

Collaborative Implementation for Ecological Restoration on US Public Lands: Implications for Legal Context, Accountability, and Adaptive Management

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Received: 18 March 2014 / Accepted: 11 December 2014 / Published online: 31 December 2014
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Abstract The Collaborative Forest Landscape Restoration Program (CFLRP), established in 2009, encourages collaborative landscape scale ecosystem restoration efforts on United States Forest Service (USFS) lands. Although the USFS employees have experience engaging in collaborative planning, CFLRP requires collaboration in implementation, a domain where little prior experience can be drawn on for guidance. The purpose of this research is to identify the ways in which CFLRP's collaborative participants and agency personnel conceptualize how stakeholders can contribute to implementation on landscape scale restoration projects, and to build theory on dynamics of collaborative implementation in environmental management. This research uses a grounded theory methodology to explore collaborative implementation from the perspectives and experiences of participants in landscapes selected as part of the CFLRP in 2010. Interviewees characterized collaborative implementation as encompassing three different types of activities: prioritization, enhancing treatments, and multiparty monitoring. The paper describes examples of activities in each of these categories and then identifies ways in which collaborative implementation in the context of CFLRP (1) is both hindered and enabled by overlapping legal mandates about agency collaboration, (2) creates opportunities for expanded accountability through informal and relational means, and, (3) creates feedback loops at multiple temporal and spatial scales through which monitoring information,

prioritization, and implementation actions shape restoration work both within and across projects throughout the landscape creating more robust opportunities for adaptive management.

Keywords Collaborative implementation · Ecological restoration · Public lands management · Accountability · Adaptive management

Introduction

In March 2009, President Obama signed the Omnibus Public Lands Management Act, which created the Collaborative Forest Landscape Restoration Program (CFLRP) to encourage landscape scale ecosystem restoration on National Forest System lands managed by the United States Forest Service (USFS). CFLRP projects must aim to reduce wildland fire-management costs, enhance ecological health, and promote the use of small-diameter woody biomass as well as engage in collaboration with multiple stakeholders throughout planning, implementation, and monitoring. The policy has been lauded as an innovative turn in forest management policy due to the focus on landscape scale restoration and requirements for collaboration in all phases of implementing the law (Schultz et al. 2012).

At least since the adoption of ecosystem management as a guiding forest management principle in the 1990s (US Forest Service 1992), the USFS has supported collaboration with interested stakeholders to work across organizations, jurisdictions, and sectors to better inform the management of public lands. However, collaborative efforts primarily have occurred during the planning stage with implementation carried out almost exclusively within

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the agency. Creation of the CFLRP has changed this context, as it requires that implementation be undertaken collaboratively. This presents a challenge as public land management agencies must adhere to systems of authority, accountability, and legitimacy laid out in federal policies and agency guidelines and procedures that may not always fit with the collaborative process. Moreover, agency history and culture have shaped professional identity and practices for more than a century. In this context, a central tension that land managers have to navigate is the extent to which they *can* collaborate in the implementation phase as well as the extent to which they are *willing* to do so.

The purpose of this research is to identify the ways in which CFLRP collaborative participants and agency personnel describe and conceptualize how stakeholders can contribute to implementation on landscape scale restoration projects, and to build theory on dynamics of collaborative implementation in environmental management. The paper opens with a review of how collaboration and adaptive management have converged in environmental management and an overview of the USFS experience in collaboration. We then describe the grounded theory methodology that informs our approach to theory building, followed by the results where we describe how participants in CFLRP projects characterize and engage in collaborative implementation. We conclude by discussing the opportunities for and constraints to land management agencies engaging in collaborative implementation with a focus on the largely indirect role collaborative groups play in implementation, legal tensions that arise, and opportunities for strengthening accountability and adaptive management in collaborative implementation.

Collaboration in Public Lands Management

The passage of the National Environmental Policy Act (NEPA) in 1969 heralded a “golden era” of environmental lawmaking in the US when, for nearly a decade, there was remarkable policy consensus around environmental management issues (McGrory and Sousa 2012). However, persistent uncertainties and conflicting social values led to widespread disputes and a period of gridlock in environmental management in the 1980s and 1990s (Kraft 2004; McGrory and Sousa 2012; Gray 1989; Weber 1998). The northern spotted owl crisis and timber wars in the Pacific Northwest are prominent examples of the antagonism between environmentalists, government agencies, and industry that characterized the gridlock in relation to public lands management during this period (Layzer 2008). Two responses to this crisis rose to prominence in the 1980s and 1990s—adaptive management and collaborative governance.

This review examines each of these approaches and tensions that exist in their actualization in practice.

As environmental gridlock intensified, adaptive management was seen as a potential normative framework to overcome “analysis paralysis” and allow management to proceed even when uncertainties remained (Lee 1993; Holling 1978). In ideal conception, adaptive management uses an experimental approach in which actions are taken on the landscape followed by monitoring to determine whether the strategy achieved desired results. Through such experimental means, uncertainties can be redressed overtime, while allowing management to proceed based on the best available information. The adaptive management cycle moves through the usual stages of planning, implementation, and monitoring with a specific orientation toward learning through intensive monitoring and evaluation of strategies to inform both current and future management actions (Lee 1993). While theoretically appealing, to date, these concepts have been much more successful in capturing the imagination of scholars and practitioners than in their implementation in practice (Lee 1999).

Meanwhile, collaboration in the public sector emerged in the 1980s as a potential means to develop consensus and resolve disputes, and to overcome gridlock created by conflicting stakeholder values and knowledge where legislative decision making, administrative implementation, and judicial enforcement fell short (Gray 1989; Koontz et al. 2004; Weber 1998; Fung and Wright 2003; Innes and Booher 2010). Over the last four decades, scholars from a range of disciplines, including policy studies, urban planning, and public administration, have sought to describe and theorize this emergent approach to governance focusing much of their attention on building a normative framework for effective practice. Ansell and Gash (2008) provide a meta-analysis of collaborative governance literature and suggest that collaborative institutions rely on clear ground rules, inclusive and open participation, process transparency, and an orientation toward consensus. In the process itself, diverse stakeholders engaging in face-to-face dialogue have the potential to build trust, develop a shared understanding of the context and problem, devise joint strategies to respond and derive benefit from social learning, conflict management, and strengthened social, political and intellectual capital (Ansell and Gash 2008; Bryson et al. 2006; Innes and Booher 1999, 2010). While much of the current research provides important normative principles for collaborative governance, Ansell and Gash (2008) point out that the literature to date focuses mostly on the collaborative process rather than outcomes associated with implementation.

Collaborative governance and adaptive management converged with the rise of collaborative adaptive management or adaptive co-management which seeks to

address both social and ecological uncertainties through dialogue, deliberation, and experimentation through planning, implementation, and monitoring (Armitage et al. 2007; Olsson et al. 2007; Pahl-Wostl et al. 2007). This emergent conceptualization of the adaptive management process recognizes that both social values and scientific understanding of social–ecological systems are in flux over time. Scholars focus on understanding how collaboration can contribute to social learning amidst such uncertainty to enable adaptive management and how to navigate complex roles among governmental and nongovernmental stakeholders (Fernandez-Gimenez et al. 2008; Folke et al. 2005; Berkes 2002; Weber 2003; Lee 1999; Brunner et al. 2005).

