



Research

Shared visions, future challenges: a case study of three Collaborative Forest Landscape Restoration Program locations

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ABSTRACT. The USDA Forest Service is encouraging the restoration of select forest ecosystems through its Collaborative Forest Landscape Restoration Program (CFLRP). Collaboration is often necessary to implement landscape-scale management projects such as these, and a substantial body of research has examined the benefits and limitations of using collaboration as a tool for improving relationships, trust, and other outcomes among stakeholder groups. However, limited research has investigated the use of collaboration to achieve large-scale ecological restoration goals. Restoration poses some unique conditions for a collaborative approach, including reaching agreement on which historic conditions to use as a reference point, the degree of departure from these reference conditions that warrants management intervention, and how to balance historic conditions with expected future conditions and current human uses of the landscape. Using a mental-models approach, semistructured interviews were conducted with a total of 25 participants at three CFLRP sites. Results indicate that collaboration contributed to improved relationships and trust among participants, even among stakeholder groups with a history of disagreement over management goals. In addition, a shared focus on improving ecosystem resilience helped groups to address controversial management topics such as forest thinning in some areas. However, there was also evidence that CFLRP partnerships in our study locations have primarily focused on areas of high agreement among their stakeholders to date, and have not yet addressed other contentious topics. Previous studies suggest that first conducting management in areas with high consensus among participating stakeholders can build relationships and advance long-term goals. Nonetheless, our results indicate that achieving compromise in less obviously departed systems will require more explicit value-based discussions among stakeholders.

Key Words: *CFLRP; collaboration; ecological restoration; forest management*

INTRODUCTION

Ecological restoration is defined by the Society for Ecological Restoration (SER) as “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed” (Society for Ecological Restoration 2004). A historic reference point, (i.e., the condition of the ecosystem at a specific point in the past; typically pre-European settlement), is used to provide the basis of restoration goals, which may also include components such as improving biodiversity or creating habitat for threatened species. Restoration efforts also often include goals for meeting human needs and interests in the selected landscape (Hobbs and Norton 1996, Society for Ecological Restoration 2004). For example, restoration activities may provide economic benefits to local communities by extracting merchantable materials, reduce the risks and associated costs of wildfires, or be designed to provide other societal benefits in addition to the specified ecological objectives (Hjerpe and Kim 2008, Thompson et al. 2013).

To help promote these diverse benefits, the USDA Forest Service created the Collaborative Forest Landscape Restoration Program (CFLRP), which provided a competitive funding opportunity for National Forests engaged in large-scale restoration efforts (United States Congress 2009). Central to the eligibility criteria of this funding was that local forest units could demonstrate an ongoing collaborative relationship with external parties in planning, goal setting, and management activities. Since the late 1990s, the process of collaboration has been cited as a way to potentially address the social conflicts that have often challenged public land management in the United States (Meine 1995, Keele et al. 2006, Leach 2006). By involving multiple stakeholders in

the problem-identifying and decision-making processes, some collaborative efforts have been found to help those involved improve relationships, build trust, and work together to achieve acceptable outcomes (Gobster and Hull 2000, Wondolleck and Yaffee 2000, Moote and Lowe 2008). Past research has shown that collaboration also has limitations, however, with many collaborative groups dissolving before accomplishing all of their goals. This can occur for a number of reasons, including time or budgetary limitations, a lack of perceived progress, or a lack of sufficient trust between participants, among others (Wondolleck and Yaffee 2000, Schuett et al. 2001, Moote and Becker 2003, Margerum 2011).

Although there is a rich body of literature examining the effects of collaboration on natural resource management, less research has examined the use of collaboration to achieve large-scale ecological restoration efforts such as those proposed through CFLRP efforts. Although there are likely some similarities with past collaborative management efforts, there are also some important differences that may influence the success of using collaboration to achieve restoration objectives. For one, having large or connected areas of restored habitat is required to achieve restoration goals such as improving biodiversity and increasing resilience (Hobbs and Norton 1996, Noss 2001, Millar et al. 2007). Accordingly, restoration efforts often include large expanses of land with multiple ownership types, increasing the number of stakeholders with potentially different needs and interests. Increasing scale has been observed to also increase the complexity of decisions and potential for conflict during other forms of resource management (Gobster and Hull 2000, Moote and Becker 2003), as well as restoration efforts in particular (Antuma et al.

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2014, DuPraw 2014). Moreover, whereas collaborative efforts usually begin by developing a shared vision of future conditions to achieve on the ground, restoration efforts are somewhat different in that goals are more explicitly tied to historic conditions (Jordan 1995). Potential tensions may arise when deciding as a group which historic conditions are preferred, what constitutes a departure significant enough to require action, and balancing historic conditions with modern human uses and needs (Vining et al. 2000, Hjerpe et al. 2009, Thompson et al. 2009).

The purpose of this paper is to examine the effectiveness of a collaborative approach to build relationships, identify common goals, and achieve ecological restoration objectives using a comparison of three sites engaged in large-scale, collaborative forest restoration efforts. Our overarching research question is in what ways, and to what extent, can a collaborative process contribute to landscape-level ecological restoration efforts? Our findings contribute to improved understanding of challenges and opportunities associated with large-scale, multistakeholder ecological restoration efforts such as the CFLRP.

BACKGROUND

Social conflict and collaboration in the management of National Forests

How to appropriately manage natural resources, particularly on public lands, has long been a source of conflict in the USA. Questions around appropriate uses of public lands, such as recreation or range and timber uses, have no definitive answers. Rather, they are influenced by psychological (e.g., values, beliefs) and social (e.g., group affiliation) influences (Rittel and Webber 1973, Shindler and Cramer 1999). As a result, these “wicked” problems have greatly impacted the USDA Forest Service, which has been beset with hundreds of appeals and litigation challenging decisions and disrupting management activities (Keele et al. 2006). Prior research suggests that a lack of trust, communication, and compromise among management agencies, external stakeholder groups, and the public is often underlying these conflicts (Meine 1995, Olsen and Shindler 2010).

