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PNW Pacific Northwest Research Station

Science FINDINGS

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"Science affects the way we think together."
Lewis Thomas

Managing Wildfire Risk in Fire-Prone Landscapes: How Are Private Landowners Contributing?

Paige Fischer

Most landowners in a recent study reported that they treat their forest properties to reduce the risk of wildfire.

"Boundaries: fires don't understand them. We can't draw a line and say we did our part up to this point and now we are good —it's a bigger picture."
—Landowner in Upper Grande Ronde Watershed

As the scale, frequency, and intensity of wildfires increase throughout the western United States, forest managers have been emphasizing the need to reduce hazardous fuels on forest land and restore fire-adapted ecosystems. Property boundaries are irrelevant to a raging fire, which means that successful risk-reduction efforts often include coordinated treatments on both private and public lands.

Nonindustrial private forest land comprises 35 percent of all U.S. forest lands. In the western United States, many family forest parcels border federal land, creating the potential for movement of fire between wildlands and populated areas. When the Pacific Northwest (PNW) Research Station received funding through the National Fire Plan to undertake social science research, Susan Charnley and Paige Fischer initiated a project to gain insight into how nonindustrial private forest owners perceive and address fire risks, and what might motivate them to reduce hazardous fuels on their land.

Charnley, an environmental anthropologist and research social scientist with the station, explains: "Because fire as a natural process operates across ownership boundaries, the Forest Service is taking an all-lands approach to forest management, and is making an effort to cooperate with other landowners across landscapes. There's very little information about how family forest owners manage their

IN SUMMARY

The fire-prone landscapes of the West include both public and private lands. Wildfire burns indiscriminately across property boundaries, which means that the way potential fuels are managed on one piece of property can affect wildfire risk on neighboring lands.

Paige Fischer and Susan Charnley, social scientists with the Pacific Northwest Research Station, surveyed private landowners in eastern Oregon to learn how they perceive fire risk on their land and what they do, if anything, to reduce that risk. The scientists found that owners who live on a forested parcel are much more likely to reduce fuels than are those who live elsewhere. Private forest owners are aware of fire risk and knowledgeable about methods for reducing fuels, but are constrained by the costs and technical challenges of protecting large acreages of forested land. Despite the collective benefits of working cooperatively, most of these owners reduce hazardous fuels on their land independently, primarily because of their distrust about working with others, and because of social norms associated with private property ownership.

These results provide guidance for developing more effective fuel reduction programs that accommodate the needs and preferences of private forest landowners. The findings also indicate the potential benefits of bringing landowners into collective units to work cooperatively, raising awareness about landscape-scale fire risk, and promoting strategies for an "all-lands" approach to reducing wildfire risk.

land for fire. We need to learn about how they're managing their land for the same risks we face as an agency, to see what we might do differently to better address those risks."

Fischer, a research social scientist with the Forest Service's Western Wildland Environmental Threat Assessment Center, took the lead on the project. For their study area, she and Charnley chose the arid ponderosa pine zone on the east side of Oregon's Cascade Range, where fire suppression, grazing, and harvest methods have led to a buildup of hazardous fuels.

Fischer first interviewed 20 private forest landowners in each of three locations—the Sprague, Upper Deschutes, and Upper Grande Ronde River basins—and toured the properties with the owners. Using the information from the interviews, Fischer and Charnley then developed a mail survey that queried landowners about their forest management goals and practices, perceptions of fire risk and barriers to reducing fuels, experiences with fire, and policy preferences.

Fischer worked with Tom Spies, a research ecologist with the station, to develop an innovative technique to create the mailing sample for the survey using spatial vegetation layers and geographic information system (GIS) technology. She explains: "There's no list of private forest owners in the ponderosa pine area. You can get lists of landowners from tax assessors' offices, and you can sort them by how their land is zoned. But the people who own ponderosa pine forest land can have their land zoned as forest land, rangeland, agricultural land, or residential land. So selecting the sample for the survey was a big challenge of the study."

