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Forest Management and Wildfire Risk in Inland Northwest

Survey of Landowners' Concerns About Public Land Management in Northeastern Oregon

Joel Hartter, Forrest R. Stevens, Lawrence C. Hamilton, Paul T. Oester, Russell G. Congalton, Mark J. Ducey, and Morgan A. Crowley

Many working landscapes[1] throughout the American West are in transition. From the 1950s through the late 1980s in parts of the American West, the wood products industry was an important economic driver, woven into the social and cultural fabric of many rural communities—particularly communities near national forests. In the last two decades, policy changes on federal forests have de-emphasized wood fiber production and have shifted toward diversifying forest structure and habitat, initially with the goal of maintaining old-growth habitat but later with an emerging and sometimes controversial emphasis on creating fire-resilient forests and landscapes and restoring ecosystem functions. These changes led to declining timber harvests in the 1990s and 2000s. The decline in wood harvests from federal forests affected the region's timber supply chain and dramatically altered the economic foundations of communities that depend on working, forested lands. At the same time, populations, settlements, and new housing are increasing in many of these historically resource-dependent areas because they are often in desirable, scenic places. Many forest community residents have transitioned from those who were financially dependent on timber harvests to retirees, second-home buyers, amenity seekers, and others who value the forest more for its aesthetic properties and investment potential than as a main source of economic livelihood. The shift from heavy reliance on commodity timber production, particularly on federal forestlands, has transformed the ways in which forests are perceived, valued, and managed. This shift has created a tension between the "Old West," where residents still value the landscape as a source of economic production and cultural identity,[2] and the "New West," in which natural amenities and wilderness play more important roles.

KEY FINDINGS

- Northeastern Oregon forest landowners perceive wildfire as the greatest threat to their lands.
- Forest landowners believe public lands are managed poorly and see a greater risk of wildfire occurring on neighboring public land than on their own land.
- A majority of landowners perceive cooperation with neighbors as very or extremely important for land management.
- People who participate in extension programs have different outlooks and opinions on land management from those who do not participate in extension programs.
- Forest landowner opinions on land management are not strongly related to background factors or ideology (for example, gender, age, political party, wealth) but may be heavily influenced by personal experience with wildfire.

Recent patterns of fire behavior have raised concerns that land use and fire suppression—a legacy lasting more than 100 years—have fundamentally altered the interaction of fire and forests on the landscape.[3] Fire suppression in public and private forests (which still succeeds in suppressing more than 99 percent of all unwanted wildland fires during initial attack[4]) has contributed ironically to uncharacteristically dense

stands, abundant understory vegetation, and high fuel loads, leading to an increasing number of large and more intense wildfires. Dense, overmatured, water-stressed forests are also vulnerable to insect outbreaks, which increase tree mortality and add to the fuel load. Forecasted growth in these natural hazards implies dramatic socioeconomic costs to local people.

The Communities and Forests in Oregon (CAFOR) Project, which began in 2010, focuses on the people and landscapes of Baker, Union, and Wallowa counties in northeastern Oregon, where working landscapes and communities are changing in interconnected ways (see Figures 1 and 2). The CAFOR Project assesses how different landowner groups manage forests and examines the relationships between perceptions of risk and forest management. Nearly a century of emphasis on fire suppression on federal lands, drier conditions, and reorientation of forest management have created forests in the Wallowa–Whitman ecosystem with a heightened risk of catastrophic insect outbreaks and wildfire. Forecasted increases in these natural hazards imply dramatic socioeconomic costs to communities that depend on the forest and its services for commodity timber production, amenity services, and ecosystem services.

Figure 1. The landscape of northeastern Oregon is characterized by a dynamic mix of land uses and management priorities. This photo of fields, pasture, private and public forests, and designated wilderness south of Enterprise, Oregon, in Wallowa County, illustrates how agriculture, forest uses, amenity seekers, and conservation interests generate multiple management interactions among various stakeholders.



