Planning and Managing for Resilience: Lessons from National Forest Plan Revisions

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Recent federal forest and wildfire policies have increasingly united around a vision of restoring forest resilience in the face of destructive and expensive wildfires driven by altered forest conditions and climate change (see Table 1, page 2). In the environmental management context, the resilience perspective broadly focuses on adaptability in the face of uncertainty; a resilient system is one that is able to constructively adapt to disturbances, surprises, and shocks (see Table 2, page 2). The concept of resilience represents a contrast with management approaches that attempt to control forest ecosystems by eliminating disturbances such as fire. Resilience appears as a concept in several recent policies (Table 1), including the National Cohesive Wildland Fire Management Strategy and the US Forest Service's (USFS) 2012 regulations for the National Forest Management Act, hereafter referred to as the '2012 Planning Rule.' The 2012 Planning Rule sets the guidelines for revising the comprehensive management plans that direct management for individual national forests. The 2012 Planning Rule emphasizes the restoration and maintenance of ecological integrity, a concept that describes an ecosystem with key characteristics that are resilient and that reflect the natural range of variation.

The forest plan revision process presents an opportunity for managers to reorient a national forest's management direction in pursuit of resilient landscapes, among other goals. It also represents an opportunity for public engagement and the identification of new roles and responsibilities for governmental and non-governmental entities. Through a Joint Fire Science Program-funded project, we compared three recently completed national forest plan revision processes to determine whether and how planners were able to plan for resilient landscape outcomes. Our work helps illustrate the ways that front-line forest planners attempt to promote landscape resilience while reconciling potentially conflicting pressures and management directions. The lessons from our comparative analysis are relevant for forest managers and key stakeholders attempting to plan in pursuit of more resilient landscapes.

Table 1 Key US Department of Agriculture policies and directives featuring resilience and related concepts (Timberlake et al. 2017)

Agency policies and documents	Language related to resilience
Forest Service Manual (2016)	Chapter 2020, Ecosystem Restoration, directs the agency to reestablish and retain "ecological resilience of National Forest System lands and resources to achieve sustainable multiple use management and provide a broad range of ecosystem services."
National Cohesive Wildland Fire Management Strategy (2014)	The strategy outlines three guiding nationwide goals, the first of which is to "restore and maintain resilient landscapes" (Wildland Fire Leadership Council 2014, 3).
USFS 2012 Planning Rule (2012)	Directs the national forest plan revision process and addresses eight key management needs, the first of which is to "emphasize restoration of natural resources to make our NFS lands more resilient to climate change, protect water resources, and improve forest health" (36 CFR §219, 21164). The rule requires land management plans ensure restoration and maintenance of "ecological integrity," incorporating resilience into this definition (36 CFR §219.19). The rule also adopts language related to adaptation in the face of climate change and other stressors.
USDA Roadmap and Scorecard (2011)	Builds on the strategic framework and outlines response to climate change through a cycle of stages: Assess, Engage, and Manage. Forests must manage for "resilience, in ecosystems as well as in human communities, through adaptation, mitigation, and sustainable consumption" (U.S. Forest Service 2011, 4).
USDA Strategic Framework (2008)	Outlines seven broad goals for how the agency responds to climate change. One goal, Adaptation, seeks to "enhance the capacity of forests and grasslands to adapt to the environmental stresses of climate change and maintain ecosystem services … [by] maintaining ecosystem resilience" (U.S. Forest Service 2008, 9).

Table 2 What is resilience? The following three conceptualizations are most common among scholars (Timberlake et al., 2017)

Resilience conceptualization	Definition
Engineering Resilience	The speed and ease with which a system returns to its equilibrium state following a disturbance (Holling, 1973).
Ecological *or* Social Resilience	"The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks" (Walker et al., 2004, 2).
Social-Ecological Resilience	The capacity of an integrated social-ecological system to constructively incorporate and deal with disturbance in ways that do not lead to drastic social consequences (Folke, 2006).

Approach

We investigated the dynamics of planning for resilient landscapes through qualitative case studies of three recent forest plan revision processes. These cases were purposefully selected as national forests that recently completed their plan revisions and addressed resilience in the context of fire and climate change. Case studies included the Francis Marion National Forest in South Carolina, the Kaibab National Forest in Arizona, and the Rio Grande National Forest in Colorado. The Francis Marion and Rio Grande National Forests used the 2012 Planning Rule to guide their revisions; the Kaibab National Forest used an earlier version of the Planning Rule but nevertheless made a conscientious effort to integrate concepts of resilience, ecological integrity, and consideration of climate effects. In Box 1 below we have included the different examples of the use of resilience in each forest plan.

