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Policy Design to Support Forest Restoration: The Value of Focused Investment and Collaboration

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Abstract: To address rapid change and complex environmental management challenges, governance approaches must support collective action across actors and jurisdictions, and planning at appropriate spatial extents to affect ecological processes. Recent changes in U.S. national forest policy incorporate new tools to facilitate collaborative landscape restoration, providing an opportunity to examine the relationship between policy design and governance change. Based on 151 interviews with agency personnel and partners, and a survey of 425 agency staff members, we investigated how two new policy approaches affected the governance of forest restoration and also looked at the other factors that most significantly affected policy implementation. Our findings reveal that, under these policies, multi-year funding commitments to specific landscapes, combined with requirements to work collaboratively, resulted in larger scales of planning, improved relationships, greater leveraged capacity, and numerous innovations compared to the past. A history of collaborative relationships, leadership, and agency capacity were the most significant variables that affected the implementation of policies designed to support collaborative landscape restoration. Our findings suggest that policies that provide focused investment to undertake landscape approaches to restoration, along with specific requirements for interagency and partner collaboration, are yielding positive results and may represent a new era in forest policy in the United States.

Keywords: policy design; scale mismatch; forest governance; collaborative governance

1. Introduction

A central question for policymakers, stakeholders, and governance scholars is how policy can be designed to support governance approaches that better match the spatial extent of management efforts with ecological processes and promote collective action and coordination across jurisdictions [1–3]. Recent policy changes to support U.S. national forest restoration provide an opportunity to study this question [3]. Since the 1990s, community-based forestry groups have organized to work in collaboration with the Forest Service to define management goals and plan activities, with a growing emphasis on the principles of restoration and resilience [4,5]. Despite changes over the last several decades in the goals of forest management and growing participation of collaborative stakeholder groups in planning efforts, until recently, there has been little change to the formal institutions that define roles for collaborators, drive project design, or prioritize investments in planning and project implementation. By contrast, in recent years, the Forest Service and its partners have implemented activities under two new programs, the Collaborative Forest Landscape Restoration Program and the Joint Chiefs Landscape Restoration Partnership. Both programs involved new policy tools to support

collaborative restoration activities across jurisdictions and at larger spatial extents [3]. In this paper, we report on findings from our 2017 investigation of both programs [6]. Our central research objective was to understand how policy changes affected the governance of forest restoration.

1.1. Policy Design for Collaborative and Landscape Approaches in Governance

In an era of rapid ecological change and increasing management complexity, policies should facilitate governance approaches that are flexible enough to operate at a variety of spatial extents to address the complex and changing dynamics in complex social–ecological systems [7]. In particular, scholars point to the need to address scalar mismatches (i.e., situations where management actions are planned and implemented at spatial extents that are poorly aligned with the spatial extents of ecological processes of interest) [8–11]. Planning across large spatial extents requires collective action among state and non-state actors. Collective action to manage large resource systems, such as forests, is challenging given their size, their complicated boundaries, and the difficulty associated with understanding and monitoring changing conditions [12]. Nonetheless, it is critical for groups of actors to work together in order to address ecological processes and conditions across jurisdictional boundaries, leverage diverse capacities and resources, and, particularly in the United States, build agreement among actors in a system with a high degree of adversarial legalism and numerous veto points [13,14]. Addressing today's challenges also requires partnerships to allow agencies to leverage capacity, gain a greater understanding of ecological dynamics at different spatial and temporal levels, and to facilitate improved communication among scientists, managers, and stakeholders [15–17]. The social–ecological systems governance literature also emphasizes the criticality of monitoring and adaptive management to embrace uncertainty, complexity, and change in environmental management [7,18]. In addition, actors must learn to improve environmental governance approaches over time to find better strategies for communication, conflict resolution, problem identification, and coordination [19].

There is ample need to explore empirically how to design policy tools in specific legal and administrative contexts that can promote and support these many aspects of improved governance [1,2,20]. Some general principles exist to guide policy design. Given the need for scale and contextual flexibility, legal authorities should create enabling conditions, with guidance about desired strategies and outcomes, but flexibility to tailor approaches to local contexts [21]. This confers a degree of reflexivity to respond to conditions that require locally tailored activities, partnerships, or scales of action. The scholarship also indicates that policies that support participatory decision-making on landscapes with well-defined boundaries are more likely to facilitate collective action [2,22]. In co-management contexts, where non-state actors are participating in some degree of power sharing with state-run agencies, bridging organizations or forums (i.e., actors or forums that bring together multiple parties that have different skills and knowledge) support collective action, as do collaborative monitoring and effective leadership [23]. Policy also must give actors tangible support, such as funding or technical resources, provide actors with authority to make decisions, and include legal sunsets that support revaluation and iterative policy improvement [2].

As policies with these characteristics are implemented with the intention of improving governance, a research imperative is to empirically assess whether realized improvements result from policy design [24]. One way to do this is to look for correlations between policy design and implementation results, ideally across multiple sites and while accounting for other possible explanatory factors; this is our approach in this paper. Improved governance approaches ultimately should lead to better land management outcomes, such as improved wildlife habitat or restoration of natural processes. Although measuring ecological outcomes was not the purpose of this research, we measured perceptions of improved governance approaches that are thought to lead to improved outcomes on the ground. In the context of collaborative landscape restoration, we looked for evidence of improved collaborative structures and processes and whether these laid a foundation for collective action to support work across jurisdictional boundaries and at spatial extents better aligned with ecological processes of interest. We also looked for "second-order" effects, where trust and collaborative relationships

extend into arenas beyond the original venue of play [25]. Other "second-order" effects include the development of innovative practices, particularly if this occurs through a process of collective learning [26].

1.2. The Ecological Context of Forest Restoration in the United States

The two programs that are the subject of this paper, and which we discuss in detail below, focused on restoration of forest ecosystems, a topic on which we provide some background here to give context for the policies that were the subject of this research [3]. Restoration of most forested ecosystems in the Western United States, where the majority of U.S. public forestland is situated, depends on fire as a key ecological process [27,28]. Although fire in the United States poses a growing risk to ecosystems and communities, because of its natural ecological role, scientists, stakeholders, and policymakers agree there is a need to "live with more fire" [29,30]. As a result of over a century of fire exclusion, some forest types may benefit from restoration activities [31–33]. Restoration activities often involve the reduction of woody biomass (sometimes referred to as mechanical thinning), so that both wildland and prescribed fire, subsequently applied, will pose less risk to resource values and the safety of fire personnel and nearby communities. Where the goal is to influence fire behavior and reduce a fire hazard, efforts must be coordinated across landscapes because of the spatial extent of natural fire events and the contiguity of fuels that drive fire behavior [34]. In addition, to protect communities and reduce suppression costs, policymakers have directed that a significant amount of fuels reduction or "treatment" must occur near the wildland–urban interface (WUI), where private lands intermix with public forestlands; fuels treatments to date have focused less on the WUI than policy directs, necessitating a greater emphasis on reducing fuels near the WUI, particularly on private lands [35].

