

Regional Approaches to Addressing the Mountain Pine Beetle Outbreak on US Forest Service Lands

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About the Ecosystem Workforce Program:

The Ecosystem Workforce Program is a bi-institutional program of University of Oregon's Institute for a Sustainable Environment and the College of Forestry at Oregon State University. We conduct applied social science research and extension services at the interface of people and natural resources. Our publications aim to inform policy makers and practitioners, and contribute to scholarly and practical discourse. More information available at: <http://ewp.uoregon.edu/about/intro>.

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For more information about this project: <http://ewp.uoregon.edu/MPB>

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Elevated outbreaks of mountain pine beetle (*Dendroctonus ponderosae*) have occurred across the western U.S. over the past two decades. Although mountain pine beetle (MPB) is a native insect that naturally infests various pine species, recent outbreaks have had significant impacts due to their intensity and extent. On national forestlands in several states, widespread tree mortality has affected forest health, tourism and recreation, the timber industry, public safety, and other values. MPB infestations also cross ownership boundaries, making them a complex management challenge for land managers. In responding to MPB impacts, the US Forest Service (USFS) must therefore consider effects and strategies across landscapes beyond national forests, as well as the social and political factors that may constrain or enable management options.

There is an ongoing need to better understand how agency land managers and partners engage with MPB outbreaks as well as other acute forest health disturbances that can affect multiple values on public lands. Through a National Science Foundation-funded research project, we investigated MPB response through case studies on national forestlands in five states. Our primary goal was to examine socio-political strategies for addressing MPB impacts, including any formal or informal changes to forest governance and management practices that were implemented in these cases, and to identify variables that supported or inhibited effective responses. We provide an overview of each case study, then compare and discuss the strategies used.



Approach

We utilized a qualitative case study approach to provide in-depth insight into the dynamics of MPB infestation and response occurring within specific locations and contexts across the U.S. West. We purposively selected four case studies of national forestlands in five states, seeking locations with active MPB infestations that were extensive across at least one national forest unit and adjacent landownerships, and where agency managers and partners had attempted to respond to MPB impacts (see Figure 1, page 3). Case studies took place in northern Colorado, Wyoming/South Dakota, western Montana, and northeastern Washington (see Table 1, below).