Recognizing an opportunity to learn more about how to reach out to private landowners and the implications of land use, zoning, and housing density for fuel reduction, the Oregon Department of Forestry funded and mailed the surveys and entered the survey data into a database. Oregon State University's (OSU) Department of Forest Ecosystems and Society also provided support.

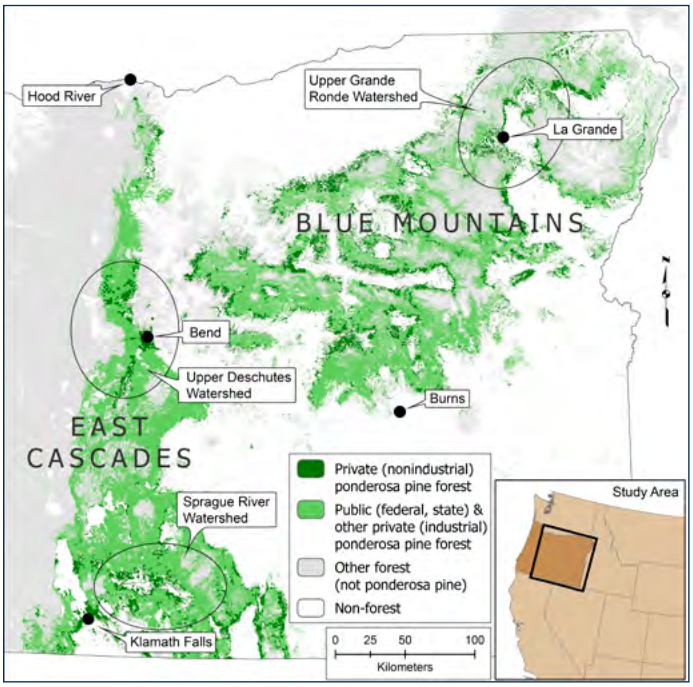
KEY FINDINGS

- Private forest landowners who perceive great fire risk or are concerned about hazardous fuel conditions on nearby public lands are more likely to reduce fuels on their properties and cooperate with public agencies on fuel reduction.
- Most private landowners surveyed reduce fuel independently, rather than in cooperation with others, primarily because of distrust and social norms about private property ownership.
- Forest owners who live on a forested parcel of land are much more likely to reduce fuels on that parcel than are owners who maintain residences elsewhere.
- Limited opportunity to offset the costs of fuel reduction (e.g., with public incentive programs or income from markets for logs and wood products) poses greater constraints to fuel reduction by private forest owners than does lack of knowledge or skills.

MOST LANDOWNERS ARE REDUCING FIRE RISK

Of the 1,010 surveys delivered, Fischer and Charnley received 505 valid responses. They were surprised to find that 70 percent of the people surveyed reported treating their land to reduce hazardous fuels between 2003 and 2008. The most common treatment methods included burning fuels in piles, grazing livestock, thinning and pruning trees, clearing brush around structures, and creating firebreaks.

Fischer notes, "Many public agencies assume that private landowners aren't knowledgeable about fire risks, aren't motivated to make their lands less vulnerable to those risks, and aren't contributing to reducing wildfire risk across the landscape. Our study shows that landowners are aware, they are concerned, and they are taking action." She continues, "Reducing fire risk on large acreages requires applying mechanized approaches, creating fuelbreaks, and using controlled or prescribed burning. These management techniques require a sophisticated set of skills and knowledge and considerable financial resources. It's definitely not easy, yet people are applying them."



The study area. Scientists interviewed 60 private forest owners; another 505 forest owners responded to a written survey.

Fischer and Charnley also found that owners who live on the properties included in the survey were almost eight times more likely to reduce fuels on their land than owners whose primary residences are elsewhere. Residents are more motivated to take action than nonresidents because they are more aware of hazardous conditions on their land and adjoining lands, they have valuable investments at risk, and they don't have to travel to manage their land. Also, owners who perceive great fire risk or are concerned about fuel conditions on nearby public lands treat their properties to compensate for their neighbors' failure to manage their land.