While fuels reduction emphasizes reducing fuel loads, integrated (i.e., multi-resource) restoration treatments also focus on restoring natural vegetation structure and composition. Both of the policy approaches we discuss in this paper also involved work to restore desired conditions for wildlife and watersheds, which are both broader goals for the U.S. Forest Service, which oversees the National Forest System. National forest management today is oriented around restoring ecological integrity, which is the guiding framework in the regulations that interpret and implement the National Forest Management Act of 1976 (NFMA) (see 36 CFR 219 et seq.). Ecological integrity emphasizes the restoration of natural processes that drive the structure and composition of ecosystems and the conservation of native biodiversity [5]. The current NFMA regulations include specific requirements to protect native biodiversity on national forests, including approximately 3500 at-risk species [36,37]. In addition, protecting watershed conditions, including from the risk of fire and its effects, plays a central role in planning (see, e.g., the focus on watersheds in sections of the NFMA regulations at 36 CFR 219.6 and 219.8) [38].

1.3. The Social and Political Context of Forest Restoration in the United States

Several important trends define the current social and political landscape for accomplishing U.S. forest restoration. First and foremost is the fact that the Forest Service has faced a dramatic decline in resources and capacity. Since the turn of the 21st century, fire suppression has consumed a greater proportion of the agency's budget; by the end of this decade, projections are that suppression activities will consume over 60% of agency appropriations, although recent appropriations legislation promises to stabilize and decrease this number over the next decade [39]. This has resulted in a concomitant decline in personnel working in land management and less resources to do everything else the agency is supposed to do besides fire management [40]. Adding to this dynamic is the fact that U.S. public policy is increasingly emphasizing the importance of private actors and resources to support land management, with less funding for and emphasis on the role of federal actors working in isolation [16,41]. Additionally, since the 1990s, in the face of a decline in trust in the Forest Service and extensive conflict, community-based stakeholders have demanded a greater voice in forest management and increasingly have worked to carve out space for participation [4,42]. Stakeholders

seek involvement in forest management and also bring capacity and resources; collaboratively forged social agreements also can allow the Forest Service to proceed with greater certainty that their projects will not be challenged via legal and administrative avenues. Finally, while the annual extent of fire is on an upward trend, since the early 1990s, timber production has been a tenth of what it was prior to that time [43]. This has meant a loss of industry partners in most places, and those that remain have had to reorient their business approaches to support the use of lower-value wood products [44].

In the face of these variables and particularly in light of fire risk, for about the last decade, the U.S. Forest Service has focused on the need to accelerate the pace of restoration and to work at "landscape scales"; Forest Service policy documents highlight the attendant importance of collaboration with stakeholders, partnership across jurisdictional boundaries, and effective engagement of industry in order to offset the costs of restoration through utilization of wood byproducts [3,45]. In this context, "landscape" is a boundary concept, in that its meaning is both disparate and cohesive enough to bring together multiple communities around a general idea to improve planning across multiple jurisdictions and resource areas [46]. In forest management, the notion of "landscape-scale" work boils down to putting individual treatments into a broader spatial context to have a greater likelihood of affecting resources and processes of interest. In essence, national forest management today, and restoration work in particular, requires collaboration with stakeholders who desire a greater role in management, leveraging non-state resources, reckoning with the face that industry capacity has declined, which can make work difficult and expensive to accomplish, and planning at landscape scales.

The U.S. Congress and U.S. Forest Service have implemented several policy changes to achieve the goals of collaborative landscape restoration. Whereas prioritization of investments has not been a transparent or obviously prevalent activity in forest management in the past, recent changes to policies and budget allocations have encouraged the Forest Service to prioritize its efforts around fire risk reduction. Prior efforts included the Healthy Forests Initiative and Healthy Forests Restoration Act of 2003 (HFRA), which both emphasized planning and implementation of fuel reduction projects around communities, reduced requirements for environmental review, and community planning for wildfire; however, the Government Accountability Office [47] found that the HFRA was of limited efficacy, and in congressional hearings, Senators stressed the importance of doing more to prioritize investments and treatment locations to improve the efficacy of fuels reduction approaches [48]. Meanwhile, over the last 20 years, community-based forestry groups have organized into coalitions and advisory committees to discuss common policy goals and challenges [49,50]. Some noted that restoration would require the following: novel planning and implementation approaches to increase the pace and scale of restoration activities; more flexible and stable funding streams to support prioritization and integration of multiple types of restoration activities; and a greater role for collaborative partners both to leverage collective capacity and agreement and to maintain accountability to collaboratively forged agreements [49,51,52]. These needs set the stage for the next iteration of policy tools to support collaborative landscape restoration.

1.4. Background on the CFLRP and Joint Chiefs Partnership

In response to pressure from community-based groups to improve policy to support the goals of collaborative landscape restoration, in 2009 the Congress established the Collaborative Forest Landscape Restoration Program (CFLRP, P.L. 111-11). Traditionally, the Forest Service made its funding decisions internally, without explicit processes to involve stakeholders in either setting priorities or co-designing projects. By contrast, the CFLRP allocated funding through a competitive process to landscape restoration projects proposed jointly by the Forest Service and a group of collaborators on National Forest System lands. The law required projects to develop a 10-year landscape strategy to support a program of work on areas larger than 50,000 acres and characterize the ecological need, social agreement, and economic opportunities associated with forest restoration byproducts that made the landscape a priority for investment. While the Forest Service may have had in place internally some tools to support larger-scale planning and prioritization, there had never before

been laws that unambiguously required it to provide an explicit, multi-faceted justification for priority investments or that included minimal spatial requirements for project planning. The law also required collaborators to be involved in planning, implementation, and monitoring of projects that received funding based on a landscape strategy; this was the first program that gave collaborators any formal role in national forest management beyond traditional public-notice-and-comment procedures and also was unique in emphasizing collaboration beyond the planning phase of project design. The CFLRP appropriation was flexible in that it could be used for multiple restoration activities, including monitoring, rather than being tied to specific resource budget line-items, as was the usual approach. Multi-party monitoring was a requirement of the law as well, and the personnel on selected projects were supposed to demonstrate the extent to which they were able to engage industry partners to offset restoration treatment costs. The 10 projects funded in 2010 received a 10-year funding commitment, and 13 additional projects were funded in 2012 with an 8-year funding commitment; these commitments depended on annual renewal of appropriations from the Congress, which were forthcoming. These 23 CFLRP projects across the United States varied in size from ~100,000 to over 2 million acres, with unique collaborative histories and different local ecological conditions; per the policy's requirements, all were in fire-adapted landscapes, with the goal of reintroducing natural fire and reducing the risk of fire to valued resources. The novel aspects of the CFLRP were: the emphasis on competitive selection, prioritization, collaboration, and monitoring; the 10-year, flexible funding commitment; and the requirements for a landscape strategy and collaborative involvement from the proposal stage throughout the life of projects.

The Joint Chiefs Landscape Restoration Partnership, established in 2014, was a multi-year partnership between two agencies in the U.S. Department of Agriculture, the Forest Service and the Natural Resource Conservation Service (NRCS), the latter of which assists private agricultural landowners through a variety of programs and funding mechanisms. The Joint Chiefs Partnership was an internal initiative by these two agencies to encourage interagency and community collaboration to meet restoration goals where public forests and grasslands connect to privately owned lands. The primary land management objectives of the program were to reduce wildfire threats to communities and landowners, protect water quality and supply, and improve habitat quality for at-risk or ecosystem surrogate species. It provided up to 3 years of funding for projects identified through a competitive process managed internally by the NRCS and Forest Service. As of 2018, 55 projects had been funded, beginning with 13 projects in 2014 and 15 projects in 2015. This too was a new and novel program in its partnership approach, multi-year funding investment, and competitive, internal process for funding a select set of collaboratively designed and implemented projects.