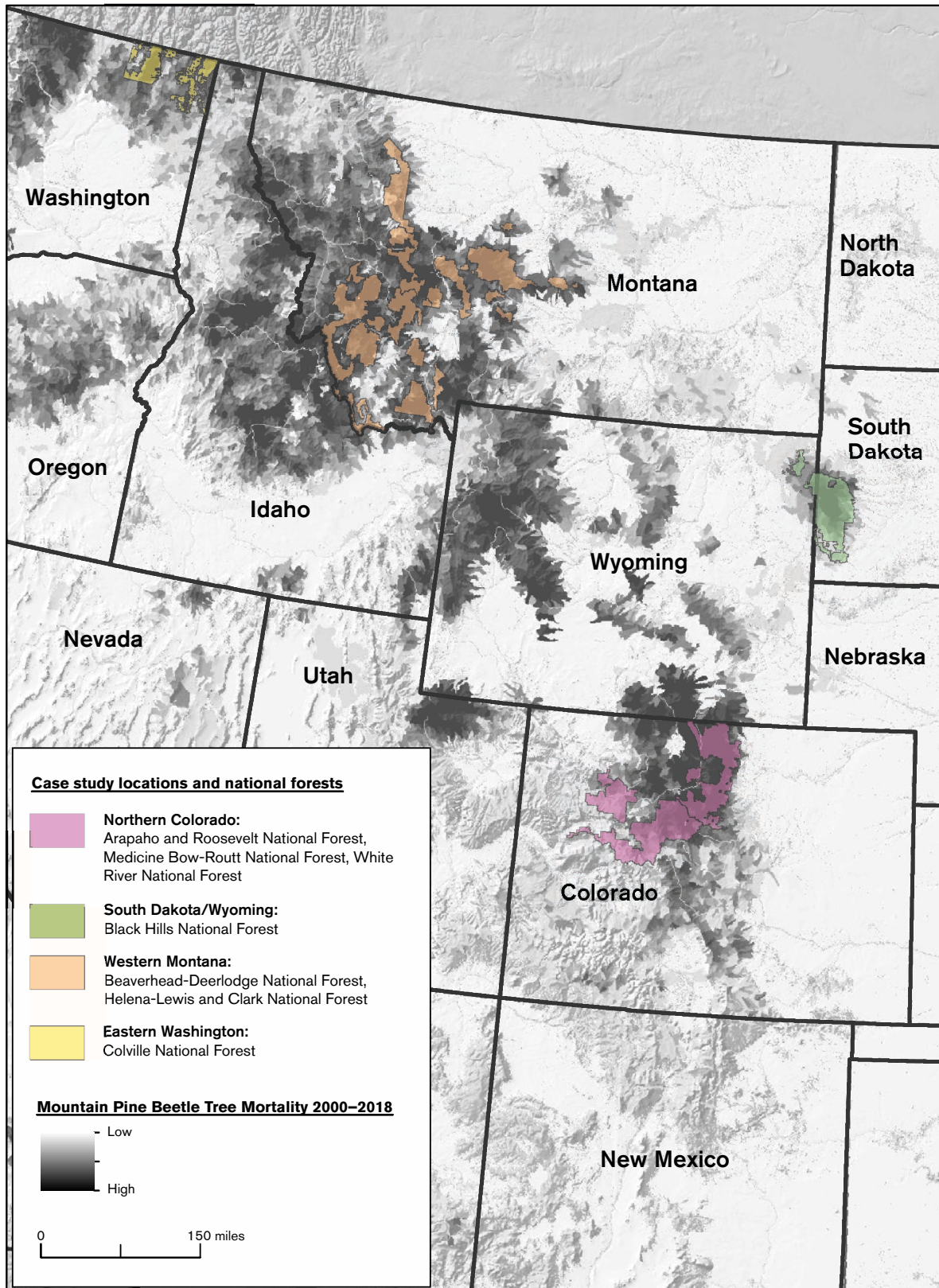
In each case study, we gathered and analyzed documents related to the management of the national

forest unit(s) and MPB response, and identified key informant interviewees who had been actively involved in MPB response in the case study areas. We interviewed a total of 129 interviewees across all four cases between 2015-2018. Interviewees included national forest managers such as line officers and resource specialists, as well as other landowners and managers; and local and regional stakeholders representing interests including local government, conservation, and the forest industry. Interviews were audio-recorded and transcribed, or detailed notes were taken. We analyzed interview data using NVivo qualitative analysis software and a coding guide to classify how MPB response occurred in each case, particularly to characterize then compare and contrast the processes, programs, tools, authorities, and management approaches used.

Table 1 Case study areas

Case study	Focal national forest units	Primary species affected	Number of interviewees
Northern Colorado	Arapaho and Roosevelt, Medicine Bow-Routt, White River	Lodgepole pine	58
South Dakota/Wyoming	Black Hills	Ponderosa pine	20
Western Montana	Beaverhead-Deerlodge, Helena-Lewis and Clark	Lodgepole pine, whitebark pine	26
Northeastern Washington	Colville	Lodgepole pine	26

Figure 1 Case study areas





Case study profiles

Northern Colorado

The Colorado case focused on the Arapaho-Roosevelt, White River, and Medicine Bow-Routt National Forests, which were the three national forests in Colorado that experienced the most significant MPB impacts. These forests have been the focus of intensive recreational investments throughout the last several decades. They encompass tourism and recreational hotspots such as Vail, Aspen, and Breckenridge, are close to the major population centers of Denver, Fort Collins, and Boulder, and border Rocky Mountain National Park. The area also contains some rural communities that are economically and culturally linked to natural resource management and extraction. These national forests have been characterized by a long-term decline in timber management on most forests/districts, and a shift to more emphasis on recreation management as well as managing wildfire risk given the expansion of wildland-urban interface areas as development has continued along the Front Range of the southern Rocky Mountains. There is a mix of coniferous species present depending on elevation, with a large belt of lodgepole pine that was most significantly affected by the MPB outbreak. The outbreak was a highly visible event that turned entire mountain-

sides red and then grey as trees died, prompting major concern on the part of residents, community leaders, and others who recognized the safety and aesthetic implications posed.