For each case we reviewed relevant documents related to the recent plan revision and reached out to key informants actively involved in national forest planning. Between 2017 and 2019 we interviewed a total of 64 individuals across all cases (see Table 3, below). Interviewees included U.S. Forest Service line officers, planners, and other staff at both the national forest and regional office levels, as well as non-Forest Service stakeholders who participated in some way in national forest planning or management. Interviews typically lasted between 60-90 minutes. Following practices approved by our universities' Institutional Review Boards, interviews were audio-recorded and transcribed (detailed notes were taken in cases where the interviewee preferred not to be recorded). We analyzed interview data using Dedoose qualitative analysis software.

Box 1: Examples of the use of resilience in national forest plans

- "To increase resiliency to climate change: The forest is healthy, free of excessive insect and disease pressure, and tree densities are moderate; longleaf pine is favored over loblolly pine in the upland longleaf pine forest and wet pine savanna ecosystems; refuge conditions are promoted to extent feasible for climate sensitive species; bottomland hardwoods and native grasses and forbs within fire-adapted low-density forests and grasslands are desired." (Francis Marion National Forest 2017, 53)
- "Management practices (such as prescribed selection cutting for age class diversity) that sustain healthy forests and provide adequate nutrients, soil productivity, and hydrologic function promote resilience and reduce the potential for disturbance and damage." (Kaibab National Forest 2015, 201)
- "A natural variety of species, genetic composition, and ecological processes are key to providing the diversity needed for resiliency in the face of environmental disturbances and changes." (Rio Grande National Forest 2020, 7)

Table 3 Case study forests

Case study	State	National forest acres	Plan revision timeline	Number of interviewees
Francis Marion National Forest	South Carolina	259,000	2014-2017	23
Kaibab National Forest	Arizona	1,600,000	2010-2014	23
Rio Grande National Forest	Colorado	1,800,000	2016-2020	18

Case study profiles

Francis Marion National Forest (FMNF)

The FMNF is situated in the coastal plain of South Carolina, north of the city of Charleston. It contains a variety of ecosystems ranging from longleaf and loblolly pine forests to lower-elevation blackwater swamps, Carolina bays, and salt marshes. It also is home to the endangered Red-cockaded Woodpecker and Frosted Flatwoods Salamander, among other rare and sensitive species. In 1989, one third of the forest was leveled as a result of a direct hit from Hurricane Hugo, resulting in the resurgence of dense vegetation and a heightened threat of wildfire.

On the FMNF, partnerships with NGO and state organizations were particularly important during the plan revision process given the forest's proximity to the rapidly growing Charleston area and the interface with non-federal land. The FMNF benefited from climate modeling tools provided by the Forest Service's Eastern Forest Environmental Threat Assessment Center, the Southern Research Station, and analysis from the Santee Experimental Forest. Much of the revised plan focuses on restoration of longleaf pine forests in places where loblolly pine had been planted following Hurricane Hugo. While historically dominant, longleaf pine is now less common than loblolly throughout the South due to efforts to prioritize loblolly for its timber production values. However, there are ongoing efforts to restore longleaf on the FMNF and elsewhere in the Southeast due to fact that longleaf pine is associated with many species that are threatened, endangered, or at risk of becoming threatened or endangered, and viewed as more resilient to climate change.

Kaibab National Forest (KNF)

Historically frequent-fire ponderosa pine and dry mixed-conifer systems are predominant forest types on the KNF in Northern Arizona. Piñon-juniper woodlands, shrublands, and grasslands comprise the lower elevations and some moist mixed-conifer forest is found at higher elevations. Grand Canyon National Park borders two of the KNF's three districts and several Native American tribal reservations border or are in close proximity to the national forest. Tribes have long-standing connections to lands that are currently part of the KNF. Further, it is important to note that the Four Forests Restoration Initiative (4FRI), a massive landscape-scale restoration initiative under the Collaborative Forest Landscape Restoration Program (CFLRP), began in 2010 across the Tonto, Apache-Sitgreaves, Coconino and Kaibab National Forests.