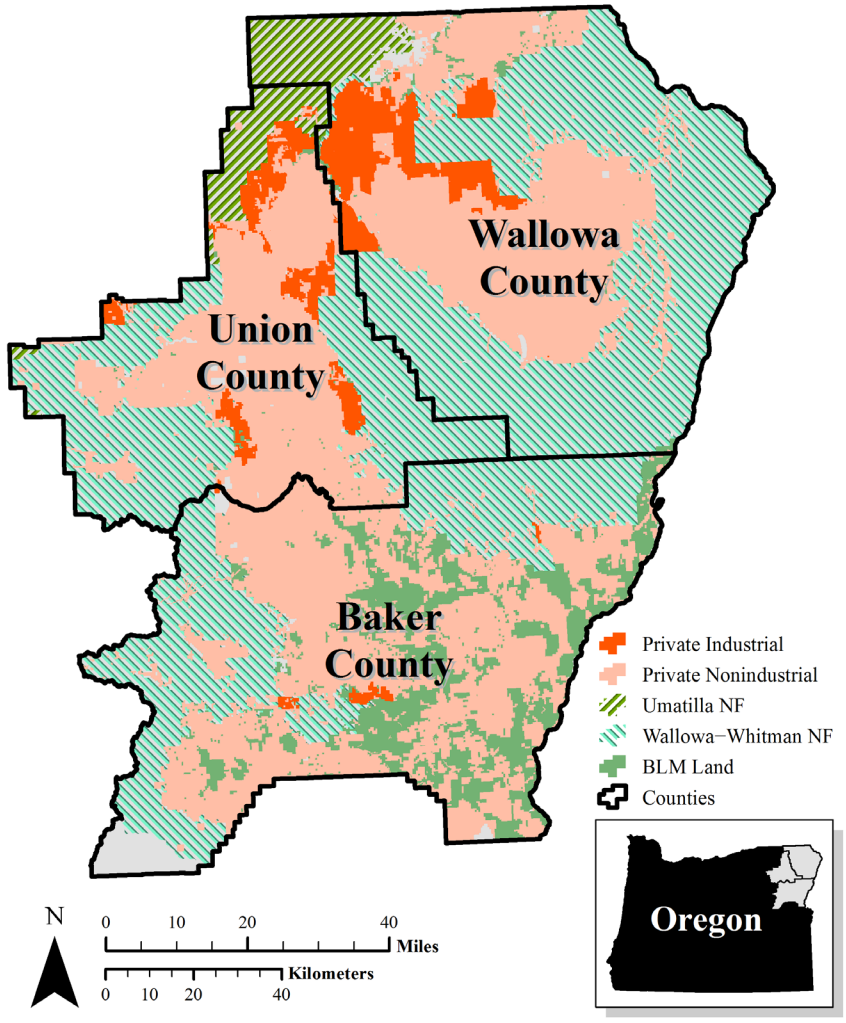
Photo Credit: F. R. Stevens

Working Forests of Northeastern Oregon

Northeastern Oregon exemplifies working landscapes that are in transition. Three counties in northeastern Oregon (Baker, Union, and Wallowa) contain the Umatilla and Wallowa–Whitman National Forest (WWNF) (including Hells Canyon National Recreation Area), which includes 2.3 million acres, of which 600,000 acres are designated wilderness. Forests in this region of Oregon, 45 percent of which are on public land, are threatened by insect outbreaks and the risk of catastrophic wildfire. From 1990 to 2000, jobs in the forest sector throughout Oregon decreased by 10 percent, despite 32 percent growth in the overall Oregon economy.[5] Mills have closed and logging infrastructure has drastically declined owing to steep reductions in timber harvesting in national forests in the region. The loss of jobs and economic activity indirectly affect other local service-oriented businesses. Unemployment and poverty rates remain high for the state. Despite Oregon's strict regulations that limit conversion of agricultural areas and forestlands to other land uses, there have been changes in land use and ownership. The cost of housing has tripled since 1990, although the annual wage only increased about 3 percent.[6] Population levels have remained nearly constant since 1980, despite immigration of exurbanites to the area. However, land use and forest management strategies have become more heterogeneous, with a more diverse array of beliefs about what constitutes effective management and strategies to reduce wildfire and improve forest health.