MPB response in this case study area primarily occurred through the creation of a new, dedicated coalition at the regional scale. Elected officials associated with the Northwest Colorado Council of Governments created the Colorado Bark Beetle Coalition (CBBC) in 2005. This group was originally composed of county commissioners, local elected officials, the State Forester, and representatives of the three national forests. It was later expanded to include utilities, conservation representatives, wood products representatives, and others. Following some initial conflict among the stakeholders, collaborative agreement eventually coalesced around a set of priorities that emphasized human/infrastructure safety and the need for salvage treatments in priority areas such as roads, trailheads, along powerline corridors, and in the WUI.

The CBBC worked with state and national officials to obtain additional funding for Colorado to deal with the outbreak. National funding was largely a reallocation of existing regional and national USFS monies, with only a small amount of new federal funding. Funding was used for projects focused on

dead tree salvage in critical areas, including new staff hires to conduct planning, layout, and implementation. The response included some National Environmental Policy Act (NEPA) planning at larger spatial scales, use of the incident management system for sequencing implementation of projects to remove MPB-killed trees, and stewardship contracting; but the low merchantability of wood and lack of industry was a constraint on the ability to respond beyond the most critical safety needs. The low value of the beetle-killed wood and the lack of local forest products processing infrastructure translated to a high cost per acre of treatment. There were attempts to spur processing infrastructure, including supporting a mill in Montrose and a biomass plant in Gypsum, but success was very limited. The biomass facility caught fire in 2014 and has been involved in numerous lawsuits related to investors, the town of Gypsum, and the federal government. The mill in Montrose went into receivership in 2010, shortly after receiving federal funding. It reopened under new ownership in 2012. Following the end of the outbreak and the completion of treatments, the CBBC transitioned into the High Country Forest Collaborative and shifted to a focus on larger resiliency issues on the area's national forests.

South Dakota / Wyoming

The Black Hills is an island of higher-elevation forested terrain surrounded by high plains vegetation. The forest is dominated by ponderosa pine, which reproduces abundantly due to prevailing rainfall patterns. The Black Hills holds special religious and cultural significance to the Lakota Nation, and was included in lands belonging to the Sioux Tribes under the 1851 and 1868 Treaties of Ft. Laramie. However, the discovery of gold in the Black Hills soon led to an influx of white prospectors and the founding of frontier towns such as Deadwood and Lead, and the U.S. Government removed the Black Hills from tribal territory in 1877. It continues to be legally and culturally contested territory, with the Mt. Rushmore and Crazy Horse Monuments representing conflicting narratives regarding the heritage and possession of the mountain range. The Black Hills National Forest (BHNF)

was originally reserved from public domain lands by President McKinley in 1897, and the range includes various other state and national designations, including Wind Cave National Park, Jewel Cave National Monument, Mt. Rushmore National Memorial, Devil's Tower National Monument, and Custer State Park. The BHNF is characterized by extensive private inholdings within the boundaries of the national forest, a legacy of the region's mining history. The BHNF also has strong connections to the Washington Office and elected officials, and has been one of the nation's top timber-producing forests in recent decades.

MPB has long been present in the BHNF, and the species was originally called the "Black Hills Beetle" after being named in that forest by USFS entomologists. Like many national forests, the BHNF was mired in conflict in the late 1990s regarding its timber sale program and appeals on its forest plan revision led to major slowdowns in timber management activity. Then-Senate majority leader Tom Daschle added a rider to an appropriations bill in 2002 that allowed management to move forward to reduce risks of MPB and wildfire, pending litigation notwithstanding. The BHNF's response to the outbreak centered on processes of planning for more aggressive treatments to remove MPB-killed trees through establishment of various forest-level groups composed of BHNF line officers and local community and industry representatives. The Black Hills National Forest Advisory Board was set up as a Federal Advisory Committee Act (FACA)-compliant advisory group in 2003 with support and direction from Senator Daschle and from other USDA/USFS leaders. Later, many of the same entities formed the Conservation Leaders Group, which itself formed a committee called the Black Hills Mountain Pine Beetle Working Group to implement a collaborative strategy. Plans created through these groups allowed for MPB response in the short-term (named the Bug Town project), as well as in the medium-term and across a larger landscape (the Pine Beetle Response project). Longer-term management and larger-scale strategies for resilience following the end of the outbreak were charted through the Forest Service's Black Hills Resilient Landscapes Project (BHRL). The

