

Learning Factors: Variables that would influence learning.

Learning Products:

- Behavior Changes
- Cognitive Changes

Purpose of Learning Activities: The reported or understood reason for participating in a learning activity. Examples include, reduce uncertainty, build trust, build agreement, disseminate information, etc.