These two policies had in common a requirement to work at larger, more cohesive spatial extents, multi-year funding investments, a process to prioritize where investments would be allocated, and an emphasis on collaboration; in this way, they represented a new type of policy tool. The CFLRP specifically required a landscape strategy and included a mandate to plan over a minimum of 50,000 acres. The Joint Chiefs Partnership required work across multiple agencies and jurisdictions also with an emphasis on working in a contiguous landscape of intermixed public and private lands. Both policies embraced a number of the legal design principles outlined above, including mandates for collaboration, tangible support for policy implementation in the form of funding investments, and a balance of broad principles and institutional support around program goals, with space for local flexibility in the design of collaborative arrangement and projects at the local level. The CFLRP, established by Congress, also had a legal sunset after 10 years, while the Joint Chiefs Partnership, established by the agencies, could be stopped at any time by either of the involved federal agencies. Other differences between the programs included the following: the CFLRP involved 8 or 10-year investments, compared to the Joint Chiefs' 3-year investment; the CFLRP had an emphasis on restoring natural fire across larger landscapes, whereas the Joint Chiefs' was more focused on reducing fire risk in the WUI; the CFLRP funded work on public, National Forest System lands only, whereas the Joint

Chiefs' funded work on both public and private lands; and the CFLRP had a greater emphasis on engaging industry partners to offset the costs of large-scale restoration efforts.

1.5. Summary and Research Questions

As we noted at the outset, a foremost question in the environmental governance literature is how to promote collective action and improve the fit of management actions with the scale of ecological processes, and specifically how to do this in particular legal and administrative contexts. New policies in forest management have been developed by federal agencies and community-based stakeholders to support collaborative landscape restoration. Our primary objective for this paper was to assess whether the two forest restoration policies we investigated, which both incorporated legal design principles thought to support improved governance and were similar as policy tools in aspects of their design, led to observable changes in governance approaches. While we have written about these policies separately, there is value in looking at results for both policies and all elements of our data collection to consider emergent themes around governance change in response to policy design. For this paper, we asked two research questions: (1) What were the effects of policy changes for forest restoration efforts? (2) What variables, aside from policy design, most affected project success under these policies? We asked this second question both to provide a broader understanding of the institutional context of U.S. forest governance and also as part of our effort to disentangle the effects of policy from the effects of local conditions or other institutional drivers.

2. Materials and Methods

Our objective was to obtain a program-wide perspective on both the CFLRP and Joint Chiefs Partnership through interviews and a survey; we did not conduct case studies of projects. Our data collection took place in the Summer of 2017. We entered into a challenge cost-share agreement with the U.S. Forest Service's national office to conduct an independent review of these two restoration programs, precisely because they had design aspects in common. Working with the Forest Service provided us with the capacity to discuss with agency program leaders key information needs, have agency support in encouraging staff at lower organizational levels to participate in our research, and gain access to leadership in order to share findings after project completion to inform future approaches. We controlled the details of our research questions and methods, and we maintained full editorial control over all products. We kept confidential the identities of all of our respondents.

2.1. Interview Methods

For our interviews, we sought to reach information saturation with regard to our research questions for the programs as a whole. For the CFLRP, we conducted a total of 89 semi-structured interviews, including 42 internal agency staff and 47 external collaborators associated with all 23 CFLRP projects across the United States. Interviews were conducted in person or by phone and were approximately 60–90 min in length. We aimed to interview two internal agency staff and two external collaborators per project to obtain diverse perspectives. We began with individuals who were in a leadership role for projects (e.g., stakeholder group or Forest Service project coordinator), and triangulated based on these individuals' suggestions to identify additional interviewees. We specifically requested recommendations for interviewees who could speak to multiple stakeholder perspectives, were still involved in projects, and would be knowledgeable about a project's history. External interview participants included individuals that were not part of the federal agencies, had participated consistently in the CFLRP project, and represented groups that had active roles in the project for an extended period of time. Examples of external collaborators contacted and interviewed included national or regional environmental groups and other non-governmental organizations (NGOs), timber industry representatives and local contractors, and community and municipal groups, such as county commissioners, with multiple participants from across these major groups in our sample. Some individuals did not respond to email or phone requests; we recognized that some people

had been interviewed previously for other research projects, so we limited our attempts to contact people. Everyone interviewed was on a funded project. A potential bias is that we may not have spoken to those least satisfied with the program if this was a reason for their non-response or non-participation in projects. The interview guide included questions regarding what facilitated success on projects, the value of the CFLRP, challenges and barriers to success on projects, and what participants would like to see changed if the program were to continue. Each series of questions additionally had probing questions to allow participants to fully develop their ideas and perceptions [53].

For the Joint Chiefs projects, we utilized similar methods, interviewing participants from 17 projects sampled from the 28 that were awarded funding in 2014 and 2015. We focused on 2014 and 2015 projects because these would have more time on the ground to identify lessons learned. Sampled projects were selected for regional diversity and included eight from fiscal year 2014 and nine from fiscal year 2015. We conducted semi-structured interviews with individuals on these projects, including, at a minimum, one Forest Service staff member, one NRCS staff member, and one external stakeholder from each project. We completed 62 interviews, including 21 with Forest Service staff, 19 with NRCS staff, and 22 with external partners, across the 17 projects. The interview guide for the Joint Chiefs projects was similar, with a few additional questions tailored to the two agencies involved and cross-boundary context.

All interviews were recorded, transcribed, and analyzed through coding in Dedoose, an online platform for qualitative research. Codes are essentially labels that can be attached to excerpts of texts, which then can be viewed as a group for each code [54]. We used codes to organize our data and identify emergent themes, including successes, challenges and barriers, future recommendations, and innovations [53,55]. A common coding guide was developed through dialogue among the researchers. Each researcher then coded several interviews, after which the team reviewed codes and associated excerpts. This allowed the research team to reconcile any issues regarding coding disparity and develop a common standard of code application. We examined excerpts for individual codes, writing a memo for each code, which provided an analytical step for looking at all comments on a topic together at once. We also wrote memos on each project to consolidate findings for groups of interviewees working in the same landscape. Our team met throughout the project to discuss emergent findings across data and programs, refine coding and memoing strategies, and dialogue about major findings and possible explanations.