These shifts in "small" landowner demographics (those who own fewer than 10,000 acres) and

Figure 2. The three-county study area of the CAFOR Project. Within the study area, the federal government constitutes the largest land manager (almost 53 percent), with private, nonindustrial landowners (including nonforested land) managing 42 percent and industrial, forest landowners managing about 5 percent. In Wallowa County alone, 58 percent consists of public land.



changing management strategies among both short- and long-term residents represent new and diverse goals and concerns. Although federal lands (wilderness and non-wilderness areas) make up 53 percent of the land area, these small, nonindustrial landowners own almost 42 percent of the land. Most of the changes in demographics in these counties are occurring in areas that have greater amenity value, particularly small, private non-industrial forested areas that typically neighbor the largely forested federal lands. Specifically, the management decisions being made by these small, nonindustrial land managers, while made alone and have small effects on relatively little area, together constitute a much larger effect on the landscape. Therefore, to understand how current forest conditions and perceptions about them have lasting and dramatic effects on forests and ongoing management decision making, it is very important to capture information about the diversity and evolution of goals and decisions among forest landowners in the last few decades.

The CAFOR Survey

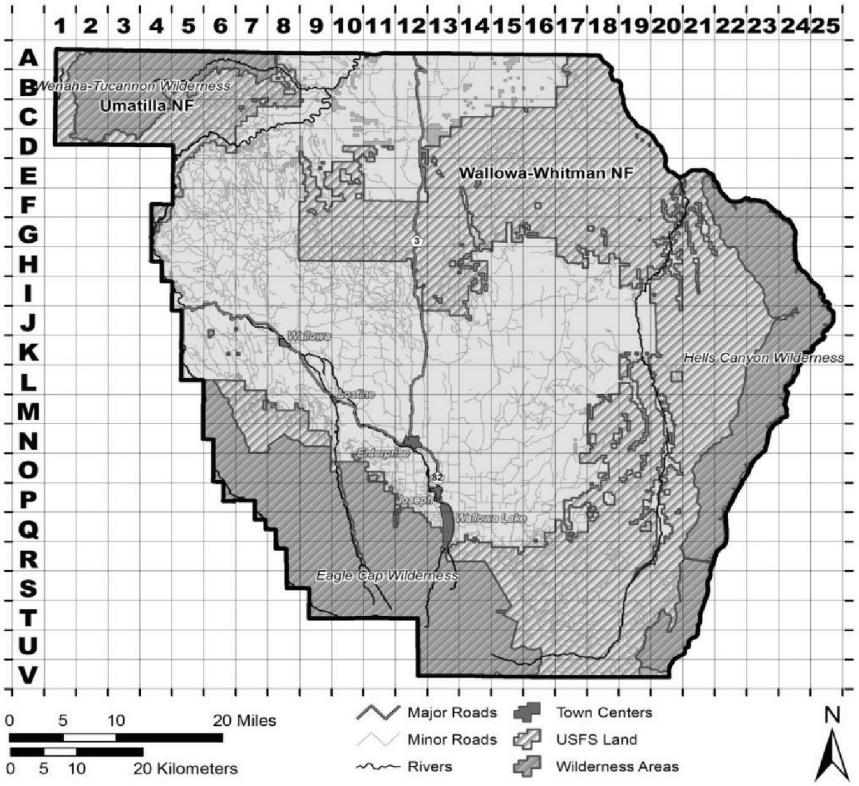
In cooperation with Oregon State University Forestry and Natural Resources Extension and the College of Forestry, the CAFOR Project at the University of Colorado and the University of New Hampshire conducted a mail survey of forest landowners in three counties in northeastern Oregon[7] in the fall of 2012. The mail survey was a follow-up to a telephone survey conducted for the same three counties in the fall of 2011.[8] The survey was administered to understand who constituted forest landowners in Wallowa, Union, and Baker counties and their perceptions about forest management on both public and private land. The survey also assessed their perceptions about risks to forests in the area and the actions they have taken to reduce those risks. A total of 2,133 questionnaires were mailed to forest landowners between September and October 2012, and 454 were completed and returned (22 percent response rate).