Efforts to advance more inclusive planning efforts, taking a variety of different approaches but generally referred to as collaborative resource management, emerged during the 1990s as a means of addressing these conflicts. Including a full range of affected stakeholders throughout the decision-making process and explicitly addressing their diverse objectives were believed to contribute to improved trust and communication among groups and reduce barriers to action (Wondolleck and Yaffee 2000, Schuett et al. 2001, Margerum 2011, Stern and Baird 2015). As it is generally conceptualized, the collaboration process takes place in three main phases (Gray 1989). First, in the “problem setting” phase, significant stakeholders are identified and contacted, and the group is brought together to define a shared problem they are all invested in addressing. In National Forest collaborative efforts, stakeholders often include federal and state land management agencies, local industry representatives, environmental nongovernmental organizations, and public interest groups such as recreation organizations and homeowners associations (Wondolleck and Yaffee 2000, Margerum 2011). The compositions of these groups can range from being quite small and limited primarily to agency representatives to quite large and

inclusive of other stakeholder groups and interested members of the general public (Margerum 2008, Koontz and Johnson 2004).

Second, in the “direction setting” phase, the group decides upon ground rules and considers alternative approaches to achieving their shared goals. Lastly, in the “implementation” phase, the group implements their plan, with each stakeholder playing different roles based on the group’s prior agreements. Central to the success of this process is building interpersonal relationships where, through a long period of interaction, stakeholder groups learn to articulate their own values and positions, trust and respect each other’s views, and consider working together to achieve common goals (Wondolleck and Yaffee 2000, Schuett et al. 2001, Stern and Coleman 2015).

Collaborative resource management efforts are not always successful, however, and many collaborative groups dissolve before accomplishing all of their goals (Wondolleck and Yaffee 2000, Margerum 2011). Factors such as a persistent lack of trust among group members or fundamental conflicts of interests or values may cause a collaborative group to dissolve (Gray 1989, Wondolleck and Yaffee 2000, Margerum 2011). Additionally, during the substantial time required for the relationship and consensus-building component of collaboration to take place, individuals may change jobs, lose interest in the process, experience pressure to withdraw from the group, or lose the agency support necessary to participate (Moote and Becker 2003, Moote and Lowe 2008, Margerum 2011). Stern and Baird (2015) suggest that, in order to avoid dissolution, a diversity of four trust types needs to be improved within such groups: rational trust (perception among participants that the benefits of participating in the collaborative group outweigh the costs), affinitive trust (evaluation of shared values, likability, and integrity among others in the group), procedural trust (perceived legitimacy, transparency, and equality of the process), and dispositional trust (likelihood of development of trust based on historical interactions and the norms of their own groups). These authors propose that strengths in some types of trust can help overcome deficiencies in another area. For example, having improved relationships, common goal identification, or a perception of fairness can help to overcome historically negative interactions between parties.

Challenges to collaborative restoration

Ecological restoration may pose additional challenges to successful collaboration. For example, reaching agreement on desired future conditions may be complicated by the common use of historic reference points as goals in restoration activities. Some have argued that factors such as climate change and existing human uses make a return to historic conditions difficult or impossible to achieve, adding a further level of complexity to restoration decisions (Harris et al. 2006, Thompson et al. 2009, Melillo et al. 2014). In addition, past research has revealed that ecological restoration is not a commonly understood process and that personal values and past experiences influence beliefs about the need for restoration, preferred treatment methods, and restoration goals (e.g., Gobster and Hull 2000, Findley et al. 2001, Hjerpe et al. 2009).

The scale of CFLRPs has also been found to increase the complexity of decisions and number of stakeholders involved, which can compound issues of trust, representation, and fairness

Table 1. Background information of study sites. (Information provided in program proposals.)

Group name	Membership (in addition to N.F.)	Regional historic context	Presence of local industry	Current ecological conditions	Restoration goals
PNW Site A	Over 40 members, including representatives of State and County agencies, conservation organizations, local residents, and the timber industry	High degrees of historic conflict between active-use (including industry), land conservation groups, and the Forest Service	Declining forest products industry in the region, with one local processor remaining	Pine stands becoming more dense and homogenous than historic levels, with fewer large, fire-resistant trees	Increase system resilience to insect outbreaks and fires, and supply product to local timber industry
PNW site B	The five main landowning agencies and organizations in the area, including State and Tribal entities and a conservation organization	High degrees of historic conflict between active-use (including industry), land conservation groups, and the Forest Service	Declining forest products industry in the region, with one local processor remaining	Pine stands becoming more dense and homogenous than historic levels, with fewer large, fire-resistant trees	Reduce fuel loads and increase habitat patchiness and diversity
South-central site	Eleven members, including State and federal agencies, wildlife and land conservation organizations, and timber industry representatives	Some levels of historic conflict between local interests and federal land management agencies and policies	Numerous timber processors in the area; well-established local forest products industry	Dense oak-dominated stands susceptible to drought and fire that do not provide habitat for many endemic plant and animal species	Return prelogging woodland ecosystem habitat, improving animal and plant diversity

within collaborative groups (DuPrav 2014, Atuma et al. 2014). Limiting membership to representatives of the most prominent stakeholder groups, which is common in large collaborative efforts, can potentially reflect existing power structures or exclude those with less tangible investments in management (for example, local residents and environmental groups) (Margerum 2011). Several studies have found that a sense of representation in decisions is crucial to obtaining broad management support (Margerum 2011, United States Government Accountability Office (USGAO) 2008, Bartlett 2012, Butler 2013), and as a result, having more inclusive and larger memberships is sometimes found to provide more long-term viability than smaller ones (Margerum 2002). In addition, groups with more diverse and balanced (between agency and nonagency) members have been found to be better able to identify and prioritize goals (Koontz and Johnson 2004).