Fostering effective communication and coordination across different actors and levels of governance to engage in adaptive management presents many challenges (Wyborn and Bixler 2013; Cash et al. 2006). Collaborative adaptive management requires feedback loops from planning through implementation and monitoring over time, while involving a range of stakeholders in dialogue and social learning throughout. Scholarship to date has laid a foundation for understanding when and how to undertake effective collaborative processes (Ansell and Gash 2008); however, insights specific to how collaboration can shape implementation activities are more limited. Gray (1989) and Margerum (1999, 2011) argue that collaborative implementation can be challenging for a variety of reasons, including legal and policy constraints, procedural requirements, emergence of new players and new issues, or persistent organizational *modus operandi* and resistance to change from familiar ways of doing things. Furthermore, where government actors are primary players in collaboration, institutional structures can often exacerbate barriers and constraints on the collaborative process and its role in influencing decision making (Koontz et al. 2004; Margerum 1999; Wondolleck and Yaffee 2000). This is a delicate balancing act. Gray (1989) concludes that collaboratives are particularly susceptible to collapse during implementation and argues that “if implementation issues are not assiduously anticipated during the negotiation [or planning] phase, implementation is guaranteed to pose new conflicts.” Thus, while “collaborative governance has emerged as a response to the failures of downstream implementation... and to the accountability failures of managerialism” (Ansell and Gash 2008), determining how to engage in collaboration within the legal and organizational context of implementation has not been effectively sorted out.

Collaboration is particularly challenging for public land management agencies as legal authority, systems of accountability, agency legitimacy, and professional practices can narrowly define who can be involved and how in the implementation of land management strategies (Steelman

2010). Collaboration in public lands management provides opportunities for stakeholders to influence decision making through planning processes, as well as a means for coordinating across organizational boundaries, mobilizing and sharing resources, and creating joint responsibilities for management actions (Koontz et al. 2004; Randolph and Bauer 1999; Wondolleck and Yaffee 2000; Layzer 2008). However, these efforts do not deliver ultimate authority and responsibility for decision making and action to collaborative groups—each agency or organization maintains their respective lines of authority and accountability. As Connelly et al. (2008 as cited by O’Leary and Bingham 2009) contend, the collaborative manager has to be “participative” in the context of engaging in a collaborative network while also being “authoritative” as the head of a program or organization.

The CFLR program provides an opportunity to examine multiple questions related to the practice and theory of collaborative implementation in public lands management including assessing:

- (1) the ways in which participants conceptualize collaborative implementation in practice;
- (2) the extent to which collaboration can contribute to implementation when management authority is vested in a single government agency, in this case, the United States Forest Service (USFS); and,
- (3) how engagement in collaborative implementation may alter our understanding of adaptive management and systems of accountability in landscape scale ecological restoration efforts.

A deeper understanding of these topics will help refine the approach and conceptualization of collaborative adaptive management. The next section builds the context for this work by describing the ways in which the USFS has adopted a more collaborative approach to management over the last several decades.

Collaboration in the US Forest Service

Since the 1980s, the USFS has evolved from a tightly insular enterprise driven by silvicultural interests to an organization that incorporates multiple values and perspectives in management decisions and actions on the USFS-managed lands (Tipple and Wellman 1991). Collaboration is encouraged in many programs within the agency and reinforced by legislation and cooperative agreements. For example, in the realm of fire management, subsequent to creation of the National Fire Plan in 2000, the USFS signed a cooperative agreement in 2002 to promote a transition to ecological fire management through the US Fire Learning Network. This network fostered

landscape scale interorganizational collaborative planning for the restoration of fire adapted ecosystems (Goldstein et al. 2010). The following year, statutory guidance for more efficient wildfire and fuels management was developed in the Healthy Forest Restoration Act (HFRA) (US House of Representatives 2003), which directed the agency to collaborate across jurisdictional boundaries at the local level through Community Wildfire Protection Planning (Brummel et al. 2010). The 2009 Federal Land Assistance Management and Enhancement Act required federal fire agencies to develop a Cohesive Wildfire Management Strategy in collaboration with state and local stakeholders. Most recently, in land and resource management planning, the agency guided a multilevel and multiyear participatory process to revise the National Forest Management Planning Act Planning Rule by 2012. The rule specifies that Land and Resource Management Plans must be developed with substantive participation, collaboration, and coordination (US Forest Service 2012).

To date, USFS collaborative efforts have focused on planning work with implementation of the resulting plans undertaken primarily by agency personnel who develop prescriptions, contract out a timber sale, or conduct marking and treatments for mechanical thinning. Implementation has largely been inaccessible to collaborative groups and the public due to various factors including regulatory and legal constraints, internal procedures, organizational culture, and associated professional practices. Legally, agency leaders cannot relinquish decision-making authority to external parties for management work on National Forest System lands and cannot privilege recommendations of a collaborative group over an individual citizen. Contracts have to go through agency bureaucratic processes and legal review. Conducting comprehensive and scientifically informed analysis is necessary to ensure decisions are defensible, not only to demonstrate professional competency but also to reduce the risk of court battles.

The CFLRP legislation creates a new layer in the legal context of agency collaboration. A proposed project plan must be “developed and implemented through a collaborative process that includes multiple interested persons representing diverse interests and is transparent and non-exclusive” [cite FLRA, Title IV, Section 4003, (c) 2 A, B]. (US Forest Service 2011). CFLRP thus requires collaboration in planning, implementation, and monitoring. And yet, CFLRP funding can only be used on National Forest System lands which are managed by the USFS. As such, collaborative implementation in CFLRP requires navigating opportunities for stakeholders to participate more extensively in forest management processes while adhering to preexisting legal requirements in National Forest land management.

Research Purpose and Methods

This research aims to describe how participants in CFLRP collaboratives conceptualize collaborative implementation of forest restoration projects on national forests and identify implications for engaging in collaborative implementation in environmental management. We examine these topics using a grounded theory methodology (Charmaz 2006; Strauss and Corbin 1990), drawing primarily on perspectives of USFS personnel and nonagency stakeholders involved in the 10 CFLRP collaborative groups (see Table 1) funded in 2010.¹ The authors collected documents and interviewed both the USFS staff and stakeholders from each of the ten projects. We gathered and analyzed CFLRP proposals, annual reports, project NEPA documentation, CFLRP website posts, and other relevant materials, and conducted more than 80 interviews at the time of writing.

Interviews were semistructured and covered topics including what collaborative implementation entails, approaches to engaging in collaborative implementation, and challenges and tensions associated with engaging in collaborative implementation. Using the semistructured interview protocol allowed interviewer and interviewee to shape new questions and clarify key points throughout the conversation. Each interview lasted approximately an hour. Initial interviews began in the fall of 2011 and continued through the summer of 2014. We selected interviewees based on who authored or was mentioned in proposals and based on conversations with a first round of interviewees. We interviewed participants from each landscape and chose a minimum of four interviewees in each case to triangulate perspectives among the USFS- and non-USFS-affiliated participants and to broaden our theory building work by drawing on data from multiple cases.