The KNF has strong institutional linkages with Northern Arizona University in Flagstaff, including the Ecological Restoration Institute and Landscape Conservation Initiative. NGO partners, such as The Nature Conservancy and the Museum of Northern Arizona's Springs Stewardship Institute, and nearby tribes including the Hopi Tribe, Havasupai Tribe, Hualapai Tribe, Kaibab Band of Paiute Indians, Navajo Nation, Yavapai-Prescott Indian Tribe, and Pueblo of Zuni, also contributed valuable information that informed the plan revision process and maintained active roles in project-level management. The revised plan emphasizes forest restoration, greater flexibility in fire management, and building resilience in the face of climate change dynamics.

Rio Grande National Forest (RGNF)

The RGNF is located in south-central Colorado, distant from the state's major population centers. The highest point on the forest, Blanca Peak, rises to over 14,000 feet in the Sangre de Cristo Mountains that form the forest's eastern border. The Continental Divide runs along most of the western border of the forest in the San Juan Mountains. The San Luis Valley, an agricultural basin, rests between these mountain ranges. High elevation spruce-fir forests dominate the RGNF, and a massive outbreak of the native Spruce Beetle resulted in widespread mortality to spruce in the years prior to the plan revision process. The forest is also home to the endangered Canada Lynx, which frequents the same high-elevation forests that have been altered by the spruce beetle outbreak.

The RGNF plan revision used data and analysis from Oregon State University, Colorado State University, and Western Colorado University, along with workshops and products led by the Rocky Mountain Research Station of the USFS. The plan represents a more flexible and less complex approach compared to the previous plan. Among other changes, the new plan identifies areas within which naturally ignited fire can be managed for resource benefits under the right conditions.

Findings

In all three of our studied forests, USFS planners instituted changes via the revision process that were perceived to better support the agency's ability to achieve resilient landscape outcomes. These changes tended to center around incorporating opportunities to restore fire to ecosystems as well as departures from traditional output-oriented planning and management. For example, the KNF revised plan allowed more flexibility in deciding when to suppress and when to manage naturally ignited fires for resource benefit. On the FMNF, an important change in the new plan was a shift from the commercially productive but ecologically less valuable loblolly pine toward greater emphasis on longleaf pine, a species expected to be more resilient to climate change. Both the FMNF and the RGNF revised plans incorporated two-zone fire management systems, one in which prescribed (and, in some cases, naturally ignited) fire would be used to achieve resource benefits and a second — closer to homes and other human infrastructure— which would see more limited use of fire.

Our case studies revealed challenges related to: meanings of resilience, instituting adaptive and flexible management, capacity issues in managing for resilient landscapes, and broader political and institutional considerations. In the following sections we describe how our studied forests experienced and worked to address these challenges.

Meanings of Resilience

Meanings and understandings of resilience varied across the ecosystems and disturbance agents present on the three studied national forests. Table 4 (page 7) provides examples of definitions and descriptions of resilience as provided by interviewees. Interviewees widely agreed on the meaning of resilience in historically frequent-fire systems such as longleaf pine on the FMNF and ponderosa pine on the KNF. These forest types were seen to benefit from the reintroduction of fire (wild or prescribed), with forest stand treatments as needed to reduce fuel loads. Fostering resilience through these activities also benefited habitat restoration, insect and disease management, and timber production objectives.

Conversely, the meaning of resilience in other common forest systems, particularly the spruce-fir forests that dominate the RGNF, was less conceptually clear. Compared to frequent-fire systems, the historic disturbance regime in these high-elevation forests is not as straightforward and was further complicated because the Rio Grande's mature spruce trees had recently been killed by a spruce beetle outbreak. Most interviewees on the RGNF