2.2. Survey Methods

We conducted a survey of agency personnel that were working on funded projects under both programs. Because of federal regulatory requirements that require approval before surveying members of the public with federal research funding, something that often takes multiple years to gain, we were not able to survey people outside of the federal agencies on the timeframe of our evaluation. Our target population included any staff members and line officers with active involvement with a CFLRP or Joint Chiefs project. With the help of our Forest Service and Natural Resource Conservation Service contacts in the national offices, we identified project leads for all of the CFLRP and Joint Chiefs projects. We sent a request to these individuals for the names of all involved personnel with all CFLRP projects (n = 23), and all Joint Chiefs projects awarded in fiscal year (FY) 2014 and 2015 (n = 28). We omitted FY 2016 and 2017 Joint Chiefs projects, because they had only been active for at most about a year and a half. Twenty-two of the 23 CFLRP projects and 27 of the 28 Joint Chiefs Landscape Restoration Partnership (JCLRP) projects responded to our request for survey participants. Contacts included line officers and staff members from a wide range of disciplines or departments. The final identified population size was 331 people for the CFLRP survey and 296 people for the JCLRP survey. Our results reflect the bias inherent in the fact that only some projects responded to our inquiry and that project coordinators may not have included all relevant personnel in their responses. Throughout our results, it is important to recognize that survey participants only included agency staff members who were at the time of our survey working on projects that had been awarded funding. We recognize that

personnel in decision-making roles on these projects may have incentives to report success, particularly to agency leadership. However, we have reason to believe that in a confidential data collection effort by a third party, people involved with projects would express dissatisfaction were it present; this was the case in a similar study we completed in 2015 on a separate program, where many internal agency personnel expressed dissatisfaction [56]. We also believe respondents were likely to report suboptimal outcomes to us in order to facilitate our role in helping the agency improve policy approaches. In our CFLRP sample, 53 individuals were decision-makers in the agency and an additional 74 of our 226 total respondents were project coordinators. Roles for the Joint Chiefs Partnership were more difficult to determine. The rest of the respondents were other staff members with no obvious reasons for positive reporting bias.

We emailed the entire population that we identified in late June 2017 to inform them of our study and invite them to participate in the online questionnaire hosted by Qualtrics through the University of Oregon. A total of three reminder emails were sent to contacts, and the survey was closed the first week of August 2017. Overall, 229 people completed the CFLRP survey (69% response rate), and 196 people completed the JCLRP survey (66% response rate). One of the questions in the beginning of the questionnaire asked respondents to describe their level of knowledge associated with the specific project, and individuals who said they did not have enough knowledge to respond (six of the CFLRP respondents, and 25 of the Joint Chiefs respondents) then were released from the survey. Given the small number of participants from any Forest Service region or particular project, we did not draw conclusions about variation in responses across these variables.

The questionnaires for CFLRP and JCLRP projects were nearly identical, with a few minor differences to reflect different participants (i.e., NRCS staff in the case of JCLRP). There were four main sections in the questionnaire: (1) background information about the respondent; (2) background information about the project; (3) factors that supported or hindered project success; and (4) respondents' perspectives about their project and the program overall. Some responses were on a five-point, Likert-type scale, while other responses were ordinal and included pertinent categories from which to choose. In addition to the questions with predetermined response options, each section included several opportunities for respondents to type in open-ended comments.

After cleaning the data of any entry mistakes, we examined descriptive information for each questionnaire item. This generally included generating frequencies (% of respondents). Mean comparisons were conducted for scale variables across subpopulations (e.g., line officer versus non-line officer, Forest Service versus NRCS employees) using independent sample t-tests; nonparametric tests (Mann–Whitney U test and Kruskal–Wallis test) were conducted for comparing frequency counts across subpopulations for ordinal variables. Two-tailed probability tests with $p < 0.05$ (i.e., 95% confidence that the results are not due to random chance) were used to determine statistically significant differences between subpopulations. However, differences across populations were rare and not revealing. We also reviewed open-ended comments throughout the survey and used them to augment our interpretation of other questionnaire responses.

3. Results

We consider here in tandem the primary effects we observed across multiple projects conferred by the two policies of interest. Because our data are extensive, we summarize some of our findings that are provided in greater detail elsewhere [6]. In this section, we first consider the common results interviewees attributed to both approaches. We then discuss our findings on factors that affected project success across both programs.

3.1. Benefits Realized under the CFLRP and Joint Chiefs Approaches

A major policy goal to was to improve planning across land management units and jurisdictions. Our findings revealed improvements in terms of planning at larger scales, across jurisdictions, and across resource areas. Among staff working on CFLRP projects, when asked to compare to

what they would have been able to do prior to receiving CFLRP funding, 86% agreed that they were engaging in restoration at landscape scales more than in the past, 82% agreed that they had accelerated restoration activities (i.e., were doing more work per unit of time), and 71% agreed that they had increased integration of multiple resource areas (Figure 1). Interviewees on the majority projects also said that the CFLRP resulted in an increase in both the pace and scale of restoration and led to improved integration of restoration activities. Similarly, on the Joint Chiefs projects, 82% of survey respondents said as a result of the program they were engaging in landscape-scale restoration more than in the past (Figure 1), and 81% said they were accomplishing more work on state and private lands compared to the past (Figure 2; note that working on state and private lands was not a goal of the CFLRP, but using federal dollars to conduct work across federal, state, and private lands was a goal of the Joint Chiefs'). One federal employee working on a Joint Chiefs project explained the value of this, commenting, "To me the biggest value-added with this is working across borders. We can do what we can do on Forest Service land, but if there's not additional treatment done on private land, it's kind of a moot point. The forest doesn't stop at an arbitrary political boundary" (#5-JC).

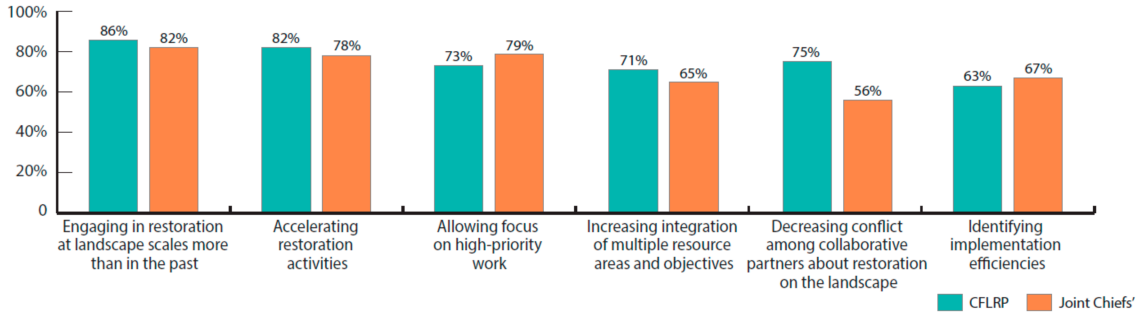

Figure 1. Percent of respondents who agreed or strongly agreed that the Collaborative Forest Landscape Restoration Program (CFLRP) or Joint Chiefs' helped them achieve accomplishments in different areas. Note: The items in the figures were the ones selected by the most participants and do not include all items included in the respective sections of the questionnaire.

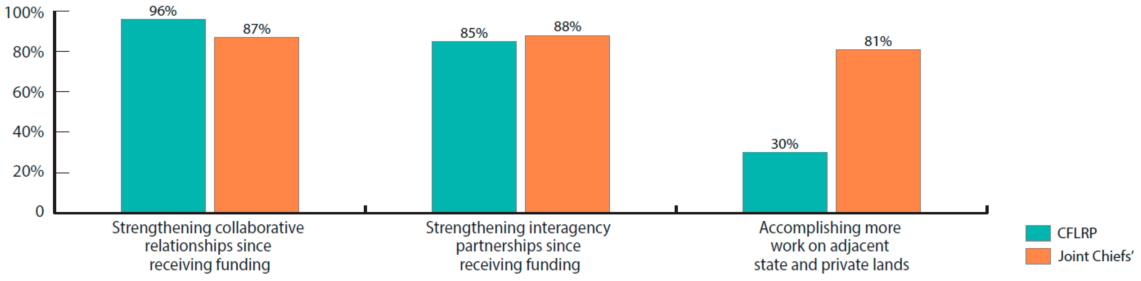

Figure 2. Percent of respondents who indicated they were moderately or very successful in making progress on different goals. Note: The items in the figures were the ones selected by the most participants and do not include all items included in the respective sections of the questionnaire.