Several studies have examined potential methods to overcome challenges of complexity and scale for CFLRPs specifically. It has been found that support for restoration efforts within communities can be improved through demonstrating results through monitoring (Schultz et al. 2014). Also, trust and communication between collaborative members can be improved by engaging in multiparty monitoring (Schultz et al. 2014), holding regular meetings (Butler 2013), having the USDA Forest Service participate in a nonleadership role (Butler 2013), having the assistance of skilled facilitators to establish a fair and safe decision-making environment (Bartlett 2012, DuPrav 2014), conducting field trips as a group (Bartlett 2012, DuPrav 2014), and including a broad range of stakeholders in the collaborative groups' membership (Bartlett 2012, Butler 2013). It has also been found that building relationships and trust among members, particularly through working together on smaller, achievable projects initially, can contribute to the success of collaborative efforts (DuPrav 2014, Atuma et al. 2014).

METHODS

Site and participant selection

Because the goal of this research was to explore how collaborative processes can contribute to large-scale restoration efforts, we selected sites with diversity in collaborative structures and ecological conditions. This desired variation between study locations was balanced with a desire to reduce the research burden on participants as there was substantial ongoing research at CFLRP locations at the time of our data collection. We selected two collaborative groups in the Pacific Northwest region of the USA: one with a large and inclusive membership and the other with membership limited to the main landowning agencies in the area (hereafter referred to as "PNW site A" and "PNW site B"). A third site was selected in the south-central USA (hereafter referred to as "South-central site"), which also had a large and inclusive collaborative group. Further information about our study locations is summarized in Table 1.

In all, 25 interviews were conducted between March and November of 2013; the majority of participants were USDA Forest Service employees (72%). Although we recognize that CFLRP partnerships engage adjacent landowners in larger scale restoration efforts, we adopted this sampling approach as CFLRP funds are limited to use on USDA Forest Service lands. Accordingly, we recognize our findings are most likely to represent a USDA Forest Service perspective. We worked with the CFLRP project coordinators to identify potential participants at each study location; coordinators were asked to identify line officers, resource specialists, and other USDA Forest Service staff directly involved in CFLRP efforts, as well representatives from other agencies or interest groups who were significantly involved in restoration efforts. At both the South-central site and PNW site A, a total of nine participants were interviewed; six from the USDA Forest Service, two from nongovernmental organizations,

Table 2. Perceived importance of different outcomes of collaborative success.

	PNW site A	PNW site B	South-central site
Improved relationships, trust	+++	+	+
Identifying shared problems, goals	+++	++	+++
Addressing contentious issues	+++	++	n/a
Achieving management objectives	++	n/a	+
Increased investment, morale	++	+	++

The symbols used here denote the perceived importance of comments based on the frequency and intensity (based on the degree of emotive language used by participants to describe a particular point) of participant comments at each location. "+++": more than half of participants mentioned this item, with intense language, "++": mentioned by less than half of participants with intense language, or by more than half but with less intense descriptions, "+": mentioned by fewer than one-half of participants without intense language, "n/a": not mentioned within the study location.

and one from an industry group. At PNW site B, seven participants were interviewed in total; six worked for the USDA Forest Service and one worked for a nongovernmental organization.

Mental-model creation and data analysis

We used a mental-models approach to develop our interview protocol (based on Morgan et al. 2002), as part of a broader investigation of collaborative ecological restoration efforts. To begin this process, a technical model (consisting of the main concepts and links present in relevant literature) was first created by conducting a thorough review of forest and disturbance ecology literature. The main concepts found in this literature and their connections to one another were then mapped in an influence diagram. The influence diagram was reviewed for accuracy and completeness by a panel of ecology and social science experts, resulting in some modifications. The resulting technical model provided the basis for development of our interview protocol. Interviews lasted a little over 1 h on average. In this paper, we focus on one portion of the interviews in which participants described their experiences using collaboration to achieve restoration objectives.

After interviews were completed, they were transcribed verbatim and uploaded into MaxQDA V11 software (developed by VERBI) for coding. The first round of coding was conducted based on the 62-item code manual that was developed from the concepts present in the technical model. After this initial round of coding was completed, memos written during interviewing, transcription, and the coding process were reviewed to identify concepts or events that were raised as important across interviews as described in the Rubin and Rubin (2005) responsive interviewing approach to data analysis. Specifically, we identified frequently mentioned concepts, common experiences, as well as conflicting accounts related to the process of collaboration; this review suggested common themes in participant responses around the perceived benefits of working collaboratively and barriers to further success in achieving goals. We then conducted line-by-line coding of interviews, focused on participants' descriptions of their experiences with collaboration as part of the restoration process. Through this process of memo review and open coding, a second coding structure was developed related to the identified successes and challenges associated with collaboration at the three sites. Results from this coding process are reported below.

RESULTS

Collaboration successes

There were five key areas of success that participants described collaboration as contributing to: (1) improved relationships and trust among stakeholders, (2) identification of common problems and goals to address, (3) ability to address some contentious issues (some participants noted that groups had largely avoided contentious issues to date), (4) success achieving management objectives, and (5) a positive effect on participant morale, investment, and sense of progress in management. Although most of these benefits were expressed at all three of our sites, some important differences between locations are summarized in Table 2. In the following sections, we will describe each of these findings in greater detail.