Table 4 Interviewee definitions and descriptions of resilience

Forest	Example definitions and descriptions of resilience from interviews
FMNF	"We're trying to get the habitats back to what they historically would have been, and then also looking toward what they need to be in the future." "Fire plus the longleaf pine, that's a big thrust on the [Francis] Marion plan that ties directly back to that resilience, trying to put a stand out there that can take these hits from climate change better than loblolly [pine]." "You want a population that's healthy enough that it can withstand some sort of stochastic, catastrophic event. So, if we were to have a hurricane or a tornado come through, are we going to lose all of our woodpeckers? Or is there a place that they can move into?... We're trying to make a system that's good for the next 100 years." "It's more ecosystem restoration based than any kind of producing numbers. That's my take on it, that we're here to restore as well as produce some timber. But the big picture is to restore the forest back to what it was." "All four pillars of ecological integrity [are] at play… If we're providing for that, then we're providing for resilience and sustainability." "We want to be able to make sure we're robust with our ecosystems and our management within a range of variability…We're managing it for ecological integrity, diversity. Then whatever the change, it'd be more resilient through those changes."
KNF	"I think of it from a standpoint of stressors…to be able to accept those stressors and adapt in a manner that would retain as much of the current character as we can without it becoming, for example, a type conversion." "That's what we're trying to do is trying to get these forests back into a resilient state which a lot of them currently are not. Fire played that historic role within them and they were very resilient because of the frequent fire…our whole basis for that is to make these forests more resilient. Fire is our tool." "Understanding resilience means being able to adapt to the change, with a positive outcome." "Having a [human] community that's actually capable of withstanding exogenous shocks and continuing to function." "What I'd like to see in every resilient ecosystem is, natural disturbances, in this case predominantly fire occurring in a natural timing and frequency and seeing a forest that is self-perpetuating under that regime." "The ability of a system to recover its characteristics, structure, composition, process, connectivity in a characteristic amount of time following disturbance."
RGNF	"When I think of resilience I think of resilience to climate change, and where are [our fish and wildlife] going to be in 50 years?" "The ability of a landscape to adapt." "Sustainable and resilient, they mesh with each other…What can we do that will last a long time and leave that lasting impression so people would want to come back?" "Ecosystem resilience is a really hard concept to get your mind around. I can understand it for an ecosystem that's very departed from its historic range of variability, [like] ponderosa pine. That one's fairly easy to link back to. We've got a goal, we're going to get this thing back to where it is in the presence of climate change." "It's all dead, at least our spruce-fir zone, it's coming back, but it's basically dead. That was a challenge of the resiliency aspect, and then the [natural range of variation] of what are we bringing it back to?" "With the beetle kill…what are we doing to make it resilient? Or are we just restoring? Are you restoring it to what, to 20 years ago? A hundred years ago?"

were unclear about what it would entail for high elevation forests to be resilient. Many planners expressed their concerns for forest regeneration in the beetle-killed spruce forest under likely future fires given the heavy downed fuel loads. Overall, in systems outside of frequent-fire forest types across all three cases (e.g. the forested wetland on the FMNF or the piñon-juniper woodlands of the KNF), there was much less clarity of what resilience entails. One national forest interviewee asked:

> *"…how do you make it resilient, spruce-fir, when it normally has a four or five hundred, six-hundred-year life cycle? And what's the disturbing agent, is it bugs? Is it fire? We're seeing it's bugs here and then fire afterwards, long term. So, how do you make something like that resilient?... It's a lot easier to define in a ponderosa pine and even lower elevation mixed conifer stands, where your fire return interval is shorter term."*

Although resilience was conceptually clearer in the frequent-fire forests, some interviewees were concerned that resilience could become oversimplified by focusing on those forests to the exclusion of other systems. On the KNF, there were tensions between restoration and resilience, as some scientists noted that climate change is forcing shifts in the distribution of forest types across the landscape. Although there was agreement regarding restoration in ponderosa and dry mixed-conifer systems, some interviewees felt that managing to restore the "natural range of variability" may not be the right approach for achieving forest resilience under a changing climate.

Related to questions around the meaning of resilience in different forest types and the discrepancies between restoration and resilience, a third point of tension related to social-ecological systems and their relevance to resilience. Agency understandings of resilience in all cases focused almost exclusively on nonhuman systems. Human interests and land uses were acknowledged and incorporated into planning; however, these were generally treated separately from discussions of resilience and restoration.

Adaptability and flexibility

Many interviewees agreed that adaptive management was needed in order to achieve resilient landscape outcomes. Adaptive management is based on the concepts of treating management as an experiment, learning via monitoring, and incorporating lessons learned into the planning and implementation of future projects. Interviewees viewed agency National Environmental Policy Act (NEPA) procedures, risk aversion in the USFS, and the expectation of clear plan commitments among some external partners and advocacy organizations as dynamics that challenge the realization of adaptive management within the USFS.