Pine Beetle Response (PBR) project was arguably the most important, as it completed NEPA analysis over a large area (250,000 acres) and allowed the USFS to move quickly to implement proactive treatments before the MPB arrived at a significant scale.¹

Working on MPB response through these groups fostered increased working relationships, cross-boundary coordination, planning at larger scales, attention and support from the Forest Service's Washington Office and elected officials, and financial support from state governments. The extensive MPB response was facilitated by a robust timber industry presence, which allowed the BBNF to conduct most treatments through commercial timber sales. County, state, and private entities were also involved in treating forests adjacent to federal lands in a coordinated manner.

Western Montana

This case focused on the Beaverhead-Deerlodge and Helena-Lewis and Clark National Forests, which experienced substantial MPB impacts due to their large lodgepole components. Whitebark pine was also a concern in these landscapes, as it is vulnerable to bark beetle-related mortality and additional stress from other factors; and MPB impacts to ponderosa pine were a particular concern on the Helena-Lewis and Clark National Forest. In an earlier MPB outbreak in the early 1900s, the Beaverhead National Forest was the most severely affected forest in all of Region 1, and the neighboring Deerlodge and Helena National Forests had similar results including significant loss of timber. The Beaverhead-Deerlodge and Helena-Lewis and Clark National Forests border several other national forests in western Montana, and the region includes rural communities with longstanding ties to timber production, communities with strong outdoor recreation economies, and small cities such as Helena and Missoula. These landscapes have been subject to social and political contestation regarding issues such as roadless and wilderness areas, endangered species including grizzly bear and Canada lynx, and the continua-

tion of traditional patterns of resource production. A number of collaborative and community-based organizations have also taken root in the region.

MPB response in this case occurred through multiple efforts, often as part of larger landscape-scale restoration and stewardship plans, rather than stand-alone, MPB-focused projects. These national forests contain several existing collaborative groups and intergovernmental efforts working on forest restoration more generally, including: the Beaverhead-Deerlodge Working Group, the Beaverhead-Deerlodge Partnership, the Greater Yellowstone Coordinating Committee (an intergovernmental committee that worked on cross-boundary issues including whitebark pine conservation), and more local efforts such as the Tenmile / South Helena Forest Restoration Collaborative Committee and Gravelly Landscape Collaborative. Many of these are associated with the statewide Montana Forest Collaboration Network. There was also an internal Forest Service effort to develop a MPB response plan for the Beaverhead-Deerlodge and Helena-Lewis and Clark National Forests in 2011.

Despite agency attempts to collaborate on projects that included MPB response, a number of environmental organizations continued to use appeals and lawsuits to try to slow or block these kinds of projects. These organizations were especially active in contesting projects that included road-building, commercial logging, and other activities. The presence of listed endangered species such as Canada lynx and grizzly bear often provided impetus for opposition. This dynamic challenged MPB response by inhibiting opportunities for larger-scale efforts. However, the Southwestern Crown Collaborative put together a successful Collaborative Forest Landscape Restoration project that included some acreage on the Helena National Forest. The Good Neighbor Authority has been put to use on both studied national forests, with a statewide master stewardship agreement signed in 2016. Some of these projects are associated with "priority landscape" designations made by the State of Montana under provisions of the 2014 Farm Bill.