Another aim of these policies was to support improved collaboration both to reduce conflict and increase capacity. Our findings indicate that both programs supported improved collaboration. In our survey, the most common success reported under the CFLRP was the strengthening of collaborative relationships, with over 95% of surveyed staff saying they had at least moderate levels of success in this area (Figure 2). Non-agency interviewees often said the CFLRP legitimized collaboration and that their relationships allowed them to hold the agency accountable and improve the quality of discussion about restoration approaches. Among Joint Chiefs respondents, 88% said they had strengthened interagency partnerships, and 87% said they had strengthened collaborative relationships with stakeholders (Figure 2). Majorities of survey respondents also reported reduced conflict under both programs

(Figure 1). Given the interagency focus of the Joint Chiefs Partnership, improved relationships with NRCS were reported as a major goal and area of improvement. One forest supervisor said, "One of the goals we had was to reach out to NRCS specifically and strengthen our partnership with them. Because of the nature of the treatments and the land ownership patterns with federal land and private and other lands, the NRCS was a natural partner" (#43-JC). A majority of interviewees reported an increase in understanding between the Forest Service and NRCS, and interviewees on a majority of projects also indicated that they had developed better community relationships with partners and landowners, often with partners acting in a bridging role, thus mitigating negative perceptions of the federal agencies and building trust in the community. As one Forest Service staff member said, when talking about a community-based organization, "People trust them more than they trust us . . . . They consider [them] to be an incredibly valuable source of information, and they have a lot of trust that if [they are] supporting the work we're doing from an ecological perspective. They'll believe that more than they'll necessarily hear us when we're talking." (#15-JC).

Another theme regarding the value that arose from these programs was around innovations. CFLRP survey respondents reported innovations (we did not define this term in the survey) in multiple areas, with, for example, 77% reporting finding successful innovations in engaging with community members and stakeholders, 58% reporting successful innovations in leveraging funding, and 57% finding successful innovations in landscape-scale planning (Figure 3). Interviewees suggested innovations would be used after the CFLRP and outside the original project footprint, indicating some second-order effects of the collaborative capacity built under the CFLRP. One interviewee noted that, when discussing a separate project, "The local stakeholders were asking the Forest to basically model the CFLRP type of process. There's definitely been spillover there that's been helpful" (#3-CFLRP). For both programs, we also commonly heard that collaborators used innovative strategies to communicate with the broader public. Many external interviewees pointed to monitoring as an area of innovation and learning, although most said it was too early to tell whether new approaches would be successful. Similarly, 61% of Joint Chiefs respondents reported identifying successful innovations in engaging with community members and stakeholders (Figure 3). About two-thirds of our survey respondents said they had identified implementation efficiencies on the Joint Chiefs projects, with about half saying they had found innovations in accelerating restoration and identifying planning efficiencies (Figure 3). In addition, several Joint Chiefs interviewees said working collaboratively on a landscape approach caused a shift in the way partners and agencies conceptualized land management and their collective roles. One NRCS State Conservationist explained this, saying, "We've really begun to look at a larger scale of project work. In the past, NRCS has really just focused on private lands. We've kind of been doing our own thing, but now we cooperatively work with the Forest Service and have certainly a better understanding of what they do and what we do, and I think the strength is certainly in building partnerships with all the federal and local agencies" (#9-JC).

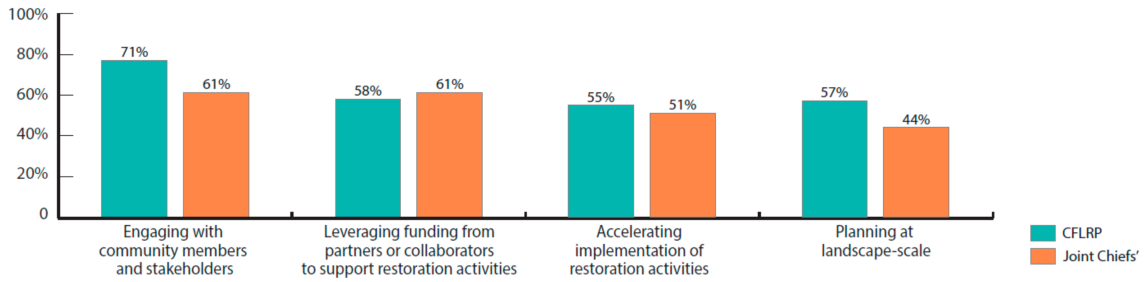

Figure 3. Percent of respondents who identified successful innovations in different areas since receiving CFLRP or Joint Chiefs' funding. Note: The items in the figures were the ones selected by the most participants and do not include all items included in the respective sections of the questionnaire.

When we asked what it was about these policy approaches that was valuable, what emerged as most important, when we consider our survey and interview data in tandem, was multi-year, focused investment via a budget line-item that could be used for multiple types of activities. In our survey, 96% of survey respondents reported the 10-year commitment of funding as the most valuable aspect of the CFLRP (Figure 4). Additionally, 94% and 92% of survey respondents respectively reported that the flexible funding and requirements to work collaboratively were valuable (Figure 4). For Joint Chiefs projects, respondents ranked the multi-year funding commitment and requirements to work collaboratively as the most important aspects of the program, followed closely by the emphasis on public–private partnerships, with 90% of respondents saying the 3-year commitment was valuable, followed by 88% rating both the public–private partnership emphasis and the flexibility of the funding as valuable (Figure 4). Both agency and partner interviewees also pointed to the funding flexibility for the CFLRP as being beneficial, particularly because it supported collaborative monitoring. One agency staff member explained, "The ecological monitoring or the landscape monitoring that's funded through CFLRP has been invaluable, in my opinion. I think for our particular collaborative, that's what brought a lot of trust in .... I think that that was one of the biggest successes, and if this does continue, [we need to] make sure we maintain that monitoring." (#8-CFLRP). Approximately 60% of agency respondents said that the CFLRP helped them leverage more funds, identify efficiencies, and work more effectively with other agencies (Figure 3). Seventy-five percent of Joint Chiefs survey respondents said that because of the Partnership, they had leveraged more funds from partners, other agencies, or stakeholders (Figure 3).