The authors also conducted site visits to regional or landscape level CFLRP meetings to observe eight landscape collaborative groups in action, tour landscape restoration areas, and interact face to face with many of the participants. These site visits have included informal conversations with participants as well as recordings of presentations and dialogue taking place among participants to supplement interview data. Researchers kept field notes and wrote memos during and after the field observations, which have been added to our data on each of the landscapes.

Text files of documents and interview transcripts were analyzed using a grounded theory methodology. Grounded theory is an inductive and iterative investigative process that aims to formulate theory through a multilevel coding

¹ For an overview of CFLRP and general characteristics of the first 10 projects, see Schultz et al. (2012).

Table 1 CFLRP landscape characteristics

Region and project name (State)	Collaborative group	Original project size (acres)	National forests
R1: Selway-Middle Fork Clearwater Project (ID)	Clearwater Basin Collaborative (CBC)	1,400,000	Nez Perce, Clearwater and Bitterroot
R1: Southwestern Crown of the Continent (MT)	Southwestern Crown of the Continent Collaborative (SWCC)	1,449,670	Lolo, Flathead, and Helena
R2: Colorado Front Range Landscape Restoration Initiative (CO)	Colorado Front Range Roundtable (COFRR)	~ 800,000	Arapaho and Roosevelt, Pike and San Isabel
R2: Uncompahgre Plateau Collaborative Restoration Project (CO)	Western Colorado Landscape Collaborative (WCLC)	1,000,000	Grand Mesa, Uncompahgre, and Gunnison
R3: Four Forests Restoration Initiative (AZ)	Four Forests Restoration Initiative Collaborative (4FRI)	~ 2,400,000	Apache-Sitgreaves, Coconino, Kaibab, and Tonto
R3: Southwest Jemez Mountains (NM)	Southwest Jemez Mountains (SWJM) Collaborative	210,000	Santa Fe NF and Valles Caldera National Preserve
R5: Dinkey Landscape Restoration Project (CA)	Dinkey Collaborative	154,000	Sierra
R6: Deschutes Skyline Landscape (OR)	Deschutes Collaborative Forest Project	130,000	Deschutes
R6: Tapash Sustainable Forest Collaborative (WA)	Tapash Sustainable Forest Collaborative	1,629,959	Okanogan-Wenatchee
R8: Accelerating Longleaf Pine Restoration in NE FL (FL)	None specified	567,800	Osceola

approach that examines, names, and categorizes the conditions, context, strategies, and consequences related to phenomena of interest (Charmaz 2006; Strauss and Corbin 1990). Data collection and analysis proceed simultaneously. Using WEFT-QDA, an open source qualitative coding software, researchers analyzed initial interviews of CFLRP landscape collaborative participants in 2011 and early 2012 to identify what kinds of activities participants associated with collaborative implementation across the multiple cases. We refined the coding scheme as we continued our interviews and document analysis over the subsequent 3 years. This process of continuous modification and reinterpretation of initial theoretical constructs enables the “grounding” of the theory as new data shape and refine emergent meaning. We tested our interpretations with CFLRP key informants to ensure that our categories and explanations resonated with practitioners. These efforts helped us further refine our interpretations which we present in the results section below. For the purposes of this paper, we did not try to assess effectiveness of certain strategies. Rather, we sought to characterize the breadth of activities that CFLRP participants felt influenced decision making and action around implementation on USFS lands.

Given the diversity of data collection approaches and the open ended nature of the grounded theory methodology, the data and analysis reported here do not reflect a comprehensive or statistically valid survey of reflections on collaborative implementation. Rather, our aim in this work is exploratory and theory driven as we seek to characterize

the breadth of perspectives and experiences of CFLRP participants engaged in collaborative implementation. As such, we not only characterize those activities widely described across cases and among many participants, we also highlight activities identified by a limited number of participants. In this way, we aim for a more complete theoretical framework for understanding collaborative implementation rather than a comprehensive count of collaborative implementation actions (Flyvbjerg 2001; Maxwell 1996).

Collaborative Implementation in Practice

This section provides the results of our analysis describing activities that interviewees identified as related to collaborative implementation. Overall interviewees described three different types of activity that could be conducted collaboratively and contributed to implementation: prioritization, enhancing treatments, and multiparty monitoring. This section provides examples of each of these ways that participants described as influencing implementation and links these processes to a broader conceptualization of collaborative implementation in public lands management.

Prioritization

Prioritization can be a challenging process to engage in collaboratively as it requires the acknowledgement and

negotiation of multiple values and, potentially conflicting interests about the most important uses of the landscape. Although conventionally conceived of as part of the planning phase, many CFLRP participants described their input into decisions about prioritization of treatment strategies and locations as a contribution made during planning, through proposal development, and during implementation, through ongoing prioritization efforts.

In the proposal-development process, many collaborative participants worked with agency staff to identify general priorities or specific projects which, in principle, the agency would implement if funded. Given that proposals were a necessary step in becoming a CFLRP, most interviewees discussed working collaboratively on prioritization during the proposal, or planning, stage. However, participants generally did not see prioritization as a one-time activity but as an ongoing process, one that took place as treatments were undertaken. In cases where stakeholders were providing input to ongoing prioritization efforts, collaborative participants felt they had at least an indirect influence on implementation by helping decide where to go next on the landscape and what kind of treatments to undertake. While the agency still makes the final decision about prioritization and implementation, collaborative engagement allows participants to feel they have some influence on the process. As a participant on the Tapash observed, the collaborative is “involved in determining which is the next landscape” and what treatments would need to take place. (NGO collaborator, interview, 9-27-11). A USFS staff member clarified that the Tapash collaborative “has pretty significant input in terms of prioritizing” but that rangers worked out where to put treatments on their landscapes and how to implement them to meet that guidance. On the Uncompahgre, one stakeholder characterized the process: “we have a huge list of projects and they’re ready to go... we will get the lead folks to sit down and explain the different projects. Then, there will be some moving around as they tell us what their priorities are and why and then we’ll see if we agree and then they start tweaking them” (NGO collaborator, interview, 11-17-11).

These examples demonstrate that prioritization can be conceptualized as part of collaborative implementation. Ongoing prioritization allows stakeholders and agency personnel to engage in the dynamic process of deciding where to go, what to do, and when as the project unfolds. As implementation activities proceed across the landscape, ongoing prioritization allows for course corrections, reactions to changing conditions or new understandings, altering of strategies, and realignment of goals. Involving collaborative groups in prioritization provides them a sense that they are able to influence implementation decision making and activities, albeit in an indirect way.

Enhancing Treatments

Much like prioritization, enhancing treatments largely involves indirect mechanisms for collaboratives to influence implementation. Through creating training opportunities, some collaboratives are having an impact on how prescriptions are being implemented by ensuring that those who will be conducting implementation work understand the values and reasoning of collaborative participants. Some collaborative partners have undertaken cost-share projects which expand agency efforts in project implementation. Finally, in one case, collaborators have the requisite certifications to be able to augment agency capacity by staffing treatments alongside agency employees.