Forest landowners were defined as those who owned ten acres or more on a single parcel of land.

Each four-page questionnaire was accompanied by a map of the county that corresponded to their mailing address (Figure 3). We asked each landowner to mark on the map the location of one parcel of their land,[9] for which they would answer specific forest-related survey questions. Marked maps enabled us to spatially relate responses to a general location on the map; however, the three-mile grid cells were large enough so that individual landowners and their lands *could not* be identified. All individual responses and their locations remained anonymous.

Survey participants were forest landowners with a mean age of 65 years (standard deviation of 11 years) and most were men (74 percent). Thirty-eight percent were employed full time, 15 percent were employed part time, 45 percent were retired, and 3 percent were unemployed. Most of the respondents were residents of Wallowa, Union, or Baker counties (60 percent), and worked on their land part time (67 percent). Eighty-five percent of respondents had education beyond high school, 46 percent reported an annual income of at least $60,000, and 25 percent reported an annual income of at least $90,000. Of those who were surveyed, 26 percent were seasonal residents, residing in Baker, Union, or Wallowa counties for fewer than six months of the year. The survey revealed that small private forest landowners rely on forests in multiple ways. The most common primary or secondary objective for their land, after it being a place of residence (40 percent), were timber (33 percent), agriculture (22 percent), recreation (28 percent), and investment (33 percent).

Figure 3. Example of the county map (Wallowa) included in the mail survey. Landowners were requested to mark the grid cell they would refer to in their responses on the survey.



Greatest Perceived Threat to Private Northeastern Oregon Forests Is Wildfire

Sixty-five percent of participants ranked wildfire as the greatest potential threat to their forest. Landowners, however, were more concerned about the conditions on neighboring forestland than conditions on their own forestland. Sixty-five percent of respondents reported moderate or very high concern about neighboring land versus 45 percent for their own land. The highest concern was for public lands (Umatilla and Wallowa–Whitman National Forests) compared with private nonindustrial (that is, family farms) and industrial forestlands (Figure 4). Sixty-two percent of landowners perceived a high risk of dangerous fire occurring on neighboring public lands.

Background and demographic factors for people such as age, gender, political party affiliation, education, and wealth often play a role in people's perceptions about environmental issues and concerns. These factors, however, did not appear to influence responses in this survey—at least with regard to forest management and health. There was strong concern for

Figure 4. Perceived risk in forestland. Respondents were asked, "How high do you consider the risk of a dangerous fire occurring on your and your neighbors' lands?" Most forest landowners perceived a moderate to high degree of risk associated with wildfire on their own lands; however, neighboring lands, and in particular public land, were considered at greater risk.