1 For more information, see: https://www.forestsandrangelands.gov/success/stories/2013/13_sd_bhnf_MaintainRestoreLandscapes.shtm

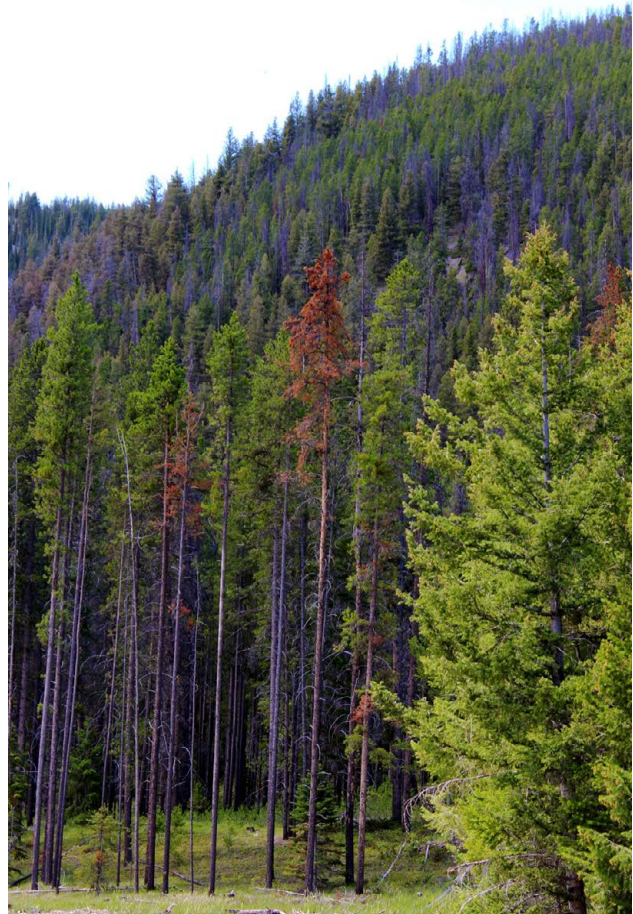
Northeastern Washington

The landscape of northeastern Washington includes the Colville National Forest (CNF), private industrial timberland, and tribal land associated with the Kalispel, Spokane, and Colville Reservations. Timber production and processing have long been important components of rural economies in this region, and several mills are still present in the area, including the family-owned Vaagen Brothers mills that have been recognized for their innovativeness. Although the CNF is not a large forest relative to many others in the region, it is highly productive and has been an early adopter of many new authorities and policy tools. Tree species on the CNF include a variety of conifer species, with lodgepole present both in mixed and small pure stands, but not in grand extensions like in Colorado. MPB impacts were mostly felt in these pure and mixed lodgepole stands, including in some roadless areas.

The CNF's response to MPB has largely occurred through a longstanding collaborative group, the Northeast Washington Forestry Coalition (NEWFC), which has organized dialogue about planned forest management projects among multiple stakeholder interests since 2002. NEWFC has been a lead entity in responding to the MPB outbreak, and MPB concerns have generally been rolled into larger integrated restoration and stewardship projects planned through this group's processes. The CNF, with support from NEWFC, has sought to experiment with new practices. An example is the "A to Z" project wherein the CNF outsourced NEPA analysis to a third-party contractor, rather than completing the analysis in-house. The CNF and NEWFC have also sought to use numerous programs, tools, and authorities for projects that included MPB treatment, including: stewardship contracting, Collaborative Forest Landscape Restoration Program, Tribal Forest Protection Act, Joint Chiefs Landscape Restoration Program, and the 2014 Farm Bill "forest health emergency" provisions (HFRA Title VI amendments). The CNF has counted on strong ties to the local Congressional representative, which has provided political support for experimenting with new forest management approaches. CNF staff also created a MPB

restoration assessment in 2014, which helped document needs but did not extensively guide the responses taken.

The CNF and NEWFC have received regional and national recognition for their use of new practices, programs, tools, and resources for forest restoration broadly, beyond response to MPB. The presence of a forest industry, participation of that industry in collaboration, the long history of effective collaboration, and the willingness of some CNF leadership were factors in these perceived successes in innovation. However, NEWFC also faced challenges from other local interests who did not feel that the collaborative represented their particular interests, and the creation of a parallel group to interface with the CNF has contributed to some conflict.