Improved relationships and trust

At all three sites, participants indicated that working with the CFLRP collaborative group contributed to improving relationships, communication, understanding, and trust among participants. The greatest concentration of responses along these lines was in the PNW site A, where nearly all participants discussed these impacts and their significance. This site has a history of conflict between industry and environmental groups, and the collaborative group, which has over 40 members, including local residents, representatives of timber companies, and conservation organizations that had previously litigated them, seemed to play an especially crucial role in improving relationships and contributing to achieving restoration outcomes. At this site, participants also provided details about the intensive mediation and relationship-building activities that they had engaged in, where they established rules based on principles of mutual respect and honesty:

It's interesting, we had a real hardcore facilitator the first couple of years... first thing was you had to sign an oath that you wouldn't talk about people behind their back... it didn't ask that you agreed with them, but more than hinted that you should try to understand where they're coming from... So they approached it real slow, I think they met for a year before they started working on a project, just as flooring. (USFS participant)

Several participants also mentioned the role that field trips and after-meeting socializing played in improving relationships:

When you sit in a Forest Service office, it's too clinical in a sense, everybody can sit in their position and

everybody's just kind of hanging on to their place... So when you get out in the woods and you walk around and you have casual conversations and you visit with people more, and then maybe after hours you go have a few beers every so often, agreements start to be forged, slowly... If I like you and I respect you as a person, it's gonna be easier [for me to agree with you]. (External stakeholder)

In part as a result of these activities, participants at PNW site A described a marked increase in trust and positivity among parties:

One [of the] things I've seen in the collaborative group is the relationships between the environmentalists, typically the environmentalists are out-of-towners, and then the people who are local are not environmentalists in the regular term, the relationships between them has grown significantly... the level of trust has increased so much. (External stakeholder)

Comments at PNW site B about interstakeholder relationships and trust came up less often than at PNW site A, and never unprompted. In terms of relationship building, three out of our seven participants noted that working relationships have improved as a result of the collaboration between the Forest Service and four other landowning members of the group: "*the Forest Service [is] not being the gorilla in the room, in their words. They try really hard to be one of five [collaborative agency partners] and they do a good job considering what the usual role is*" (external stakeholder). This and other comments suggest that relationships may not have been as equal in the past, but that the Forest Service currently seems more willing to engage other agencies. However, there were also two participants that noted some distrust still existed between the Forest Service and certain conservation groups that were not actively participating in the collaborative effort, as well as the general public.

At the South-central site, relationships within the collaborative were described as generally being positive, although as no explicit trust or relationship-building activities were mentioned, it is difficult to say if these were due to the collaborative process or pre-existing positive relationships. Agencies and organizations included in the collaborative group also seemed to be working more independently from one another than in our other locations. A proposed explanation for this was provided by one participant, who indicated that relationships and roles were established while creating a new Forest Plan years in the past (discussed further below) and were improved by demonstrated successes in restoration since that time.

Identifying shared problems and goals

Working with a collaborative group was also reported as helping stakeholders agree on restoration goals and identifying shared challenges. In each location, participants described the development of a shared vision and mission as one of the main drivers of the collaborative group's success in accomplishing treatments such as conducting prescribed burns, implementing thinning treatments, and closing roads.

The identification of shared goals was described as a key focus of the collaborative group's efforts at PNW site A; six out of nine participants noted considerable progress. Ultimately, agreement on the need for increased forest resiliency created a starting point from which agreements on other, more specific goals and

management approaches were now being made. Particularly remarkable was that common ground had been identified between previously conflicting parties in the need for thinning in dry-pine areas specifically, and the need to keep the local mills open to aid in this purpose:

Some of the meetings were heated, some people stormed off and never came back, some stormed off and came back...But once you get out there and start talking, you get your shared goals that the forest is not the way it should be and we have to really make it better somehow, you have a shared vision. So, you may differ on how you get there, but it was interesting when the mill threatened to shut down about a year ago now, the last mill in town, the first person I heard saying "we can't let that happen, we need the mill to do the forest restoration" was an environmentalist. (USFS participant)

At both PNW sites A and B, the risk of large wildfires and departure from historic conditions seemed to be a key uniting force for a diverse set of partners.

Participants at PNW site B described shared visions less frequently, with five participants agreeing that there was a shared vision on a general level. Three participants provided clarification on this point, such as the following example:

I think our shared vision is a healthy forest that's going to sustain the social needs of this landscape... And that's probably, in general, what the Forest's outlook would be, too. But I think because [PNW site B] is a network of land managers, if you were to ask a state agency what they wanted out of [PNW site B] it would be a little bit different than what the Forest Service's idea is, or what the [redacted - tribal] Nation desires, of what they want to see. (USFS participant)

At this site, it was also mentioned that use of a specific modeling program helped to reach agreement on specific treatment approaches and project locations. This was done by providing targeted modeling estimates that were perceived as legitimate by collaborative group members, the public, and staff members.

At the South-central site, diverse agency and conservation partners described being united by a long-standing, shared goal of restoring more resilient and diverse pine-oak woodlands. However, the discussion of shared goals was typically described in the past tense, and it was stated by several participants that restoring a pine-oak ecosystem has long been a shared goal within the region. Rather than citing collaborative processes resulting from receiving CFLRP funding in particular, two participants mentioned that the creation of a recent Forest Plan contributed to helping bring partners together under a united, concrete restoration goal:

Not everybody was all 100% bought-in, but the 2005 Forest Plan solidified the direction that it [the agreed-upon Forest Plan] wanted people to move and gave validity to this idea of restoration. So that document was the first thing that pulled everybody that direction and said: "believe in this. Here's a vision, here's what we want you to do." (USFS participant)

Addressing contentious issues

At PNW site A, it was reported that, after an extended history of conflict and litigation, the forest had been litigation-free in the 7 years since establishing the collaborative group. Seven out of nine participants, representing both those within and outside of the Forest Service, indicated that collaborative processes had been key in helping stakeholders to address long-standing issues that had historically been a source of this conflict. For example, despite substantial past conflict regarding timber harvests in the area, the collaborative group came together to keep the last remaining timber mill in the area open; an accomplishment cited by many participants as evidence of their success. Moreover, the group had successfully negotiated an amendment to their Forest Plan allowing trees up to 21" diameter at breast height to be harvested when appropriate to meet restoration goals (the previous limit was 16"): "*The 21" rule, that's a huge shift... Because you had a law that protected the big trees and they [environmental groups] agreed to a concession on that*" (external stakeholder).

There was less discussion of how the collaborative group had helped address historically contentious issues at PNW site B. Two participants did indicate the collaborative group had aided in addressing issues associated with relaxing restrictions on prescribed burn permits after an incident with smoke complaints. The topic of collaboration helping to address contentious issues was not raised at the South-central site.