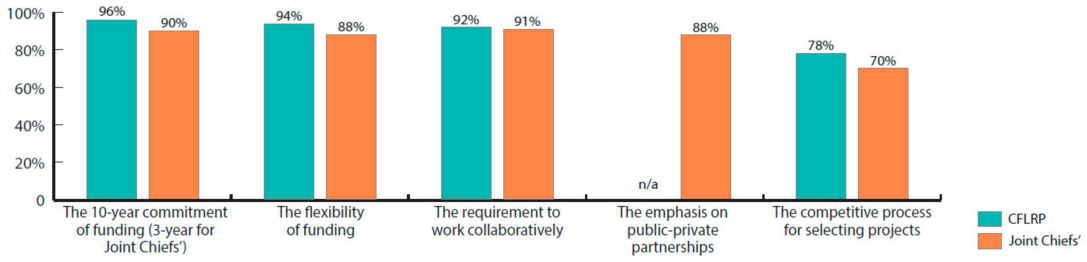

Figure 4. Percent of respondents who rated program aspects as somewhat or very valuable. Note: The items in the figures were the ones selected by the most participants and do not include all items included in the respective sections of the questionnaire.

Interviewees on multiple projects for both policy approaches emphasized that a commitment of multiple years of funding to a specific place and group of partners supported collective action, leveraged capacity, and supported innovation; this was a common theme among both agency and stakeholder respondents. An NRCS interviewee said, "We wanted to operate on a scale that was large enough to make a demonstrable difference throughout the landscape, and to do that takes big funding. This enabled us to ramp it up, increase the pace and scale, and begin to connect some of the dots. [T]hose people that historically weren't interested in participating, once they saw the scope and the scale that we were operating in, they were willing to participate" (#13-JC). For the Joint Chiefs Partnership, interviewees across all projects indicated, to some extent, that increased funding and commitment to cross-boundary work incentivized partner and landowner participation. One person explained in their survey comments, "[The Joint Chiefs Partnership] facilitated greater engagement across partners leading to efficiencies and expanded work." Over half of the CFLRP interviewees also said that the landscape focus and collaborative involvement over multiple years gave their projects the social license to experiment with larger NEPA documents that encompassed more types of restoration work. As one person explained, "With the collaborative group's help, we've gained a tremendous amount of social license to expand our projects to encompass larger areas and take away some of the risk" (#5-CFLRP).

We also looked for areas for policy improvement. Ninety-one percent of our survey respondents said they thought the CFLRP should continue, and 84% of Joint Chiefs respondents said the Partnership

should continue. All interviewees suggested that both approaches should remain in place. Suggestions for changes involved the need to build and maintain capacity, leadership, and facilitation throughout the life of projects. Some suggested more flexible options for using allocated funds. One CFLRP external stakeholder suggested, "I think [CFLRP] should be amended to allow for the funds to be used to facilitate collaboration, which currently isn't allowed for . . . . I think that there is a conversation to be had about whether the funds should be allowed for planning, which they currently [do not allow] for, but I think that's worth talking about" (#44-CFLRP). Participants on several projects suggested ways that proposal evaluation processes could be improved to select for projects most likely to be successful or to identify potential challenges that might require extra support from the agency.

Another reported issue was that prioritized investments create "winners and losers" on forests. Some interviewees suggested that investments be directed to a broader suite of restoration activities, and many interviewees discussed a need for seed money for other locations to build collaboration and plan projects to be competitive for these types of programs. Our survey results indicate that these programs had negative effects on other programs on the same forest or other forests. About a third of people surveyed said the CFLRP led to too much emphasis on funded work at the expense of other important work and created unsustainable expectations with partners. About a fifth said the CFLRP negatively affected other forests in their regions. Likewise, about 10% of Joint Chiefs survey respondents said the Partnership negatively affected other programs and forests.

Finally, our primary focus for this paper is on whether these policy approaches led to improved collective action and planning across contiguous landscapes. Although we leave additional details to our larger report [6], it is worth noting that for the CFLRP, strong majorities in our survey reported success at achieving the land management objectives under the program. In fact, when considering the primary goals of the CFLRP, the exception among areas of reported success was the program's efficacy in supporting wood products contractors and reducing treatment costs; for these items, reports of success were less common, something which we discuss more below. Similarly, for the Joint Chiefs' program, majorities reported success at achieving the major land management objectives of the program. However, almost all projects across both programs reported problems specifically with accomplishing prescribed fire, where this was a project goal, citing numerous barriers to implementation, something that is a problem beyond these two programs [57]. Additionally, almost all (87%) CFLRP questionnaire respondents, and about half (49%) of Joint Chiefs questionnaire respondents, said that they would not be able to maintain treatments in the future without additional investments. Some lamented the impending loss of funding, which would result in both an inability to maintain treatments and a loss of built collaborative capacity. Many respondents said they would continue to seek funding and working together. However, one external partner on a Joint Chiefs project explained, "All of this happened because of a funding source, and if the funding source goes away, then the motivation for maintaining partnerships is lessened" (#51-JC).

3.2. Common Factors That Facilitated or Impeded Success

We wanted to understand what factors affected success in order to disentangle policy effects from other variables. Here, we discuss the major themes that emerged across our data collection for both programs, recognizing that some specifics for individual cases are not captured by this approach. When we asked people what factors helped or hindered success, and considering our survey and interview data together, people pointed to collaborative history as the most critical factor. Over 90% of our CFLRP survey respondents said that a history of collaboration along with an effective communication strategy with stakeholders were important factors, ranking these as the most important internal variables (i.e., those related to agency practices) that supported success aside from the infusion of funding (Figure 5). Respondents ranked their stakeholders' history of working together as the primary external factor (Figure 5). Stakeholder and agency interviewees corroborated collaborative history as the most important variable underlying success and said that having an established collaborative group had allowed them to develop strong relationships and forge a record

of accomplishments. One person explained, "The project was already in formation as a collaborative group, prior to CFLRP. So, they were already positioned very well to receive and essentially support the CFLRP initiative when it came to fruition. And that continuity is something that's been invaluable. We didn't have to go through the process of developing a collaborative group and the growing pains associated with that" (#5-CFLRP). Partners also emphasized in interviews that established lines of communication and trust with agency personnel were helpful. One person, when referring to calling agency leadership during times of conflict, explained, "The reason I can do that is I build relationships, and they trust me. They've seen that I'm not out to get them" (#36-CFLRP). Similarly, for Joint Chiefs survey respondents, the agencies' history of collaborating and stakeholders' history of working together were highlighted as the most important factors underlying success aside from the Joint Chiefs funding investment (Figure 5). One Forest Service employee explained that established collaboration positioned them to compete for funding, stating, "We have a good collaborative group in place, and we have a purpose. We just fold all these projects into it" (#8-JC).

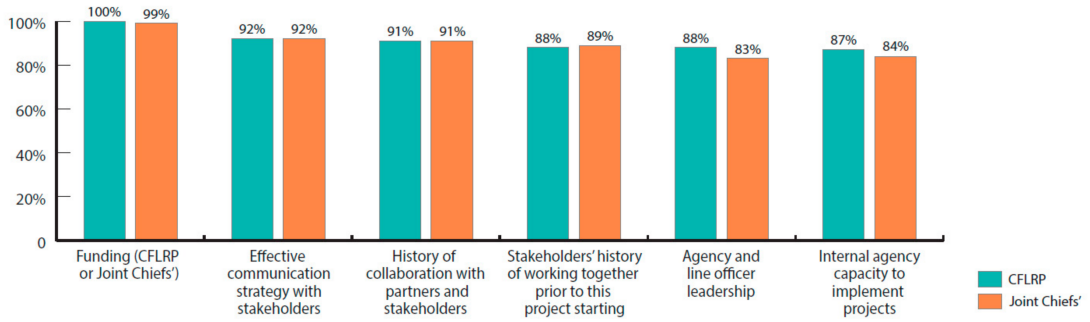

Figure 5. Percent of respondents who indicated that various internal and external factors were a major or somewhat major contribution to project success. Note: The items in the figures were the ones selected by the most participants and do not include all items included in the respective sections of the questionnaire.