However, limited opportunities to offset the costs of reducing fuels—for example, with public incentive programs or income from markets for wood products—pose the greatest constraints to these efforts. Fischer reports: "Owners generally recognize that fire risk is increasing, and there's not enough money to go out and treat every acre. There's also an uncharacteristic and hazardous accumulation of forest vegetation on public land. But how that should be managed and to what extent it creates more of a risk than the conditions on other people's lands is a matter of opinion."

INDEPENDENT ACTIONS

The landowners interviewed who perceived the risk of wildfire on their property and attributed the risk to conditions on nearby lands were more likely to treat hazardous fuels on their land and cooperate with others to reduce the risk, but only when neighboring public lands—not private lands—were the source of the risk.

Says Fischer, "We suspected that motivations for cross-boundary cooperation would include both outcomes that benefit owners' property values and land management objectives, and opportunities to pool or leverage resources to reduce fuels more efficiently than working alone. Yet despite the collective benefits of working cooperatively across boundaries, most of these owners reduce fuels on their land independently."

When private forest landowners do cooperate with others to plan, pay for, or conduct fuel treatments, they are more than twice as likely to work with public agencies (39 percent) than with other private landowners (15 percent) or nonprofit organizations (18 percent). This may be due to incentives for private-public cooperation, such as administrative, technical, and financial support. Private landowners have participated with their public forest neighbors in fire management planning, forest thinning, and brush clearing, and in synchronized prescribed burns. They also allow neighboring private landowners to graze livestock or horses on their properties to reduce grass and brush, or jointly plan fuel reduction treatments along a shared property boundary to create a wider fuel break.

Significant predictors of private landowners' willingness to cooperate with public landowners included concern about fire affecting their properties, previous experience with a fire on their properties, and greater knowledge of the role of fire in maintaining forest health. However, only knowledge about the role of fire in forest health predicted cooperation with other private owners.

Paige Fischer

Owners concerned about fuel conditions on nearby public lands are likely to treat their own. Above, the fence separates private property on the left from national forest land on the right.

Tom Iraci

Property owners are more likely to partner with public agencies on fuel reduction projects than with other private landowners.

SOCIAL, LEGAL, AND FINANCIAL CONCERNS

The surveyed landowners identified several barriers to cooperation. For example, with a median property size of 540 acres, many of landowners are rather isolated. Legal liability and the risk of being held responsible for fires or injuries that result from escaped controlled burns also discourage many owners from using prescribed fire to reduce fuel. Gulfs in values, beliefs, and motivations regarding the management of fire risk were perceived as additional barriers to cooperation.

The most commonly cited reasons for the reluctance of the landowners to work cooperatively with their private neighbors were distrust and social norms about private property ownership. Says Fischer: "At the heart of the forces that work against cooperation is an

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age-old challenge to collective action: free-ridership. If I reduce fuels on my property, my neighbors will benefit from my investment and from the reduced risk to their property, without having to do anything. There's also the social norm that says private property owners shouldn't meddle in each other's affairs or expect each other to provide protection against fire risk."

"Most of these relationships are interpersonal and are built on trust," Fischer continues. "When you don't have rules for interaction and reciprocation as you would with financial transactions or institutional relationships, it takes longer for trust to build, and it's easy to knock it down if someone doesn't reciprocate when expected. The financial cost and magnitude of cooperation on fuel reduction make it more of an economic transaction with a lot more risk."

The researchers found that other social constraints limit cooperation with neighboring private landowners. For example, about half of the survey respondents are members of organizations related to natural resource, fire, or property management. Several landowners were concerned about potential threats to neighborly relations between those who chose to participate in such groups and those who did not. They were also concerned about new bureaucratic or regulatory burdens, which they perceived as risks to their autonomy as private landowners if they accepted support from public agencies. Other landowners expressed discomfort at the prospect of unequal relationships between themselves and "the experts" at the agencies.