Success achieving management objectives

Participants at two of our three sites (PNW site A and the South-central site) reported that they experienced greater success implementing restoration treatments as a result of working with a collaborative group. At PNW site A, for example, they are seeking to expand the geographic area included in their CFLRP as they expect to treat all of the land originally included in their proposal before the end of the 10-year funding period. At the South-central site, it was also reported by two participants that one-on-one efforts of local USDA Forest Service employees, particularly one who is native to the area, to engage adjoining and inholding private landowners in prescribed burn treatments resulted in large per-acre cost savings for prescribed burns. These savings have extended project funding and allowed the addition of new projects. Participants at the South-central location were more likely to attribute this success to having a shared goal among multiple agencies and therefore the potential of restoring large swaths of landscape.

Compared with the other two sites, participants at PNW site B did not mention that collaboration had facilitated greater success achieving specified management objectives in their location. One participant indicated they were able to implement larger scale restoration treatments since initiating the CFLRP, mainly attributed to the additional funding provided by the program.

Increased investment and morale

Success in improving relationships and synchronization among partners, as well as increased treatment amounts, appear to have had a positive influence on the morale of USDA Forest Service participants at both PNW site A and the South-central site. Four of the six agency participants at PNW site A expressed strong sentiments about the amount of progress that had been made as well as hope for future success with their collaborative group, describing it as "amazing," "exciting," and "a watershed event."

At the South-central site, several Forest Service employees conveyed an intense personal investment and pride in their restoration-related work, with sentiments that their treatments would result in a more diverse and resilient woodland that would potentially attract recreation to the region in the future:

I think many of us down here hope to look back on the end of our careers and say that we made a difference, a lasting difference on the landscape. This stuff matters to me...there's some of us on the Forest that really, truly believe in this stuff, and care about it... that's why you can tell some of us are excited about it and, and we want to see results from it. (USFS participant)

Comments of this type were less common and more subdued at PNW site B, where two participants indicated that although collaboration was difficult at times, it was also rewarding.

Remaining challenges

Although participants described several successes and a prevailing sense of optimism about the collaborative process, they also identified ongoing challenges facing their groups. They identified three particular types of challenges they felt were not being effectively addressed: (1) balancing values, goals, and treatment preferences of diverse stakeholders, particularly relating to the economics of treatments, and the necessity of treatment in certain disputed systems, (2) engaging and incorporating the opinions of the broader public into restoration decisions, and (3) addressing external influences that were largely out of the control of the individual collaborative groups but nevertheless influenced their success, such as natural conditions and agency policies. Although these challenges were shared among our three sites, their influence on local decisions varied greatly between locations; see Table 3 for a summary of these findings.

Balancing stakeholder values and goals

Although participants agreed on the basic goals and principles of restoration, they still experienced several differences on more specific topics of exactly how to treat, where, and why. These conflicts divided along two main lines: the necessity of using active restoration in certain habitats at our two Pacific Northwestern sites, and at all three sites, how economic and ecological objectives should be balanced.

Although treatments were being steadily implemented in dry pine systems in both Pacific Northwest sites, stakeholders disagreed about the necessity of implementing treatments in mixed conifer and old-growth forests, as well as riparian areas. Opinions varied widely between individuals, with some indicating that these systems need to be actively managed similar to dryer forest sites, whereas others believed that they were not departed enough from historic conditions to warrant active management:

They're coming to consensus on some things but there's some areas that no one's ever gonna agree on... When it comes to roads or it comes to how big of trees you should cut, that's where it gets, you know, the two sides kind of split back apart... one side may say the best thing to do is clearcut and start over, which is basically trying to mimic a stand-replacing fire in mixed conifer, right? And others say you shouldn't even be going in there. (USFS participant)

Table 3. Perceived importance of collaborative challenges.

	PNW site A	PNW site B	South-central site
Balancing stakeholder values and goals: action in disputed systems	+++	++	n/a
Balancing stakeholder values and goals: the role of economics	++	+++	++
Engagement of the public	++	+++	+
Situational barriers: budgets and policies	+++	+++	+++
Situational barriers: natural conditions	++	++	n/a

The symbols used here denote the perceived importance of comments based on the frequency and intensity (based on the degree of emotive language used by participants to describe a particular point) of participant comments at each location. "+++": more than half of participants mentioned this item, with intense language, "++": mentioned by less than half of participants with intense language, or by more than half but with less intense descriptions, "+": mentioned by fewer than one-half of participants without intense language, "n/a": not mentioned within the study location.

These differences largely coincided with distinctions in disciplinary background or type of stakeholder (silviculturalists and industry stakeholders supported active treatments in more locations, whereas biologists and representatives from environmental groups often believed treatments in these areas were unnecessary). Four participants noted that these disagreements were related in part to a remnant lack of trust and a legacy of historic conflict between those with different interests. At PNW site A, a majority (six out of nine) of the participants recognized that treatment levels and locations were not purely influenced by scientific data, but also based on stakeholder values. Perhaps as a result, rather than being discouraged in the collaborative process, they were generally respectful of one another's opinions and were actively meeting to work out compromises about management activities within disputed systems. By comparison, at the South-central site, collaborative group members gave largely similar definitions for their landscape restoration goals.

At all three of our sites, there was also a variety of opinions about the role that economic objectives should play in planning restoration treatments. One participant at PNW site A felt that economic considerations were a central component of restoration and that more or larger trees should be included in thinning treatments to make them cost effective. In contrast, two participants shared the viewpoint that treatment decisions such as site and tree selection should be done for purely ecological reasons regardless of economic costs or benefits. However, the majority of participants at PNW site A, (five out of nine participants) noted the importance of both economic and ecological needs, with some expressing strong sentiments that economic or ecological goals could only be accomplished if considered simultaneously. Not all participants at PNW site B discussed this topic, although one participant expressed that restoration decisions should be based primarily on economics, two believed in making ecologically based decisions, and two participants held the balanced viewpoint described above. Lastly, at the South-central site, the majority of participants (five out of nine) shared a viewpoint of having to balance ecological and economic goals similarly to that expressed at PNW site A. In addition, one participant held a more economics-based decision focus, and two held a more ecologically based focus.