Our data indicate that leadership and capacity were also critical. Eighty-eight percent of CFLRP survey participants, when asked about factors that supported success, pointed to agency leadership (Figure 5). Most non-agency interviewees on the CFLRP discussed the importance of leadership in terms of setting expectations with their own staff and establishing a culture supportive of collaboration. As one person said, "Our local leadership on the forest has been phenomenal . . . . They also have been very clear from the top that this is how we do business...that we collaborate and work together . . . and we do science and work in a large scale and we monitor" (#44-CFLRP). Over 80% of respondents also highlighted the importance of agency capacity to implement projects. A few interviewees linked these two factors, noting that strong leaders were key to ensuring adequate resources were available for accelerated planning and implementation. For Joint Chiefs survey respondents, aside from collaboration and communication, agency capacity and leadership were the internal agency variables people identified as being most important to project success (Figure 5).

On the flip side, survey participants pointed to lack of internal agency capacity and turnover in agency positions as being the most important internal factors that hindered project success under both programs (Figure 6). One Forest Service interviewee explained, "As an example, we've had six of the eight [interdisciplinary] team-level positions that we need for planning these landscape-level projects . . . six of the eight have turned over two or more times. So, we just don't maintain the continuity that we need to keep the vision going" (#2-CFLRP). Most CFLRP and Joint Chiefs interviewees also pointed to limited capacity and turnover as the primary factors that hindered project success. CFLRP interviewees reported developing creative strategies, such as on-boarding documents (i.e., memos to explain to new personnel project status, context, and expectations) and meetings with new personnel, to overcome these challenges.

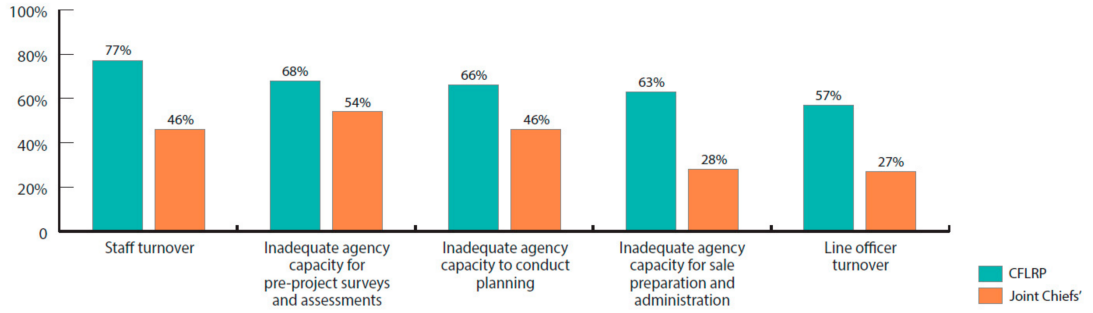

Figure 6. Percent of respondents who said that internal factors were a major challenge or somewhat of a major challenge that hindered project success. Note: The items in the figures were the ones selected by the most participants and do not include all items included in the respective sections of the questionnaire.

When responding about factors external to the agency, about 60% of CFLRP survey respondents indicated that limited industry capacity was a hindrance to success (Figure 7). While this was not a major factor for Joint Chiefs projects, given the smaller scale of their efforts, CFLRP projects sought industry partners to reduce the costs of restoration treatments; as we noted above, this was a specific goal of the CFLRP legislation. Our interviews with CFLRP respondents clarified that the CFLRP supported existing industry partners but did not lead to the establishment of new partners. Lack of capacity among stakeholders, conflict among stakeholders, and stakeholders' limited ability to leverage funds were other common external factors that CFLRP survey respondents indicated limited project success (Figure 7). Joint Chiefs survey respondents pointed to lack of financial capacity and lack of willing landowners to participate in projects as the primary external variables hindering project success. A Forest Supervisor explained, "Where it would have been most effective to do a treatment in an area next to a community, well, that landowner wasn't always willing, so we had to do the treatment somewhere else, but we still got it done. It just isn't as beneficial as, you know, doing it in the priority place" (#43-JC). Although this was a less-common theme, interviewees with both programs said that unexpected disturbances also were a reason some projects had not proceeded apace. One external CFLRP stakeholder said, for example, "We also have had significant tree mortality, so there's parts of our collaborative that we'd hoped to . . . restore to what we are describing as reference conditions and reference densities. But 90% of our pine trees are now dead. And so, we have to look at it differently, in terms of what restoration you can meet" (#20-CFLRP).

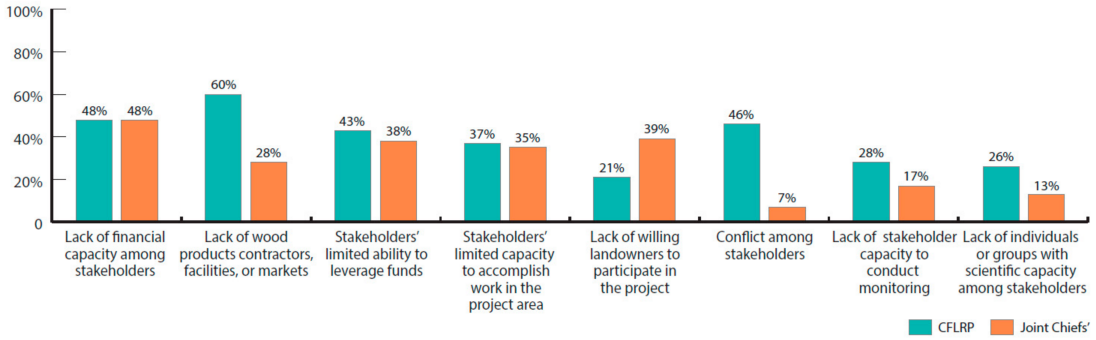

Figure 7. Percent of respondents who said that external factors were a major challenge or somewhat of a major challenge that hindered project success. Note: The items in the figures were the ones selected by the most participants and do not include all items included in the respective sections of the questionnaire.

4. Discussion

Our central question was whether the policy tools of the CFLRP and Joint Chiefs Partnership facilitated governance approaches that support collective action and better matching of the scales of planning and action with those of targeted ecological processes. Both approaches incorporated many of the legal design principles that have been proposed in the governance literature to achieve these desired outcomes [2], and both included specific requirements to plan at larger spatial scales for multiple objectives. Policy design and the fact that stakeholders had organized for policy change to overcome long-standing barriers to restoration offered reason to believe that these policy changes might lead to improvements.