Prescription Implementation Training

To ensure that implementation fulfills the intentions of the original plan, a few collaboratives have worked to improve training to help staff and contractors better understand the intentions behind treatment strategies. These training efforts range from trying to establish new curriculum at a community college, to developing a formal set of guidelines for marking crews, and to engaging in informal field reviews with contractors and stakeholders together to discuss implementation strategies and outcomes on the ground.

A core concern of many of the stakeholders was that marking crews were not effectively trained in how to mark trees for restoration purposes rather than timber extraction purposes. According to one of the collaborative participants on the Four Forests Restoration Initiative (4FRI) project, stakeholders and the USFS had the potential to enhance the quality of tree marking for mechanical thinning projects through curriculum development and field-based training. As one collaborator observed: “The problem is when you’re dealing with 600 thousand acres, you can’t go out there as a collaborative and mark trees” (NGO collaborator, interview, 11-15-12). To address this concern, some of the collaborators discussed partnering with community colleges in the region to develop a restoration marking curriculum for translating a restoration prescription into marking trees on the ground.

The Dinkey collaborative sought to build understanding among marking crews by creating a tool that includes a photo guide and marking guidelines for crews to take out into the field. These guidelines were sensitive to specific species of concern, primarily the Pacific Fisher. Marking crews were then trained in the field to understand what trees they should mark, which ones to avoid and why. Members of the collaborative observed that marking crews did a much better job if they understood underlying

reasoning of the marking approach rather than following a prescription (USFS staff interview, 5-13-13).

The Deschutes collaborative has undertaken efforts to “create shared-learning and training opportunities between contractors, stakeholders/collaborators, and USFS staff regarding implementation efficiencies of restoration treatments” (NGO collaborator, personal communication, 3-17-14). Modeled on efforts of the Central Oregon Partnerships for Wildfire Risk Reduction (COPWRR), the Deschutes collaborative brought contractors into the collaborative process to ensure they had a sense of the diverse values that a prescription reflects (such as spatial heterogeneity in forest stands or retaining trail marking trees for recreation purposes or fuels reduction to manage wildfire risk). Collaborative stakeholders and USFS staff worked together to ensure that contractors were familiar with the goals of the project to identify what and how to cut, as well as conduct post-implementation field reviews that ensure stated objectives were met. As one NGO collaborator put it, “participation of contractors in the collaborative or stakeholder communication to contractors is critical to contractors understanding and accepting more complex implementation prescriptions...allowing them to more effectively implement restoration projects” (NGO collaborator, personal communication, 3-13-14).

Cost Share Treatments

The CFLRP legislation places certain restrictions on funding, including that funds can only be used for project implementation, not project planning and that 50 % of project funds must be cost share. The cost share can be accounted for in multiple ways including by counting non-CFLRP funds appropriated to the agency or by counting grants, in-kind contributions, and transfers via intergovernmental agreements. Most of the CFLRP cases have met at least a portion of their cost share requirement to date by counting other USFS expenditures for activities that support implementation within landscape boundaries, including the preparation of necessary planning documents. However, a few collaboratives went beyond this internal accounting technique and procured external funds to conduct treatments complementary to USFS restoration work on National Forest lands. To some extent, these types of projects have always taken place as nongovernmental organizations have worked on public lands to forward their missions. However, in the CFLRP context, there is a motivation to account for these projects and to seek external funding to contribute to meeting the cost share requirement of the program.

For example, in the SW Jemez Mountains collaborative the Santa Fe National Forest has ongoing cost share projects with The Nature Conservancy (TNC) and a local

nonprofit group, Wild Earth Guardians, to enhance ecological health of the CFLRP landscape by conducting aquatic restoration work including both wetlands and riparian restoration. According to one of the USFS staff members, there were 9 restoration projects conducted by partners and several more seeking grant funding in the fall of 2012 (USFS staff, interview, 9-21-12). One USFS staff member states that “the CFLRP has created an opportunity to expand formal collaboration between governmental and non-governmental entities in a significant way” vis-à-vis implementation (USFS staff, personal communication, 3-13-14).

The Colorado Front Range Roundtable (COFRR) provides another example of how collaboratives have used cost-share to augment implementation efforts. The USFS developed cooperative agreements with Denver Water and Colorado Springs Utilities as a result of significant impacts on reservoir capacity and water quality after wildfires, particularly the Hayman Fire in 2002. These partner agencies invested around \$2 million annually to support additional forest treatments within their watersheds. The USFS used these funds to expand their treatment area. Indeed, in part due to this cost-share arrangement, treatments on the COFRR exceeded the pace originally expected allowing the agency to accelerate implementation across the landscape. This led the collaborative to undertake a 67,000-acre NEPA analysis on the Pike National Forest to open up new acres for restoration treatments for implementation over the next 5 years of CFLRP (USFS staff and NGO collaborator personal communication, 10-29-2013).

Collaborative Treatments

In general, CFLRP collaboratives are not directly engaged in conducting treatments alongside the USFS staff as a group. Interviewees reported extensive barriers to engaging in project level treatments. Contracts have to be drawn up and approved (often by legal teams through a competitive bidding process), workers have to have relevant trainings and certifications to conduct treatments, and the participating individuals or organizations have to have the capacity (personnel, equipment, etc.) to contribute to the work. Few participants in the collaborative processes have the requisite skills, certifications, or capacities to work directly with agency staff on the ground. In one case, however, the Accelerating Longleaf Pine Restoration (ALL) project in Florida, the USFS, and The Nature Conservancy (TNC) Ecosystem Restoration Teams (ERTs) have conducted treatments together as collaborative partners. The teams are staffed by TNC employees who have completed the National Wildland Fire Certification, which allows them to participate on fire crews with federal agency

staff. The teams were created to complement the work of state and federal agencies in responding to wildland fire issues. Over time, they broadened their capabilities to aid in prescribed fire, invasive species management, preparation for thinning, and other aspects of restoration work (NGO collaborator, interview, 3-27-12). One ERT has worked with the Osceola National Forest to implement treatments on the CFLRP landscape. As one of the USFS staff members described the relationship, “they are helping to serve to increase our capacity” as the TNC burn crew can conduct a treatment under a USFS burn boss on one plot while the USFS crew can burn another increasing the number of acres under prescribed fire in a day (USFS staff, interview, 12-8-13).

Monitoring for Adaptive Management

Finally, every collaborative in the program engages in multiparty monitoring which is a requirement of CFLRP and a central focus of many of the collaborative groups. As funds allotted for monitoring can only be used for “assessing whether the project was implemented to the specifications and assessing the direct effects of the restoration treatment(s)”² the primary focus of monitoring efforts is on post-treatment effectiveness evaluation. Monitoring is approached systematically and involves both scientific monitoring and qualitative field reviews.