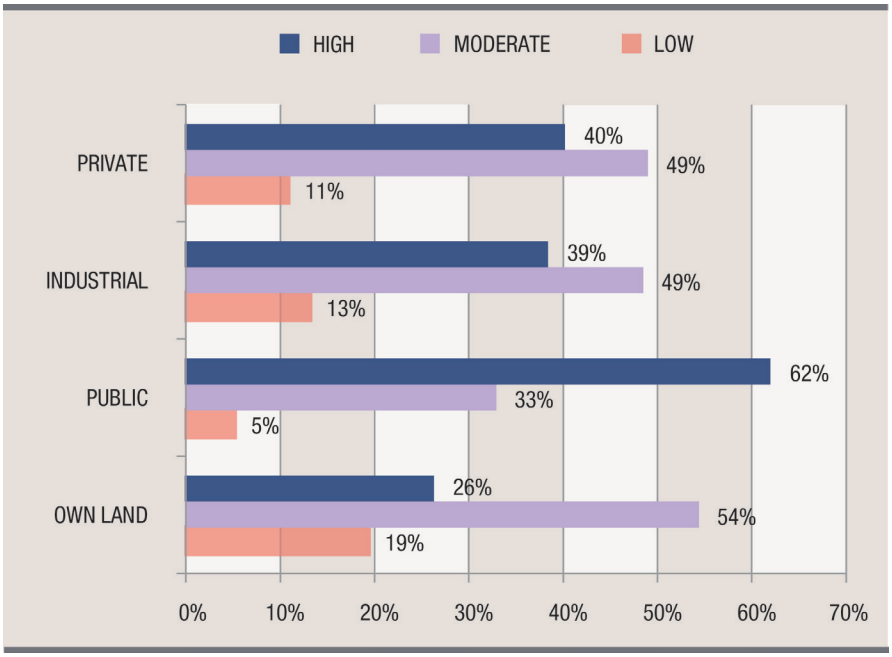
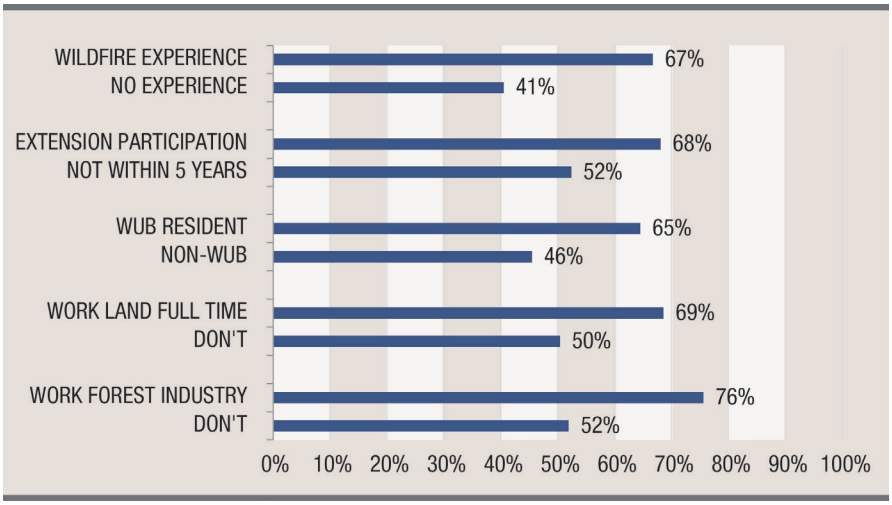


Figure 5. Percentage of respondents perceiving high risks of dangerous fire on neighboring public land. "WUB" residents are those respondents with permanent addresses in either Wallowa, Union, or Baker counties. Responses show that personal experience and background significantly affects perceptions about forest conditions and risks associated with fires.