Engaging the broader public

A second challenge emerged regarding the appropriate role of the broader public in forest restoration decisions, with participants

differing in their beliefs about the usefulness of engaging the general public in restoration decisions and the best way to do so. The majority of our participants from across all three of our sites (six at PNW site A, five at PNW site B, and seven at the South-central site) discussed the impact of public perceptions on their restoration decisions and outcomes. At each site, a few participants (three at PNW site A, two at PNW site B, and three at the South-central site) specifically stated the need for better public outreach or involvement to ensure project success. Although participants at all three locations indicated that interest groups weighed in on restoration decisions and adjacent landowners were involved in some management activities in the South-central site, the general public was not very involved in decision making in any of our locations. Indeed, the collaborative structures of both the South-central site and PNW site B were composed only of government agencies and adjacent landowners; input from the broader public was limited to formal comments submitted during the National Environmental Policy Act (NEPA) process.

The issue of general public engagement and support was raised most commonly when discussing potential road closures, which was described as a pressing issue at each of the Pacific Northwestern sites. Although most (10 out of 16) participants at these two sites identified road density as an ecological problem with serious consequences, many expressed that the topic was not being sufficiently addressed by the collaborative group due to intense public disagreement. Some (five out of 16) suggested that reaching out and engaging the public further in decision making was needed. However, several participants (six out of 16) also indicated that the public was not often heard from during comment periods, even when their opinions were actively solicited through the traditional channels. Several of these individuals communicated a great sense of frustration in working with the public through typical public interaction approaches specified by NEPA (e.g., review and comment on proposed plans, public meetings) and were not hopeful that the general public was interested in engaging in constructive discussions on management topics. There was also uncertainty as to how to best involve the public in the collaborative restoration efforts outside of traditional channels, even if they were ineffective:

The general public definitely has a say in it. I just, I'm not sure that we have quite figured out how to involve the general public short of having all 250,000 [people] in [redacted] County march into the conference room and

tell us what they want. We kind of have to rely on stakeholders and interest groups and comments during the NEPA process." (USFS participant)

At the South-central site, two participants described considerable success visiting individual landowners one on one and inviting them to be included in prescribed burn treatments, although efforts to reach out to the general public specifically were not as often described.

Situational barriers: budgets, policy, and natural conditions

There were also some perceived challenges that were largely viewed as outside the control of the collaborative partnerships, but that nevertheless influenced their success. These items were raised fairly evenly among our three sites, indicating agreement on the importance of these issues to restoration activities. Most prominently, 14 participants across all three of our sites described Forest Service policy overall as being inefficient, with the complex and somewhat unpredictable bureaucratic framework contributing significantly to stress and reduced implementation amounts. Several of these individuals suggested that agency policy had to become more efficient and streamlined to allow them to do more with shrinking budgets. Related to this, seven participants felt that budgets and employees were already stretched thin, with not enough time, money, or personnel to accomplish the required workload. Lastly, six participants described specific challenges created by CLFRP policies, mostly regarding how funds could be used. In particular, several participants highlighted that restrictions in using CFLRP funds for planning or on partner lands were counterintuitive for collaborative efforts and a barrier to conducting landscape-scale restoration treatments.

In a similar way, the naturally fast tree regeneration in dry forest types was cited as a serious challenge by three participants at each of our PNW locations because they necessitated recurring treatment. As these areas were also often located on steep slopes and produce lower-value trees, extraction is more difficult and expensive for group members. Collaboration has provided some success in overcoming this challenge by allowing group members to complete larger treatments; by pitching in together to treat larger and adjoining areas, some cost reduction on a per-acre basis could be achieved. At the South-central site, such economic challenges were less prevalent, as a thriving local forest products industry combined with treatment areas that generally included trees with higher economic value more often offset treatment costs.

DISCUSSION

Several key findings emerge from our results that merit further discussion. We first consider the contributions of collaboration within our three sites. We then consider the strengths and limitations of the concept of ecological restoration to provide a common cause among those with traditionally distinct goals. Lastly, we discuss two continuing challenges evident in each of our locations: namely, difficulty reaching agreement regarding both the preferred balance of ecological and economic goals in restoration activities, and regarding the systems in which restoration is necessary or beneficial.

To begin, our three collaborative groups all experienced some success building relationships and trust among stakeholder groups, developing a shared vision, and, in many cases, agreeing

on management activities. These have been identified as key components of collaborative management success in other work (i.e., Wondolleck and Yaffee 2000, Margerum 2011, Stern and Coleman 2015) and were particularly evident at our Pacific Northwestern sites, where years of conflict had resulted in active distrust and a history of impasse regarding forest management activities (Yaffee 1994, Stern and Coleman 2015). The trust ecology and multidimensionality frameworks developed by Stern and Coleman (2015) and Stern and Baird (2015) provide more depth of understanding to these findings by distinguishing between the types of trust that have been developed at each site. For example, the South-central site experienced less previous conflict surrounding forest management relative to our two Pacific Northwestern sites, and as a result, dispositional and affective trust may not have been strained to the same degree. In addition, stakeholders at our South-central site were united by a clear restoration goal that had been present among a variety of stakeholders for several decades, which improves rational trust within the collaborative group as well. As proposed in the trust ecology and multidimensionality frameworks (Stern and Baird 2015), we expect the diversity of existing trust contributes to management success in the South-central site.