Scientific Monitoring

Most of the CFLRP landscapes have scientific monitoring programs that are either planned, implemented, or both. We use the phrase “scientific monitoring” to describe a systematic endeavor to collect statistically valid data across multiple plots oriented toward assessing the effectiveness of restoration treatments over the long term. Scientific monitoring is generally seen as central to the long-term process of engaging in adaptive management. These methods are focused on gathering robust data across the landscape to see whether management actions generate the desired results. Approaches used range from using a Rapid Forest Assessment tool with protocols that can be undertaken by citizen scientists and/or professionals to using detailed, specific, and scientifically defensible monitoring protocols such as the Common Stand Exam (CSE) of the Forest Inventory Assessment (FIA).

A variety of approaches shaped by the capacity and interests of both agency personnel and collaborative

participants have been used to accomplish monitoring ranging from contracts to organizations with monitoring expertise to collaborative committees taking on monitoring work as a group. The Clearwater Basin Collaborative has chosen to contract some of the major monitoring work out to an environmental consulting firm. In the SWCC, strong interest in wildlife monitoring, led to the establishment of a monitoring subcommittee to develop protocols for wildlife. The Uncompahgre project relies on the support of the Colorado Forest Restoration Institute for some of their scientific monitoring needs while also drawing on robust citizen science protocols to inform their monitoring program. Participants in the first 4 years of the program report having set up monitoring plots and/or completed baseline monitoring. However, none of our interviewees reports analyzing post-treatment effectiveness in ways that would have an impact on ongoing management decisions.

Qualitative Field Reviews

Qualitative field reviews generally involve collaborative partners going on a field trip and evaluating a site against their expectations of restoration. Like scientific monitoring, qualitative field reviews are oriented toward ensuring that the work completed is achieving the desired effects. This type of review has been undertaken both as part of a formal monitoring program and informally when groups go out to visit a restoration area without the explicit intent of monitoring. These reviews add to collaborative implementation because they inform collaborative participants and agency personnel about what is or is not working as they return to the planning and implementation phases.

Field reviews are part of the formal monitoring strategy on the Deschutes landscape and are highly valued as a mechanism that facilitates input into management decision making. A collaborative member on the Deschutes landscape noted that, “These multiparty monitoring field reviews have played a key role in providing feedback that’s written down, and making sure that interdisciplinary team planners [involved in NEPA required analysis] hear that. And I believe that has been an important part of why that concept has been adopted by the Forest Service” (NGO collaborator, interview, 1-17-12). Another stakeholder adds “these field reviews have been incredibly important in promoting shared learning and trust between stakeholders and the Forest Service” (NGO collaborator, personal communication, 3-13-14). On one field review, a representative of an environmental group that historically had been adamant about preserving trees of a certain diameter shared that he would have liked to have seen a bit more thinning on a particular plot when the collaborative conducted a post-treatment field review. The project contractor who was on the field review shared that he could have

² CFLR Frequently Asked Questions, http://www.fs.fed.us/restoration/CFLRP/questions/answers/qa004_impmon.shtml, accessed 10-4-2014.

moved the project from a net cost to the USFS to a net source of revenue had those trees been included in the prescription he was given. This was an eye-opening exchange for the group, and they have since sought to clarify how the prescriptions can be written and implemented in ways that honor the social values of collaborators, meet restoration goals, and achieve greater efficiencies (USFS staff and NGO collaborator, personal communication, 4-17-13).

The Four Forests Restoration Initiative undertook collaborative field reviews in which the USFS personnel took stakeholders on tours of multiple treatment sites and had them mark pretreated areas and reflect on visual results post treatment. As a result of these reviews, some environmental groups who had historically advocated for stringent diameter limits have suggested that more trees could have been removed on some sites and contractors or the USFS staff have been surprised by these observations (NGO collaborator, interview, 11-15-12; USFS staff, personal communication, 10-29-13). As one USFS staff member clarifies, “there is a great deal of agreement within the range of silvicultural prescriptions that could be applied” between the marking conducted by the stakeholder group and the USFS contractor teams. Still, there was “a clear division between the intensity of treatment” leading to further discussion about the acceptable intensity of thinning to be conducted on the forest (USFS staff member, personal communication, 3-14-14). While it is not completely clear that these monitoring efforts have directly led to a change in implementation strategies or actions on the ground, stakeholders and the USFS personnel reflecting on these monitoring efforts suggest that they have witnessed perspectives shifting through these field reviews, perhaps a first step toward changes in subsequent implementation strategies or actions.

Discussion

By fostering experimentation in a new domain of collaborative public lands management, the CFLRP is creating new modes of interaction as groups determine what is collaboratively feasible to contribute to implementation within the agency structure. These activities are not without tensions and are unevenly practiced. Our interviews indicate that collaborative implementation involves a complex array of activities that interact, overlap, and blur the lines between planning, implementation, and monitoring. This largely reinforces the literature on policy implementation which recognizes the messiness and nonlinearity of the policy process (Vaughn and Cortner 2005; Pressman and Wildavsky 1984). At the same time, our findings about what collaborative implementation entails suggests that a range

of largely indirect activities can influence implementation decision making and actions in landscape scale ecological restoration work. In this section, we aim to conceptualize (1) how collaborative implementation is both hindered and enabled in the legal context of CFLRP, (2) how collaborative implementation creates the potential to expand accountability in landscape scale restoration work, and (3) how collaborative implementation opens opportunities for adaptive management across temporal and spatial scales.

Legal Context and Organizational Constraints

Margerum (1999) and Gray (1989) point out that legal context and organizational procedures can often be constraints on collaboration in general and collaborative implementation in particular. This specifically holds true for public lands management where authority tends to be limited to a single land management agency. The CFLR legislation provides a new overlay onto a legal context that has inhibited collaboration in relation to land management practice on USDA Forest Service managed lands by mandating collaboration in proposal development, implementation, and multiparty monitoring. In effect, CFLRP efforts on public lands management are at once not only constrained by preexisting legislation and forest management practice but also engendered by the legislation creating the program. In practice, this legal context has led to indirect collaborative engagement in implementation: the USFS still does not relinquish authority to collaborative groups, but more room has been created to allow those groups to be more actively involved in forest management processes beyond the planning stage.

Most efforts to influence prioritization and the quality and nature of implementation activities have been indirect and somewhat limited by organizational procedures. On some landscapes, the agency plays a strong role guiding the prioritization process and agency personnel proceed in a largely insular way getting stakeholders to sign off at the end of the process. In one case, an agency staff member stated, “internally we’re doing everything we would normally do. We have our interdisciplinary teams meet to identify locations and opportunities and begin to sketch out what the desired conditions are and how to get there from current conditions. Essentially, the collaborative is a check on the work that we’re doing” (USFS staff, interview, 2-9-12). A CFLR coordinator on another landscape clarified that “we haven’t matured to the point where we can just sit down with a map and say ‘let’s design a project. We need to give them something to shoot at. So, we try to put together the best project we can, we take it to them, and then allow them to provide input” (USFS staff, interview, 5-9-12). Thus, much of the advanced work of identifying potential project areas and desired outcomes continues to

be guided by agency staff. Some interviewees shared that this was due, in part, to internal procedures and a sense that stakeholders may not have adequate knowledge or information to provide substantive input early in the planning process.