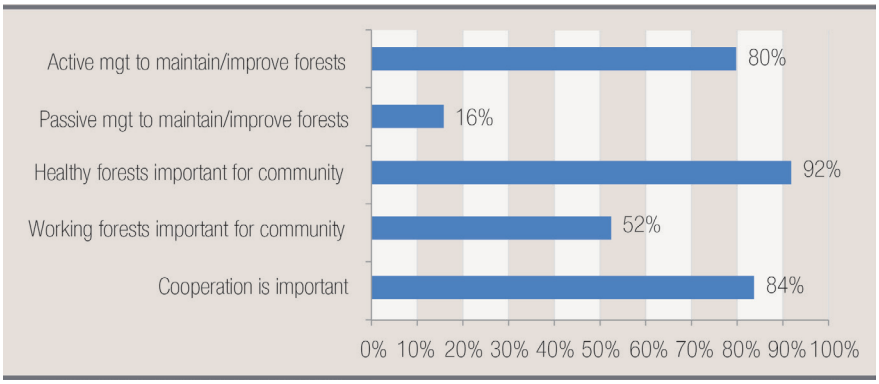


forests[10] that transcends these typical factors. Varying views on forest conditions were associated with factors such as the following: experience with wildfire, participation in forest-related extension activities within the last five years, working on their own land full time, and working in the forestry sector (Figure 5). In particular, permanent versus part-time residence was also highly associated with views on forest conditions; a higher proportion of those with permanent residences inside Wallowa, Union, and Baker counties perceived higher risks of dangerous fire on public lands. Moreover, these perceptions were widely dispersed throughout the three counties and were not localized to a few pockets. Overall, the sentiment about public lands among forest landowners was negative.

Only 36 percent of respondents believed that public lands near their property are managed well, and a smaller percentage (26 percent) believed that, as a whole, public lands are managed well.

Overall, respondents were concerned about the conditions of forestlands in northeastern Oregon and the federal forests in particular. They believed strongly in resource stewardship and that nonactive management leads to greater fire risk. Residents are invested in the regional ecosystem, on both public and private lands, and believe healthy forests are an important contributor to community vitality. Working lands are not just part of the past, but this heritage is essential to local communities and cooperation is needed in issues of forest health among landowners (Figure 5).

Figure 6. On a scale of "not at all," "somewhat", "very," or "extremely" important, these represent the percentage of respondents who answered "very" or "extremely" important with regards to the following items relating to forests and communities in northeastern Oregon.



Discussion

Overall, there is a strong concern about wildfire among forest landowners in Baker, Union, and Wallowa counties, but the sentiment is much stronger when it comes to federal forests. In working landscapes, jobs and forest health are connected. Timber production fell drastically in the past two decades in this region, led by a decline—based on gross receipts—of more than 90 percent in federal land harvests. Overall harvest decline since the 1980s, coupled with rising global competition, led to mill closures (all three industrial-scale facilities in Wallowa County, five of eight in Union County, and five in Baker County have closed permanently) and mill closures in nearby Pendleton, Oregon; John Day, Oregon; and Walla Walla, Washington. Furthermore, the logging infrastructure (that is, logging, trucking, and skilled labor) was reduced, and United States Forest Service staffing was cut in half with several hundred jobs lost (along with their families and tax revenue owing to emigration). Rising costs of ranching—including costs for energy and feed—have added to the economic hardship in these counties.

Unlike other environmental issues where beliefs are strongly tied to political ideology[11] or other common factors such as age, gender, and wealth, personal experience with wildfire is the strongest predictor of concern about wildfire. This is unsurprising in this region because of the strong historical tie between people and forests. Underscoring this point is the difference between part-time and permanent residents with regard to assessing the quality of management and risks of wildfire on public lands. Many of these part-time residents may have different motivations and cultural attachments to public lands and their role in the historic economic and environmental fabric of northeastern Oregon. We also learned that neighbors matter. Most people perceive less of a threat on their own land versus their neighbors. However, concern about public lands is by far the greatest.

Working landscapes in eastern Oregon represent a glimpse of the transition occurring throughout the American West: The consumption of aesthetic and lifestyle amenities is replacing traditional agricultural production and forest harvesting. These counties have experienced migration, the introduction of new land uses, and new patterns of social and economic activity, all of which have affected forests and local livelihoods. Despite a long tradition of extending land use control to local governments, these decisions are often constrained by a mix of policies and regulations created by federal, state, county, and municipal governing bodies. On private lands, management decisions are affected by a complex interaction of externalities (for example, globalization of the forest products market, decline in supply from public lands, milling technology efficiencies, and loss of milling infrastructure), policies, and changing demographics. Here, people are managing to meet their own needs (for example, generating cash, investing, hunting), while minimizing the occurrence or proliferation of wildfire and insect outbreak. How people perceive and manage risk reduction significantly affects management decisions, but in these working landscapes, the interconnected issues of forest management and conditions (both employment and disturbances) are perceived as the greatest threat. The aggregate effect of land use and forest change reflects many small individual decisions made by a diverse array of landowners. Decisions about land use on 10-, 20-, or even 100-acre parcels cause a relatively small footprint that often is "invisible" when viewed collectively as a region, but their accumulation can have dramatic and long-lasting effects on the working landscapes of northeastern Oregon.