Key components of mountain pine beetle response

Federal land management responses to MPB have been contingent on local and regional policy contexts and the scale, scope, and public visibility of the outbreaks. In each of the four case studies, different combinations of programs, tools, and authorities as well as approaches to planning treatments were used. We found that the following components were important for enabling response to the impacts of MPB outbreaks:

Collaboration and social support

Multi-stakeholder collaboration helped managers design responses that were socially supported. There is some evidence that the sense of urgency created by the MPB outbreak prompted various interests to come together to agree on a response plan. Case study forests with existing collaborative venues or new venues created for MPB response were able to articulate concerns, plan treatments on national forest land, and develop cross-boundary coordination and communications with partners. Dialogue and collaborative planning in these settings built or grew the working relationships and trust necessary for an agreed-upon

course of action, and in some cases, allowed the Forest Service to pursue more aggressive and innovative approaches to accomplishing the work. However, collaboration was not able to eliminate all conflict, and in some cases individuals and organizations continued to oppose certain types of forest management projects, including some MPB-related treatments.

Funding for response

National forests and their collaborators sought new or additional funding to help support responses to MPB, including from federal, state, county, NGO, and private sources. These sources included, for example, new federal funding directed toward certain forests or regions, reallocation of funding within regions to redirect funds to forests experiencing severe MPB impacts, state funds for insect and disease response on adjoining lands, water utility funds to address risks in critical watersheds, and foundation and nonprofit contributions. In many cases, partners, stakeholders, and collaborative group members were crucial for identifying and finding new funding sources to support MPB response by amplifying awareness and concerns. Forests with stronger political connections at the national scale also tended to have more directed federal funding and political support.

Capacity for response

National forests also worked to increase capacity in response to MPB, including new uses of partners, contractors, and Forest Service staff at regional and national offices. Innovative approaches to environmental analysis allowed planning and preparation of large landscapes for treatment, which sped up responses and preventative actions to MPB. The BHNF in South Dakota/Wyoming created an analysis and NEPA decision for a large landscape area, while the CNF in Washington piloted a new approach wherein NEPA requirements for a stewardship contract were completed by a third-party contractor. The three MPB-affected forests in Colorado shared an incident management team that helped communicate about safety risks and closed recreation sites to increase public awareness of MPB outbreaks and effects. The regional Western Bark Beetle Strategy prioritized actions for MPB response focused on human safety and resource values, which informed decision-making in some forests. Forest health monitoring that tracked the extent and spread of MPB was also key for decision support.

Innovative use of programs, tools, and authorities

The scope, scale, and pace of MPB outbreaks necessitated innovation. These innovations allowed agency managers to address forest health issues by 1) planning more rapidly, 2) working at larger spatial scales, and 3) implementing projects across ownerships with partners who could contribute capacity to address cross-boundary concerns. Individual forests used the Good Neighbor Authority, 2014 Farm Bill forest health emergency designations, and other new authorities as part of larger strategies for responding to outbreaks. In some cases, the use of categorical exclusions allowed targeted treatments in locations with high public use and safety risks such as roads, powerline corridors, recreation sites, and areas proximate to communities. Authorities such as stewardship contracting allowed treatments where material removed was of limited or no commercial value, which was particularly important in areas that lacked processing infrastructure. Three case

study forests were able to use the Collaborative Forest Landscape Restoration Program or the Joint Chiefs' Landscape Restoration Partnership to help fund landscape-scale restoration projects in MPB-affected areas. The use of innovative tools and authorities was strongly associated with the strength of local collaborative processes.

Challenges in mountain pine beetle response

Scope, scale, and speed of MPB infestation

Although agency resources and capacity challenges varied across national forests and regions, the unprecedented pace and scale of MPB outbreaks broadly limited agency managers' ability to respond rapidly. At the time of the outbreak, many national forests were facing pre-existing capacity challenges such as inadequate budgets and staff to complete necessary NEPA analysis and implement projects. Those that were unable to obtain additional resources for MPB response experienced these challenges even more acutely. Many response efforts were therefore more focused on addressing MPB impacts, rather than proactive prevention prior to infestation. In addition, this meant that MPB responses on national forestlands were not consistently coordinated with those on adjacent ownerships in all cases, as managers of those ownerships had different capacities and approaches to implementing treatments.