Paige Fischer

Concern over liability for escaped controlled burns may discourage landowners from using prescribed fire to reduce fuel.

DESIGNING MODELS AND PROGRAMS FOR FUTURE COOPERATION

Although their cooperation has been low in the past, 70 percent of survey respondents said they would be willing to cooperate with public and private forest landowners in the future to reduce fuels if it would provide benefits, such as reducing their share of the cost of treatments or making funding available for treatments.

Presenting some scenarios for future cooperation, Fischer and Charnley asked landowners if they would prefer an informal "over-the-fence" model, where neighbors observe each other's activities and act similarly or encourage neighboring public agencies to do more, or a more formal model led by natural resource management agencies that provides educational, technical, or financial support to landowners.

The landowners thought that among neighbors, informal models might be preferable, because they are less likely to make neighbors feel defensive. But where approaches to solving landscape-scale problems could benefit from involving multiple owners from different areas, landowners thought that formal models of cooperation could increase efficiency and focus.

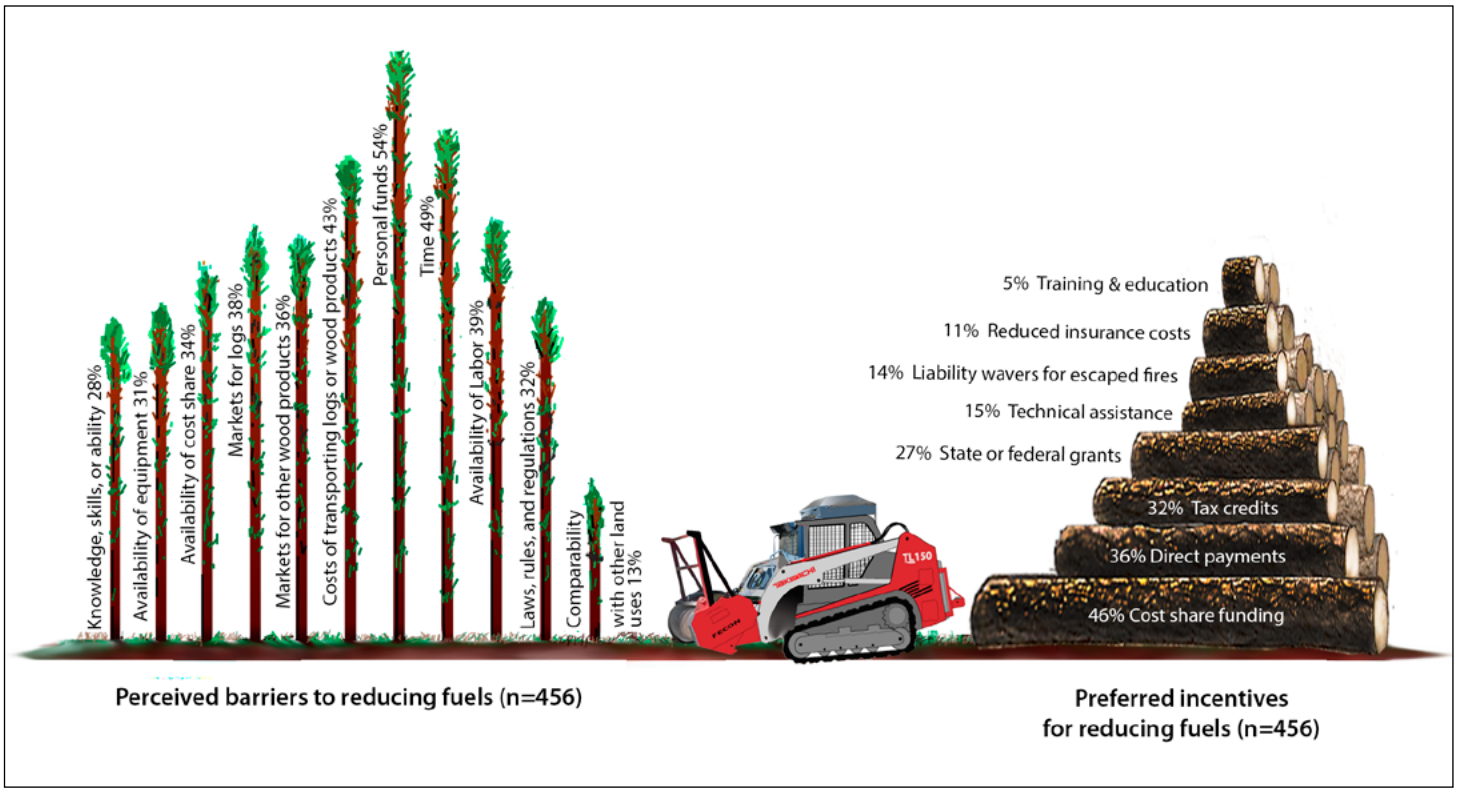
Context is as important as scale, explains John Bliss, OSU's Professor and Starker Chair in Private and Family Forestry: "These issues are set within a landscape that's heavily weighted to public ownership, light on private owners, and comprehensively regulated. If you replicated this work in any state other than California, you'd see much smaller parcels, because of Oregon's statewide mandatory zoning and stricter land use regulations. Nationwide, the trend has been toward a booming number of nonindustrial private owners, with a shrinking average parcel size. Million-dollar homes are being built in the middle of harvested timberland without firebreaks. Many new owners who built their dream cabins live in an urban area and have no background in forest management, let alone wildfire prevention or fireproofing. When wildfires come through, these houses are sources of ignition and catastrophic loss. So at the very least, a regional or national context should be set for the policy implications of these results."