Both agency and non-agency interviewees across all three cases recognized trust as a key variable for transitioning from rigid to adaptive planning and management. Several external interviewees identified ongoing engagement with partners and a robust system of monitoring as fundamental to building and maintaining trust going forward. Some interviewees distinguished between trust in individual forest planners and forest managers (mainly line officers such as district rangers and forest supervisors) and general trust in the agency itself. According to one external partner:

> *"…flexible plans are only great when you've got a great leader…so like right now I fully trust in [the forest supervisor] in being able to be rational and look at things and to weigh the pros and cons of a project…[but the supervisor] isn't going to be there forever…And so that's where flexibility is great as long as the leadership is great."*

Although external partners tended to express trust and confidence in the current suite of USFS managers, some were concerned about the possibility that future managers could take advantage of a highly flexible plan to manage in ways that are not broadly supported by the community. Despite this potential adverse leverage, interviewees broadly identified the commitment to build and sustain trusting relationships as central to transitioning towards adaptive management approaches.

Capacity to manage for resilient landscapes

Capacity emerged as an important theme woven throughout many of our interviews. This included the USFS budgetary and staffing capacity for planning, implementing, and monitoring resilience-oriented projects as well as the science and technical capacity to inform management activities. Both USFS staff and external partners noted that declines in USFS staffing and budgets placed limitations on planning, implementation, monitoring, and sustaining meaningful partnerships external to the agency. Interviewees also identified high levels of staff turnover and "detailing" (USFS staff being temporarily assigned or "detailed" into a position outside of their normal duty station) within the agency as factors exacerbating these challenges.

Partnerships with USFS and NGO scientists greatly improved planners' scientific and technical capacity (See Case Study profiles, pages 4–5, for key partners). These partnerships largely helped contribute data, analysis, modeling, and science-informed guidance for restoring and managing forests under the influences of climate change. However, as one national forest interviewee noted, partnerships could help fill some capacity gaps if the agency is receptive to new data sources:

> *"The monitoring piece is very challenging. We're very constrained by our capacity to do it and somewhat prohibitive in terms of cost…On the other hand, there's all these things that are like right in front of us, new technology, new opportunities to work with partners, citizen science, all these solutions…but they're going to require transformational change in terms of our comfort level with those types of data."*

Monitoring of management activities, a key element in adaptive management, was a broadly identified capacity challenge. Many interviewees felt that monitoring has been underfunded and underprioritized within the USFS. Interviewees identified a greater reliance upon non-agency partners, including citizen scientists, and the repurposing of existing data (such as the USFS Forest Inventory and Analysis program and state natural heritage programs) to meet monitoring needs. Many national forest managers expressed the desire that non-agency partners would continue to take active roles in collecting new monitoring data, adding needed capacity and support towards achieving desired management objectives.

Broader institutional and political influences

Resilience is a relatively new addition to the vocabulary of concepts guiding national forest management, and the agency's decision-making process remains heavily influenced by a variety of laws that trace back to the 1970s. USFS staff on all three of our studied forests had to contend with conflicting legislative mandates, competing incentive systems, expectations from higher levels of the USFS administration, and inconsistent support for considering climate change in the plan revision process.

Despite multiple policies (see Table 1, page 2), and widespread interest to manage for resilient landscapes, performance targets (specifically timber sales and acres treated outputs) were commonly identified by interviewees to be of overriding priority in driving planning and decision-making on national forests. According to one interviewee, "We're an agency that—we say we're not about targets, but we are. Everything in here is target driven." Interviewees noted that this influenced plan revisions by encouraging forest-level staff to use language to maximize decision-making discretion and minimize the possibility that a future decision could be legally challenged for being inconsistent with the plan. Some expressed concerns that the concept of "adaptive management" could be used to justify agency decision-making discretion even in the absence of scientific or public support. Finally, as USFS directives associated with the 2012 Planning Rule have recently been established, there are now more detailed expectations for the structure and content of plans. This sets up the potential for tensions between forest-level planners and higher levels of the USFS administrative structure, a dynamic that came into play in the case of the RGNF revision.

Successful practices from case study forests

Despite the challenges detailed above, each of our studied forests offered practical lessons pertaining to the pursuit of resilient landscape outcomes. Table 5 (below) summarizes these key practices and elements of the resilience planning process on each forest.