Our findings indicate that the policy approaches of the CFLRP and Joint Chiefs Partnership yielded improvements that resulted from the policy tools common to both programs. In particular, our data indicate that multi-year, flexible funding investments in specific landscapes, with a requirement for collaboration, in many cases led to increased pace and improved scale of restoration, improved relationships and reduced conflict, and greater collective action, including involvement of partners, expansion of capacity, and leveraging of non-federal dollars. We suspect, as the literature would suggest, that these policies were effective because they promoted local participation in planning and allowed for some tailoring to local conditions, although more research would be needed to understand this dynamic with specificity [21]. People also commonly reported areas of innovation that they said were spilling over to other projects, indicating some dissemination of lessons learned on projects through a process of collective learning, although collective learning was not something we evaluated directly in this work [26]. In summary, we saw evidence of improved relationships, scales of planning, and discovery of innovative practices, with some evidence of second-order spillover effects from collaboration.

While the nature of our research does not allow us to demonstrate causality, we can infer that policy design yielded these changes based on the replication of improvements across multiple sites, the widespread claims by our survey and interview respondents that policy change had led to desired improvements, and the fact that change had been limited prior to the advent of these programs. We acknowledge that it is possible that these changes would have happened concurrently based on a change in practice that diffused across multiple project sites simultaneously. However, we find this difficult to conclude, given the well-known and long-standing barriers to accomplishing this type of work and the widespread reports of success in our data that people attributed to policy design.

Although it was beyond the scope of our study, as an important practical matter it is critical to note that our work did not measure ecological outcomes directly. The Forest Service provided some analysis along these lines for the CFLRP, but to our knowledge this has been difficult for the agency and for partners to accomplish to date [58]. A crucial question now for forest managers is how to measure both social and ecological outcomes at multiple time intervals, and in particular, how to demonstrate where investments may be more effective, if not necessarily more efficient in the sense of dollars spent per acre or output. Agencies always focus on what is measurable and in particular what is measurable on annual and politically relevant timelines [59]. How can the agencies and their partners communicate the successes of collaborating, or of restoration that may not yield benefits in a location for years or decades? This is a critical question for land management agencies focused on long-term social and ecological outcomes.

Our second question focused on other common factors that facilitated or hindered success under these two policy approaches. In this paper, we focused on program-wide dynamics and did not dig into the variables that explain differential success for individual cases. Policy can affect practice, but local staff and partners and other exogenous conditions are relevant to understanding how policies are implemented and why results vary across sites [60]. Organization-wide variables also affect policy implementation and organizational change. To inform future policy design and implementation, our work sought to identify these variables that were common themes across both programs. For multiple projects, a lack of agency capacity or adequate leadership stymied progress. This was a common finding,

indicating that it represents an organizational problem. If state actors are to increase emphasis on prioritization for collaborative landscape approaches, then the agencies' organization of staff capacity and other resources will require reorientation. In recognition of the pervasiveness of these challenges, coalitions and work groups recently have begun to identify a list of strategies to change the "business model" of the Forest Service to support collaborative restoration through more promotion-in-place, less vacancies, less turnover, and greater emphasis on collaborative skills for people in leadership positions [57]. In addition, our respondents said some practices, such as applying prescribed fire, which is central to restoration, were limited by numerous variables; overcoming this issue, which is not limited to these two programs, but is a broader challenge in U.S. forest management, may require additional attention to how improvements could be realized, whether it is through internal organizational change or policy change at the national level [61]. Similarly, we found that the lack of industry partners to accomplish planned restoration work was a challenge for many CFLRP projects; this factor also requires additional attention if U.S. forest management is to increasingly emphasize large-scale restoration that requires industry capacity to utilize lower-value wood products. Indeed, our findings indicate that there is no single most significant barrier to restoration, although the policies we studied appear to have facilitated significant progress. Actors continued to be stymied by multiple interacting variables and also found creative ways to work around them. In line with these findings, other scholars have emphasized the need to think beyond barriers to more contextualized analyses of why and how governance approaches persist and evolve, with policy design as only a piece of the puzzle [24].

We also raise a practical matter for policymakers and agency leaders: the need to examine the value and effects of prioritization. About 22% of our CFLRP survey respondents and 11% of our Joint Chiefs respondents said the focused investments they received caused negative effects on other units that had received less funding as a result of the prioritization of investments to some forests. In the face of declining budgets, the federal agencies face no other option than to prioritize investments to leverage partners' capacity and funding, invest in places with the greatest chances of success, and to accomplish work at a meaningful scale. However, this will have consequences for other units and resources that will have to be assessed and addressed to ensure that investments align with agency and stakeholder priorities. It also raises questions about maintaining return on investment. In addition, there may be places currently that are high priorities for restoration for one reason or another but are not competitive for these programs; such places may need to be identified more systematically and could benefit from some capacity building. In a global era of neoliberalism and investing in places with partner capacity, considering both how to design policies to invest in locations primed for success, while also maintaining return on investment and building capacity in other priority areas, presents a significant challenge for environmental policymakers [62].

Finally, while these programs led to some of the intended changes, a question now for U.S. forest policy is whether they should endure. Could the agency and its partners take these lessons and apply them without these dedicated programs? To some extent, this is a question for Congress and its constituents as to whether setting policy priorities legislatively and at the national level is desirable. Beyond this, however, given the fact that change was limited until the advent of these approaches, we conclude that policy change acted as a facilitator to overcoming a variety of dynamics that were limiting the progress in collaborative forest restoration. It is reasonable to expect that internal incentives to spread funding across units, reduce time and costs, and focus on measurable targets will continue to play a significant role in forest management. Despite good intentions, without policies that compel collaboration, large-scale and long-term planning, and a process to prioritize investments, it is unlikely that the changes realized as a result of these two approaches would persist to the same extent.

5. Conclusions

For the literature on improving governance for today's complex land management challenges, our work offers examples of how candidate legal and administrative design principles can manifest

in a specific context: in this case that of U.S. federal forest management. We offer empirical evidence of improved governance as a result of policy design. The fact that improvements to collaboration and scales of planning were realized on multiple units under these nationwide programs offers an indication of a changing governance system in U.S. forest management that goes beyond place-specific innovations [7]. Our work specifically highlights the importance of collaborative requirements and multi-year, focused investment in particular landscapes for improving the spatial extent of planning approaches and supporting collective action.

Future scholarly research now should continue to assess the effects of policy change on practice, ideally through longitudinal work across multiple locations. More attention is also needed to the tradeoffs inherent in governing at larger scales or through prioritized investment, which will privilege some locations, actors, and resources over others. We also suggest that work to compare similar landscapes or situations with and without particular policy tools in use would be valuable, although this may be impossible given the diversity of contexts across various landscapes and communities. Finally, we believe there is an opportunity in the context of policies with multiple sites of implementation to study learning more intensively: to understand what facilitates it and comes of it, and how learning may be occurring at multiple levels, as groups engage in place-based work and also participate in regional and national networks of actors working to change governance in the face of current management challenges and objectives.

As compared to older policy tools that emphasize planning, regulation, and public involvement, these policies appear to be a new type of policy tool in U.S. land management: one that encourages prioritization of limited resources, stakeholder collaboration and interagency partnership, and solutions tailored to local social–ecological contexts. As such, these policies incorporate aspects of capacity-building and incentive tools, but with novel requirements to address scale-fit and new roles for collaborators. The policies we discuss in this paper appear to be heralding a new approach to U.S. forest governance that more directly engages communities in problem-solving. How these policies endure and are adopted in other contexts both in the United States and more broadly will be an exciting area for future research.

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