Both PNW sites A and B could be expected to have low dispositional trust as a result of historic land management conflict in the region, as well as reduced rational trust resulting from more contentious and difficult-to-define ecological goals than the South-central site. Perhaps as a result of this, participants at PNW site A more frequently described engaging in intensive activities shown in the literature to contribute to the development of trust within groups and success in collaborative efforts. These included using facilitators to improve procedural trust (Margerum 2011, Bartlett 2012, DuPraw 2014, Stern and Baird 2015), frequent meetings to identify shared goals and improve rational trust (Wondolleck and Yaffee 2000, Schuett et al. 2001, Bulter 2013) and numerous field trips and other social activities to develop affective trust (Schuett et al. 2001, Bartlett 2012, DuPraw 2014, Schultz et al. 2014). These inherent challenges may have also resulted in the collaborative group structure at PNW site A, which comprised over 40 members: state and federal agencies, conservation groups who had previously engaged in litigation with the Forest Service, timber companies, and local residents. Having a larger and more representative membership has been found to be very important to participants (Koontz and Johnson 2004) and can improve collaboration outcomes (Margerum 2008, Bartlett 2012, Butler 2013). Additionally, it has been found that a more inclusive collaborative process can lead to increased trust diversity and group resiliency, even in areas of historic land management conflict (Stern and Baird 2015, Stern and Coleman 2015). Given the perceived successes frequently expressed by participants at PNW site A, our results align with a broader body of previous collaboration work suggesting that intensive collaborative processes and inclusive membership are capable of improving trust within groups in large-scale forest restoration efforts (Bartlett 2012, Butler 2013, DuPraw 2014). Our results also suggest the trust framework developed by Stern and others regarding the importance of developing or repairing diverse forms of trust may apply within the novel context of large-scale collaborative restoration efforts, and that this framework can provide a helpful lens for understanding the connections between

types of collaborative activities undertaken and positive relationship outcomes in collaborative groups.

A second main finding was that restoration can provide a meaningful common cause that serves as an organizing point for people engaged in natural resource management issues. Past work in collaboration has demonstrated that having a common cause is important to overcoming stakeholder differences and achieving success (Gray 1989, Wondolleck and Yaffee 2000, Margerum 2011). Results here and in other work (e.g., Barro and Bright 1998, Bartlett 2012, Antuma et al. 2014) support the finding that people with disparate ideologies often agree, at least at a general level, with the value of restoring degraded ecosystems. However, this shared focus appeared to have limitations as well. Other work has identified that different stakeholders can define restoration differently and associate a variety of values and goals with the concept of restoration (Gobster and Hull 2000, Findley et al. 2001, Hjerpe et al. 2009); our results suggest that agreement on the need for restoration treatment exists primarily in areas where departure from historic conditions was most evident and risks were perceived as high. This included overgrown dry forests in the Pacific Northwest, which were at high risk of wildfire, and the shortleaf pine–bluestem habitats of the South-central site, which had largely been converted to oak systems and were at risk of being lost permanently. Outside of these systems, however, restoration appeared less effective at facilitating a belief in a common cause for participants at our sites. For example, in riparian areas, mixed conifer, and old-growth forests, stakeholders did not agree that restoration was required, nor did they agree on what historic reference point and management actions were most appropriate. These results suggest that there are inherent challenges of differing values, goals, and perceptions of departure that may arise over time when addressing restoration at a landscape level.

One theoretical perspective that may provide some insight into these differing levels of agreement across systems is “prospect theory.” Prospect theory holds that decisions framed as avoiding a loss, rather than achieving a gain, are more likely to motivate action under uncertainty and reduce the perceived risks of doing so (Kahneman and Tversky 1979). This theory has been found to translate to forest management contexts, where individuals were more willing to take risks when it was framed as necessary to avoid “lost” forest health, as opposed to maintaining or improving forest health (Wilson et al. 2012). In relation to our own findings, it is possible that in less departed locations, some view management interventions as seeking to “make a gain”; if stakeholders perceive current conditions as “fine the way they are” or where proposed treatments would only contribute to marginal improvements, they may be more concerned with the possibility of making the system worse. Systems that are understood to be clearly departed and at risk of being lost due to catastrophic fire or species conversion could influence participants to view the situation as one where they are seeking to a “avoid loss,” which inspires a united motivation to taking action despite inherent uncertainty. In line with findings from numerous communication experiments (e.g., Edwards et al. 2001, Spence and Pidgeon 2010), framing ecological restoration efforts in terms of avoiding losses rather than making improvements may be more effective at establishing group consensus and public support for restoration. Our results suggest that this may be the

case, but additional research is needed to draw a definitive conclusion about the effects of loss and gain framing on restoration decision making and consensus.

In such systems where departure from historic conditions was not agreed upon, members of our collaborative restoration groups faced difficult, value-based discussions regarding how much alteration of systems is too much, the role of economics in forest management, and how ecological goals could be balanced with public perceptions and needs. Although our participants were beginning to consider these difficult issues, it may be helpful for partners to anticipate these eventual challenges at the onset of a collaborative restoration effort (Gobster and Hull 2000, Wondolleck and Yaffee 2000, Antuma et al. 2014). Previous studies have demonstrated that starting on projects with a limited geographic scope (Moote and Becker 2003, Antuma et al. 2014), or in areas of high agreement among stakeholders (Wondolleck and Yaffee 2000, Moote and Lowe 2008, DuPraw 2014) contributed to building relationships, trust, and momentum for future agreements on contentious topics. In relation to earlier discussion, it has also been found that rational trust can be facilitated by starting with achievable goals to build confidence among members (Stern and Coleman 2015). Therefore, it is possible that this is what is taking place in the Pacific Northwest collaborative efforts reviewed here, and starting with a focus in highly departed areas will enable the groups to develop consensus in less obviously departed systems in the future.