Beyond the constraints of maintaining decision authority for public lands, another challenge that arose in our interviews was how the USFS and collaborative groups could effectively engage in collective work, particularly under the rules of the Federal Advisory Committee Act of 1972 (FACA). FACA specifies that if the agency is going to take advice from a collaborative, the group must be inclusive and transparent.³ None of the CFLRP collaboratives have officially become authorized as a federal advisory committee. However, they have had to tread carefully to ensure that the way they are structured and the activities they undertake cannot be construed of as violations of FACA. Indeed, some CFLRP collaboratives were accused of FACA violations and responded by adjusting how USFS staff participated in collaborative processes. Both FACA-fear and FACA-awareness have led to an “arm’s length” relationship between agency personnel and stakeholders in a few collaboratives to minimize the appearance of collusion. Others have designed or altered their structures to make sure that the USFS is not seen as guiding or managing the group (Butler 2013). Thus, while planning and implementation must be undertaken collaboratively, the approach to collaboration and the level of engagement of agency personnel in collaborative dialogue is at least somewhat constrained by the preexisting legal context.

Despite these continuing challenges to collaborative implementation in the existing legal and organizational context, CFLRP has created new opportunities for stakeholders to engage in collaboration in ways that they had not previously been able to undertake together. The changing legal context requires inclusive and transparent collaboration through planning, implementation, and monitoring. This has created an impetus for stakeholders to engage in new ways with the agency than in the past. Although much of the work described in the results section points to indirect influence, efforts to enhance treatments, undertake multiparty monitoring, and serve as a check on agency priorities were contributions to the implementation process that both agency personnel and stakeholders described as expanded areas of collaborative engagement in many of our interviews.

Strengthening Informal Accountability

Our findings also suggest that although the agency maintains clear decision-making authority, collaborative

implementation provides opportunities to strengthen accountability, largely through informal or relational means (Romzek et al. 2012). In general terms, accountability can be understood as external oversight of organizational actors who are held responsible for their actions by a recognized authority (Ebrahim 2005). In public lands management, formal accountability structures and mechanisms essentially follow hierarchical chains of command, ultimately to Congressional oversight, and use audits, targets, and other control mechanisms to ensure that the agency is adequately performing required or expected actions (Steelman 2010; Goldsmith and Eggers 2004). Accountability can also be understood as a less formal process where mechanisms of accountability arise from “the power of generally agreed to, yet intangible informal institutions such as participant norms, the enculturation of specific virtues, and a credible commitment to accountability by leaders” (Weber 2003, pp. 69–70).

The CFLRP process appears to strengthen USFS accountability to collaborators through such informal and relational mechanisms where understandings and concerns emerge through collaborative interaction. Ebrahim (2003) argues that “as an accountability mechanism, participation is quite distinct from evaluations and reports because it is a *process* rather than a tool.” Multiparty monitoring, a requirement of CFLRP, provides a direct set of mechanisms for strengthening accountability as stakeholder values and perspectives are integrated into implementation processes through participation and dialogue. Collaborative participants have engaged in the design and implementation of monitoring plans, obtaining access to scientific data as well as social values.

Qualitative field reviews have been particularly valuable for stakeholders to clarify their own values, assumptions, and expectations of forest management while evaluating landscape conditions following treatments. Involvement in the design, implementation, and analysis of these monitoring efforts, allows stakeholders greater access to information and monitoring results that can inform feedback to the agency on the extent to which stakeholder values are met by implementation actions. A stakeholder on the Deschutes told us that after field reviews they reflect on “what can we take away for the next project? If we do the field review in one of the first years and figure out something significant, they could tweak the prescriptions on later units... There are opportunities to apply some lessons even within the framework of a NEPA approved project” (NGO stakeholder interview, 11-1-12).

This informal process is also evident in prioritization. Collaboratives that systematically participate in the prioritization process have seen that the agency incorporates collaborative input into the final decisions and as a result have a sense that the agency in general will honor the

³ For a more extensive explanation of the FACA in relation to CFLRP, see Butler, 2013.

“zone of agreement” that they reach with stakeholders. As one stakeholder put it, “I think we have quite a bit of influence. We are entering a phase where we are more actively driving the kind of work that gets done in projects. What we are seeing is that once we get to a specific NEPA planning area, the way the process takes shape is very much influenced by CFLR and the collaborative” (NGO collaborator, interview, 6-4-12). As an agency staff member explained to us “ultimately folks know it is the agency’s decision” but the collaborative has “substantive input” into planning and implementation work as they “air out their beliefs and form recommendations” (USFS staff, interview, 2-1-12). So, while the agency is not obligated to take collaborative input any more seriously than other public input, there is a level of legitimacy that comes from a group of diverse stakeholders speaking with a unified voice and interacting directly with agency personnel.

Finally, enhancing restoration treatments through training offers the potential for another layer of informal accountability in the performance of restoration treatments. New conceptualizations of how to train marking crews and contractors through field reviews, community college courses, or field guides provide the opportunity for stakeholders to substantively shape the nature of restoration treatments. Conventionally, contractors or marking crews are accountable to agency staff who review their work in relation to a specific documented prescription. When contractors participate in discussions face to face with collaborators in the field they are exposed to underlying reasons and values that animate stakeholder perspectives on desired conditions. While not bound to undertake work that coheres with these values, exposure to the individuals and their arguments for certain qualities in restoration treatments has the potential to inform how agency treatments are undertaken. Moreover, stakeholders can obtain greater access through participation and can frame restoration work and provide immediate feedback on results.

Thus, although informal mechanisms of accountability do not alter the existing hierarchical accountability structure and mechanisms within the agency, the ability to engage in continual dialogue with agency personnel about appropriateness of actions in relation to different values allows stakeholders to better assess “the ability of government to actually deliver on promises” (Weber 2003). In collaborative accountability, the voices of stakeholders are heard from the outset, making agency personnel aware of stakeholder interests throughout the planning and implementation phases. In CFLRP, the agency is not accountable to collaborative groups through enforceable mechanisms. However, as agency staff and stakeholders work together to engage in multiparty monitoring, enhance treatments, and prioritize where and how to treat on the landscape, they have the potential to reinforce and acculturate each other to shared values associated with

restoration and set norms of engagement and expectations of results in the process. As such, accountability of the agency to stakeholder views has the potential to be strengthened in collaborative implementation.

Collaborative Implementation and Adaptive Management

One of the most promising aspects of collaborative implementation may be that it enhances the ability to contribute to adaptive management through the combined efforts of collaborative prioritization, treatments, and multiparty monitoring at multiple temporal and spatial scales (See Fig. 1). CFLRP proposals lay the foundation for implementation over a ten year time period and monitoring for 15 years. As collaborative groups move toward implementation, there are three interconnected feedback loops. The first is ongoing prioritization, which can determine where to undertake the next NEPA analysis or where to implement strategies on project areas within existing NEPA approvals. Collaborative input into ongoing prioritization allows stakeholder values, scientific information, and management experience to inform project planning and implementation within the landscape boundary. The second loop relates to implementation of strategies and priorities which can be shaped through training or augmented through cost-share or collaborative treatment work. These efforts have the potential to expand the pace and scale of restoration work while influencing strategies and tasks associated with future implementation actions as they unfold.