Table 5 Successful practices related to planning for resilient landscapes

Successful practice	FMNF	KNF	RGNF
Improved fire management strategies	Incorporation of a two-zone fire management system and prescribed burning system to expand fire management options	Flexible fire management strategies to manage naturally ignited fires for resource benefit in conjunction with an effective prescribed fire program	Incorporation of a two-zone fire management system to expand fire management options
Increased partnerships and science support	Science support from NGOs, state organizations, and USFS scientists Partnering with non-USFS entities on project implementation (such as prescribed fire)	Science support from local and regional NGOs and universities Working with tribes to integrate place-based knowledge and holistic management approaches	Science support from USFS scientists and universities Use of existing databases and citizen science to build flexible monitoring program
Increased local engagement and outreach	Efforts to focus on relationship building in growing urban interface around fire management	Long-term investments of building trust and constructive relations with interested publics and organizations	Ongoing engagement with public and stakeholders throughout planning
Intentional intra-agency practices	Clear leadership intent to support agency morale and trust for transitioning to adaptive approaches Deliberate shift from a fast-growing tree species to a greater emphasis on ecologically valuable species	Clear leadership intent to support agency morale and trust for transitioning to adaptive approaches	Consultation with neighboring national forests on planning approaches Clear leadership intent to support agency morale and trust for transitioning to adaptive approaches

Conclusions

Our findings from investigating the plan revision processes on our three case-study forests reflected the complex interactions among the social, ecological, and political dimensions of resilience. Although each plan process varied, broadly comparable challenges and opportunities emerged for reorienting national forest management and planning toward resilient landscapes. Here we discuss five broad elements that should help natural resource managers in their pursuit of resilient landscape outcomes. Not all of these are necessarily under the direct control of front-line managers, but all emerged as important through our case studies.

Conceptual clarity on the meaning and application of resilience. Understandings of resilience vary across different ecosystem types. Conceptualizations of resilience and the identification of means to achieve it are relatively settled for some forest types but remain unclear or contested in others. Broadly, the realization of opportunities for land managers and collaborators to plan and manage in pursuit of resilient landscapes could benefit from the commitment of local-level managers, supportive political and social environments, as well as access to high-quality scientific and monitoring resources.

A clear legal and policy framework promoting and prioritizing landscape resilience. Natural resource policy is increasingly adopting language and concepts associated with resilience in the face of environmental change, including climate change. However, resilience-oriented planning can be complicated by agency incentives and pressures that emphasize simplified performance metrics or other priorities. To achieve resilient landscape outcomes, natural resource agencies will need the policy direction, incentive systems, and institutional direction to prioritize managing for resilience over other competing objectives. This framework should function across scales, with consistent higher-level support and clear direction for achieving resilience-oriented outcomes.

Incentives and flexibility for managers to practice adaptive management. Adaptive management for resilience implies experimentation, risk-taking, and collaborative learning—all of which stand in tension with conventional resource management expectations of prediction and control. There are still strong incentives for many natural resource managers to minimize risks, including risks associated with reintroducing fire and other disturbance agents to landscapes. Support for experimentation, risk-taking, and adaptation are crucial elements to encouraging management for resilient landscapes. Social support for adaptive management can be increased through the development of long-term trust relationships with external partners such as communities, NGOs, local governments, and higher education institutions.

Access to relevant, site-specific information to inform planning and management. Understanding past, present, and possible future ecological and social conditions is indispensable to adaptive management for resilient landscapes. USFS staff in our case studies benefited from data, analysis, and modeling resources provided by USFS and non-USFS scientists, and this was reflected in the sophistication of the scientific content included in the revised forest plans. Resources and capacity for monitoring will be needed to allow managers and partners to learn from management and build trust in the knowledge generated.

Capacity to achieve resilient landscape outcomes. In addition to the specific capacity needed to support monitoring, agencies require staff and budgets for planning, environmental analysis, implementation, and the maintenance of partnerships with external entities. Long-term declines in non-fire staffing and high levels of employee turnover in the USFS have challenged the agency's ability to meet its multiple objectives, including those associated with resilience. External partners may be able to help fill in some capacity gaps, but adequate policy and budgetary support will ultimately be necessary to achieve resilient landscape outcomes.

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