Social conflict over national forest management

Some planned projects that included MPB treatments faced objections and/or litigation from outside individuals and organizations, although this issue was most prevalent in the Montana national forests with a history of legal challenges to national forest management. Despite agency efforts to collaborate during the NEPA process, objections and litigation slowed several projects from being implemented in this case. This contributed to increased frustration among collaborative stake-



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holders who had sought more active and timely response to MPB, as well as active restoration to address other forest health issues. Social conflict was present to some extent in each case, even those with active collaborative organizations. In most cases, collaborative processes were successful at resolving tensions and arriving at broadly supported MPB response plans, but even the most apparently “successful” groups continued to experience conflict over questions of whose interests were being represented in short- to long-term management plans.

Timber value and local forest industry context

Plans to remove MPB-killed or green trees anticipated to be killed created timber volume for harvest in each case study. However, the quality of this wood and the availability of local or regional infrastructure to process it varied. In the Black Hills case, much of the material removed was green trees and there was local industry to utilize it, although concerns also arose about the future stocking and composition of the forest. Where industry was not present and/or the wood was of lower or no value due to the direct effects of MPB infestation, the cost per acre to implement treatments was higher, resulting in fewer acres treated. Use of stewardship contracting to remove some of this material aided with this issue, but rebuilding forest management and processing capacity is a long-term effort.

Comparison across cases

The comparison of four distinct cases of national forests confronting MPB outbreaks of unprecedented scale and severity allowed us to consider commonalities and differences, and begin to draw conclusions about factors that led to the outcomes observed. In each case, the MPB outbreak prompted USFS managers to build and strengthen networks with non-USFS entities as a means of attempting to build social consensus about re-

sponse, and to aid in adding funding and capacity to implement agreed-upon plans. In some cases, pre-existing collaborative networks served as the locus for these types of deliberations, whereas in other cases, new networks were constructed specifically to deal with MPB issues. In each case, the outbreak also led USFS managers and their non-USFS partners to adopt new and innovative planning and implementation techniques meant to increase the scale and efficiency of forest management. These innovations included the application of recent policy tools such as the Good Neighbor Authority or stewardship contracting and, in some cases, experimentation with entirely new arrangements and practices.

Not all forests were equally successful in realizing their response plans, however. Forests with a recent history of constructive and collaborative relations with the community and strong ties to federal, state, and local governmental officials were able to move relatively quickly in response to the MPB, whereas forests with a more conflictive history had to invest more time in working through potential solutions and, in some cases, continued to see their MPB response plans slowed or blocked through administrative and judicial challenges. Forests with existing timber processing infrastructure had greater options for adding value to beetle-killed timber and for treating green stands that were thought to be susceptible to future infestation. The Colorado experience shows the difficulties in attempting to rebuild processing infrastructure on a compressed timeline. Finally, the forests’ ecological and biophysical conditions created variability in the kinds of responses that were available. For example, the Black Hills National Forest generally benefited from accessibility to MPB-affected forest stands, whereas many affected stands in Colorado and Montana were located in steep and roadless terrain. Additionally, the large expanses of lodgepole pine in places like northern Colorado created sequencing challenges that were not apparent in places like northeastern Washington where mixed-species stands were more common.

Conclusion

The MPB is just one of many agents of disturbance that poses challenges to forest management. This research suggests opportunities and best practices as communities and national forest units continue to confront dynamic forest conditions and emerging challenges. Networks of USFS and non-USFS entities can come together in the wake of large disturbance events to plan, innovate, and respond; but local social, economic, and ecological conditions may also strongly shape the resulting outcomes. Although attention to forest conditions has been high during these moments of rapid change, leading to brief spikes in funding and political

support for management, what may be necessary is a longer-term program of forest management for resilient conditions that begins long before major disturbances appear on the landscape. Building the consensus for these types of sustained management programs, and the staffing and resources for their implementation, is itself a long-term project that requires investments of time and resources among agencies and partners at multiple levels. It remains to be seen whether experiences with the MPB will encourage shifts to manage for forest resilience at larger spatial and temporal scales.