Endnotes

1. Working landscapes imply a mix of market and nonmarket social benefits and are typically places where economies have focused on land-based production (for example, ranching, farming, timber harvesting).

2. T. M. Power and R. N. Barrett, *Post-Cowboy Economics: Pay and Prosperity in the New American West* (Washington, DC: Island Press, 2001).

3. J. K. Agee and C. N. Skinner, "Basic Principles of Forest Fuel Reduction Treatments," *Forest Ecology and Management*, vol. 211 (2005): 83–96; T. B. Jain and R. L. Graham, "The Relation Between Tree Burn Severity and Forest Structure in the Rocky Mountains," in "Restoring Fire-Adapted Ecosystems: Proceedings of the 2005 National Silviculture Workshop," Gen. Tech. Rep. PSW-GTR-203, edited by Robert F. Powers (Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2007), 213–250.

4. The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire. V. H. Dale et al., "Climate Change and Forest Disturbances," *BioScience*, vol. 51 (2001): 723–734.

5. OFRI, "Oregon's Forest Sector Contributions & Potential" (Corvallis: Oregon Forest Resources Institute, 2004).

6. D. Snyder, "Wallowa County Economic Action Team Rural Development Assistance Team Report" (Enterprise: Publisher/Organization (Wallowa County), 2007).

7. The UNH Survey Center administered the mail survey to respondents in Wallowa, Union, and Baker counties. The survey was mailed to landowners on September 18, 2012, and a reminder was sent out October 3, 2012. Addresses were obtained through publicly available county tax lot records. The response rate was 22 percent, which is a respectable rate for a survey of this type.

8. See L. Hamilton et al., "Forest Views: Northeast Oregon Survey Looks at Community and Environment," Issue Brief No. 47 (Durham, NH: Carsey Institute, 2012), available at www.carseyinstitute.unh.edu/publications/IB-Hartter-NE-Oregon-Survey.pdf.

9. We understand that forest landowners can and do own multiple parcels in any of the three counties.

10. See Hamilton's report on the telephone survey (endnote 8 above), available at www.carseyinstitute.unh.edu/publications/IB-Hartter-NE-Oregon-Survey.pdf.

11. L. C. Hamilton et al., "Rural Environmental Concern: Effects of Position, Partisanship and Place," *Rural Sociology* (2013). DOI: 10.1111/ruso.12023.

Acknowledgments

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About the Authors

Joel Hartter is an associate professor of environmental studies at the University of Colorado at Boulder and a fellow at the Carsey Institute at the University of New Hampshire (joel.hartter@colorado.edu).

Forrest R. Stevens is a postdoctoral research associate at the University of Colorado at Boulder (forrest.stevens@colorado.edu).

Lawrence C. Hamilton is a professor of sociology and a senior fellow at the Carsey Institute at the University of New Hampshire (lawrence.hamilton@unh.edu).

Paul T. Oester is a forestry and natural resources extension agent based in Union County, Oregon, for Oregon State University (paul.t.oester@oregonstate.edu).

Russell G. Congalton is a professor in natural resources and the environment at the University of New Hampshire (russ.congalton@unh.edu).

Mark J. Ducey is a professor in natural resources and the environment and a senior fellow at the Carsey Institute at the University of New Hampshire (mark.ducey@unh.edu).

Morgan A. Crowley is a master of science student in natural resources and the environment at the University of New Hampshire (mad96@wildcats.unh.edu).

University of New Hampshire

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Huddleston Hall
73 Main Street
Durham, NH 03824

(603) 862-2821
TTY Users: dial 7-1-1 or 1-800-735-2964 (Relay N.H.)

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