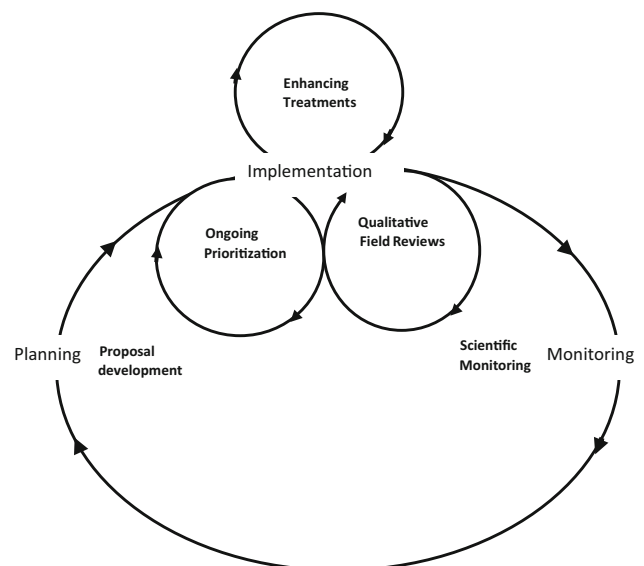


Fig. 1 Collaborative implementation and the adaptive management cycle

The third loop occurs with qualitative field reviews; these can provide immediate feedback to land managers who can alter their strategies within a sub-landscape project area or across areas with similar characteristics. This approach can help stakeholders and agency personnel further refine strategies based on changing conditions on the landscape and can build new understandings across stakeholder groups about the acceptability and effectiveness of treatments that can quickly inform future priorities and implementation strategies. Meanwhile, scientific monitoring approaches operate at a larger spatial scale and a longer-term time period and have the potential to provide data about restoration strategies that are more likely to affect the next landscape scale restoration proposal than strategies on the current CFLRP landscape.

In these ways, collaborative implementation offers the potential for feedback at multiple spatial and temporal scales. In many of the collaboratives, the same people and organizations are interacting in planning, implementation, and monitoring simultaneously which allows what is taking place in one phase to influence perspectives, understanding, and decisions in another phase. Given that stakeholders and agency staff are engaged in a long-term and iterative processes at the landscape scale, the potential for feedback is high over time and across space. Many of the CFLRP collaboratives have already experienced some level of feedback through qualitative field reviews which have led to discussions among agency staff and collaborators about altering prescription documents, adjusting training protocols, and trying new combinations of treatments on the landscape. This link is particularly strong where ongoing prioritization and field reviews are both practiced. While this feedback mechanism is largely informal, it may be one of the most responsive aspects of collaborative implementation that contributes to adaptive management across short time horizons shaping implementation strategies at the sub-landscape level.

Conclusions

This exploratory work aims to provide an assessment of how the idea of collaborative implementation works in practice, and set the stage for further research and refinement of theoretical claims we have proposed here. While the policy process is traditionally described as a cycle that starts with the planning phase, followed by implementation, and wrapped up with monitoring and evaluation, our findings indicate that collaborative implementation in landscape scale management blurs these lines. In general, CFLRP participants had the sense that they were contributing, albeit often indirectly, to implementation in three areas: prioritization, enhancing treatments, and/or

monitoring. Few landscape collaboratives are engaged in all of the practices and the extent to which duties were shared and partner input incorporated into the plans and actions of the agency varied across landscapes. However, participants in CFLRP provide a broad view of the range of activities that they perceive as influential to implementation of ecological restoration of public lands.

At the same time, CFLRP provides opportunities to overcome legal barriers and to strengthen both accountability and adaptive management. Although legal tensions pose challenges for collaboration during implementation in CFLRP, many stakeholders had the sense that the requirement to engage in “collaboration through implementation” has opened new possibilities for collaboration and input into public lands management. By changing the legal context for collaboration, CFLRP has enabled collaboration in implementation within a preexisting legal and organizational context that largely inhibited such activity. Engaging in collaborative implementation also has the potential to strengthen accountability to a broader range of stakeholder values and perspectives. Accountability becomes strengthened, in these cases, not through formal mechanisms of reporting and auditing, rather through informal and relational means based on collaboration and participatory process mechanisms (Ebrahim 2003; Romzek et al. 2012; Unerman and O’Dwyer 2006). Finally, collaborative implementation provides opportunities for stakeholders and agency personnel to engage in ongoing and continuous monitoring and feedback across multiple temporal and spatial scales. These opportunities for social learning have the potential to strengthen adaptive management within landscape boundaries in anticipation of the next treatment areas and in planning for the next landscape scale restoration projects.

CFLRP cases thus reveal ways in which collaborative implementation can open the door to a new conceptualization of the environmental management process that allows for feedback across time and space, strengthens accountability to multiple stakeholders, and fosters more robust approaches to adaptive management. These findings highlight the need for further examination of collaborative implementation in environmental management. Although stakeholders are finding ways to engage in the restoration process, the long-term effectiveness of collaborative implementation activities has yet to be established. Moreover, the complex and multiple layers of accountability deserves a more in-depth analysis to understand how new mechanisms interact with preexisting systems of accountability. Finally, while researchers articulate a normative argument for adaptive management, practitioners continue to struggle with how to operationalize it. It will be important to refine how collaborative implementation contributes to adaptive management in practice,

particularly as restoration efforts unfold over time. Ongoing work in environmental management to build theory of collaborative implementation will be relevant to both practitioners and scholars who seek to navigate this complex terrain in public lands management.

Acknowledgments This research was funded by the US Forest Service (USFS) Northern Research Station and further supported by a travel grant from The Nature Conservancy. The authors wish to thank the participants in this study whose time and thoughtful reflections were invaluable to this research. Also, we are grateful to three reviewers as well as Drs. Robert Deyle and Rachel Christensen whose insightful suggestions contributed significantly to improving the quality of this work.