Lastly, despite their varying structures, we found that public engagement was somewhat limited at each location despite being perceived as critical by most participants. Although it certainly is not possible to include every member of the general public as members of a collaborative group, more interactive and personalized engagement activities such as those undertaken at the South-central site have been found to be more effective in improving community trust and satisfaction than traditional, unidirectional forms of agency communication like public meetings given as part of a NEPA process (Shindler et al. 2002, Toman et al. 2006, Druschke and Hychka 2015). Given the history of litigation and conflict that was partially influenced by a lack of sufficient public involvement in National Forest management decisions in the past (e.g., Yaffee 1994, Meine 1995, Olsen and Shindler 2010), collaborative forest restoration groups would also benefit from investing in new ways to engage a broader set of individuals with a stake in these decisions.

CONCLUSION

Although effective collaboration does require substantial investments of time and energy (Wondolleck and Yaffee 2000, Moote and Lowe 2008, Margerum 2011), our findings suggest that collaborative approaches can provide meaningful contributions such as improved trust, conflict resolution, development of shared goals, and increased morale to large-scale ecological restoration efforts. Indeed, progress at PNW site A indicates that dedication to practices such as field trips, socialization, and common goal identification, as well as having a more open, involved membership can result in dramatic improvement to stakeholder relations and trust despite historic conflict. Ultimately, more time will be required to determine the long-term ecological outcomes of these restoration efforts. However, although there is still much work to be done to achieve

the prescribed ecological goals, the relationship outcomes achieved through the collaborative efforts suggest a venue where ongoing challenges can be considered. Our results also suggest that ecological restoration has potential to provide a common goal on which many stakeholders, even those with typically disparate goals like industry and environmental organizations, can agree. Although this agreement primarily exists in areas of clear departure and high risk currently, our findings suggest that further work in using loss frames when communicating restoration, and pioneering methods of public outreach outside of collaborative groups, could contribute to further advancing restoration efforts in a greater variety of systems.

Responses to this article can be read online at:
<http://www.ecologyandsociety.org/issues/responses.php/9248>

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Appendix A: Interview Protocol

Name of CFLRP: _____ Position: _____

Thank you for participating in this project. This project is designed to develop a better understanding of how USDA Forest Service employees engaged in ecological restoration view the concept and potential mechanisms. In particular, your answers and those of your colleagues will help us to understand the similarities and differences in how researchers and managers think about ecological restoration. There are no “right” or “wrong” answers; I am simply interested in your ideas.

This is meant to be informal, but I do have a list of questions that I need to ask each participant. If you feel like I am asking something you have already addressed, please do not hesitate to tell me to move on or to say that you have nothing additional to contribute. Do you have any questions?

If you agree to participate further, please indicate that you understand the purpose of this research and that you are a willing participant by answering “yes”.

Is it okay if I audiotape this interview? If so, please indicate consent by answering “yes.” If not, that is okay, we can proceed without the audio recording.

INTRODUCTORY/OPENING QUESTION

1. What are things that come to mind when you think about forest restoration?

Neutral prompts:

- ◆ Can you tell me more about _____?
- ◆ Can you explain how _____?
- ◆ Does _____ bring anything else to mind?
- ◆ How would you define _____?
- ◆ If you were going to explain forest restoration to someone else, is there anything you would say differently or add to what you have said?

SECTION 1 - NATURAL/REFERENCE FOREST ECOSYSTEM

2. How would you describe a natural forest ecosystem?

[Prompts: Check/highlight if prompt was used; leave blank if covered without prompt]

- What would the landscape look like?
- What would the species composition be?
- How would the forest be structured?
- What functions would be associated with the system?
- What would be a natural response to disturbance events?

3. What was the landscape within the CFLRP project area like in the past?

- What are you using as your reference point? (e.g., time period or set of conditions)
- How are historic conditions determined?

4. How would you describe the historic disturbance regime for this landscape?

- What were the typical types of disturbances?
- How frequent were the disturbance events?
- What was their typical severity?

5. What is the role of disturbance in a forest ecosystem?

SECTION 2 - CURRENT CONDITIONS

6. How would you describe the current condition of the forests encompassed by the CFLRP?

- What is the current species composition?
- How is the forest currently structured?
- What are the current system functions?

7. How are the current conditions different from what they were in the past?

- What caused the changes?
- What will happen if the forest stays on its current trajectory?

8. What are the current policies/management strategies directing management of this landscape?

- How do land use patterns contribute to the current condition of the landscape?

SECTION 3 - STAGES OF FOREST RESTORATION

9. What are the stages of forest restoration?

10. How do you know when a forest needs to be restored?

11. What are the goals of the forest restoration activities?

- From an ecological standpoint, what are the desired future conditions?
- From an economic standpoint, what are the desired future conditions?
- From a social standpoint, what are the desired future conditions?

12. What is the process of getting from the current condition to the desired future condition?

- What are the specific management actions that can be used?
- Are there social factors that influence the choice of management actions?

13. How are projects monitored?

- What are the measures of success for forest restoration?

14. What is the role of adaptive management in forest restoration?

- How are uncertainties addressed through adaptive management?
- What social factors influence adaptive management?

15. How does climate change factor into restoration decisions?

- How do you account for projected future conditions when you make decisions about forest restoration?
- How confident are you in current climate change projections?
- What information do you need to integrate projections of future conditions into your forest restoration decisions?
- What are your sources of information about climate change?

SECTION 4 - SOCIAL FACTORS

16. Can you describe any social factors that influence forest restoration decisions?

17. Is there a shared vision for forest restoration among the members of the project team?

- How was a shared vision created?
- Do others within your agency/organization share that same vision or are there diverse perspectives about forest restoration?

18. How do the existing policies or agency mandates mentioned previously influence forest restoration decisions?

Do these mandates/policies encourage or serve as barriers to accomplishing forest restoration?

19. How do you make tradeoffs when restoration goals are incompatible with other resource management objectives?

20. How do economic factors influence forest restoration decisions?

21. In what ways do external stakeholder groups contribute to forest restoration decisions?

Does the general public play a role in these decisions?

WRAP UP/ CLOSING COMMENTS

Thank you again for your willingness to speak with us today. Those are all of the questions that we have.

22. Is there anything else that you would like to cover?