References

- Ansell C, Gash A (2008) Collaborative governance in theory and practice. *J Public Adm Res Theory* 18(4):543–571
- Armitage D, Berkes F, Doubleday N (2007) Adaptive co-management: collaboration, learning and multi-level governance. UBC Press, Vancouver
- Berkes F (2002) Cross-scale institutional linkages: perspectives from the bottom up. In: Ostrom E, Dietz T, Dolsak N, Stern PC, Stovich S, Weber EU (eds) *The drama of the commons*. National Academy Press, Washington DC
- Brummel RF, Nelson KC, Souter SG, Jakes PJ, Williams DR (2010) Social learning in a policy-mandated collaboration: community wildfire protection planning in the eastern United States. *J Environ Plan Manage* 53(6):681–699
- Brunner RD, Steelman TA, Coe-Juell L, Crowley CM, Edwards CM, Tucker DW (2005) *Adaptive governance: integrating science, policy and decision making*. Columbia University Press, New York
- Bryson JM, Crosby BC, Stone MM (2006) The design and implementation of cross-sector collaborations: propositions from the literature. *Public Adm Rev* 66(Special Issue):44–55
- Butler WH (2013) Collaboration at arm's length: navigating agency engagement in landscape-scale ecological restoration collaborations. *J Forest* 111(6):395–403
- Cash DW, Adger WN, Berkes F, Garden P, Lebel L, Olsson P, Pritchard L, Young O (2006) Scale and cross-scale dynamics: governance and information in a multilevel world. *Ecol Soc* 11(2):8
- Charmaz K (2006) *Constructing grounded theory: a practical guide through qualitative analysis*. Sage Publications, Thousand Oaks
- Connelly DR, Zhang J, Faerman S (2008) The paradoxical nature of collaboration. In: Bingham LB, O'Leary R (eds) *Big ideas in collaborative public management*. M. E. Sharpe, Armonk
- Ebrahim A (2003) Accountability in practice: mechanisms for NGOs. *World Dev* 31(5):813–829
- Ebrahim A (2005) Accountability myopia: losing sight of organizational learning. *Nonprofit Volunt Sector Q* 34(1):56–87
- Fernandez-Gimenez ME, Ballard H, Sturtevant V (2008) Adaptive management and social learning in collaborative and community-based monitoring: a study of five community-based forestry organizations in the western USA. *Ecol Soc* 13(2). <http://www.ecologyandsociety.org/vol13/iss2/art4/>
- Flyvbjerg B (2001) *Making social science matter: why social inquiry fails and how it can succeed again*. Cambridge University Press, Cambridge
- Folke C, Hahn T, Olsson P, Norberg J (2005) Adaptive governance of social-ecological systems. *Annu Rev Environ Resour* 30:441–473
- Fung A, Wright EO (eds) (2003) *Deepening democracy: institutional innovations in empowered participatory governance*. Verso, London
- Goldsmith S, Eggers WD (2004) *Governing by network: the new shape of the public sector*. Brookings Institution Press, Washington, DC
- Goldstein BE, Butler WH, Hull RB (2010) The fire learning network: a promising conservation strategy for forestry. *J Forest* 108(3):121–125
- Gray B (1989) *Collaborating: finding common ground for multiparty problems*. Jossey-Bass Publishers, San Francisco
- Holling CS (1978) *Adaptive environmental assessment and management*. Wiley, New York
- Innes JE, Booher DE (1999) Consensus building and complex adaptive systems: a framework for evaluating collaborative planning. *J Am Plan Assoc* 65(4):412–423
- Innes JE, Booher DE (2010) *Planning with complexity: an introduction to collaborative rationality for public policy*. Routledge, New York
- Koontz TM, Steelman TA, Carmin J, Korfmacher KS, Moseley C, Thomas CW (2004) *Collaborative environmental management: what roles for government?*. Resources for the Future, Washington, DC
- Kraft ME (2004) *Environmental policy and politics*, 3rd edn. Pearson Longman, New York
- Layzer J (2008) *Natural experiments: ecosystem-based management and the environment*. MIT Press, Cambridge
- Lee KN (1993) *Compass and gyroscope: integrating science and politics for the environment*. Island Press, Washington, DC
- Lee KN (1999) Appraising adaptive management. *Conserv Ecol* 3(2). <http://www.ecologyandsociety.org/vol3/iss2/art3/>
- Margerum R (1999) Getting past yes: from capital creation to action. *J Am Plan Assoc* 65(2):181–192
- Margerum R (2011) *Beyond consensus: improving collaborative planning and management*. MIT Press, Cambridge
- Maxwell JA (1996) *Qualitative research design: an interactive approach*. Applied social research methods series, vol 41. Sage Publications, Thousand Oaks
- McGrory CK, Sousa DJ (2012) *American environmental policy: beyond gridlock*. MIT Press, Cambridge
- Olsson P, Folke C, Galaz V, Hahn T, Schultz L (2007) Enhancing the fit through adaptive co-management: creating and maintaining bridging functions for matching scales in the Kristianstads Vattenrike Biosphere Reserve, Sweden. *Ecol Soc* 12(1):28
- Pahl-Wostl C, Sendzimir J, Jeffrey P, Aerts J, Berkamp G, Cross K (2007) Managing change toward adaptive water management through social learning. *Ecol Soc* 12(2):30
- Pressman JL, Wildavsky A (1984) *Implementation: how great expectations in Washington are dashed in Oakland*. University of California Press, Berkeley
- Randolph J, Bauer M (1999) Improving environmental decision-making through collaborative methods. *Policy Stud Rev* 16(3/4):168–191
- Romzek B, LeRoux K, Blackmar J (2012) A preliminary theory of informal accountability among network organizational actors. *Public Adm Rev* 72(3):442–453
- Schultz CA, Jedd T, Beam RD (2012) The collaborative forest landscape restoration program: a history and overview of the first projects. *J Forest* 110(7):381–391
- Steelman TA (2010) *Implementing innovation: fostering enduring change in environmental and natural resource governance*. Georgetown University Press, Washington, DC

- Strauss A, Corbin J (1990) Basics of qualitative research: grounded theory procedures and techniques. Sage Publications, Newbury Park
- Tipple T, Wellman JD (1991) Herbert Kaufman's Forest ranger thirty years later: from simplicity and homogeneity to complexity and diversity. *Public Adm Rev* 51(5):421–428
- Unerman J, O'Dwyer B (2006) Theorising accountability for NGO advocacy. *Acc Audit Acc J* 19(3):349–376
- US House of Representatives (2003) Healthy Forest Restoration Act of 2003. Public Law 108-148 vol 117 Stat. 1887-1915, 108th Congress, First Session edn, United States of America
- US Forest Service (1992) Ecosystem management of the National Forests and Grasslands: Memorandum 1330-1. US Forest Service, Washington, DC
- US Forest Service (2011) Collaborative Forest Landscape Restoration Program, Submitting Proposals. US Forest Service. <http://www.fs.fed.us/restoration/CFLR/submittingproposals.shtml>. Accessed October 25 2011
- US Forest Service (2012) National Forest System Land Management Planning Rule. 36 CFR Part 219, vol RIN 0596-AD02
- Vaughn J, Cortner HJ (2005) George W. Bush's Healthy Forests: reframing the environmental debate. University Press of Colorado, Boulder
- Weber EP (1998) Pluralism by the rules: conflict and cooperation in environmental regulation. Georgetown University Press, Washington, DC
- Weber EP (2003) Bringing society back. In: Grassroots Ecosystem Management, Accountability, and Sustainable Communities. MIT Press, Cambridge, MA
- Wondolleck J, Yaffee SL (2000) Making collaboration work: lessons from innovation in natural resource management. Island Press, Washington, DC
- Wyborn C, Bixler RP (2013) Collaboration and nested environmental governance: scale dependency, scale framing, and cross-scale interactions in collaborative conservation. *J Environ Manage* 123:58–67