The ecological and socioeconomic conditions in central Oregon, however, are common throughout the arid West. This case study may shed light on opportunities for managing fire-prone forests elsewhere. Forest management agencies are reviewing this research to determine how to best tailor their programs to meet private landowners' needs and persuade them to take action to address wildfire risk. These programs might include educational outreach about landscape-scale fire risk, technical assistance, cost sharing, liability protection, coordinated treatments, public incentives or markets for woody biomass and other wood products, and coordination with landowner organizations.

Forest managers also have to account for tradeoffs in managing for one value versus another. For example, through a GIS analysis performed with the help of Tom Spies, Fischer and Charnley found that fire risk was significantly lower on private nonindustrial forest land than on national forest land, but biodiversity indicators were higher on federal land.

As an extension of this research, Spies is leading and Fischer and Charnley are participating in a large interdisciplinary "Forests, People, Fire" project funded by the National Science Foundation and the PNW Research Station. Taking an all-lands approach, this new project examines how the management actions of federal, state, and tribal landowners, industrial and nonindustrial private landowners, and environmental organizations are affecting fire risk and wildlife habitat on the forested landscapes of central Oregon.

Spies explains: "Susan and Paige's research lays the groundwork for some of the new studies we're undertaking. The questions they asked were useful for redesigning our new surveys. We're reanalyzing their data in the



Frank Vanni

Survey responses of nonindustrial private forest owners in eastern Oregon.

context of our larger project with some slightly different GIS layers. And we've tapped into the network of people Paige developed relationships with."

Speaking to the importance of this interdisciplinary project, Charnley observes: "Most social science studies don't involve ecologists or biologists who can document the environmental effects of people's land management actions and demonstrate whether these management activities are making a difference. Presenting public land managers with a holistic, integrative analysis has a much greater impact."

"Our view of nature will influence the way we treat nature, and our view of human nature will affect our understanding of human responsibility."

—Ian Barbour,
Religion in an Age of Science, 1997.

FOR FURTHER READING

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LAND MANAGEMENT IMPLICATIONS

- Public incentives for fuel reduction, and markets for logs and wood produced through thinning, may increase the likelihood of fuel reduction on private forest lands.
- Targeting landowners who live on their properties may be a successful approach for fuel reduction incentive and assistance programs, because they are much more likely than absentee owners to reduce fuels.
- Raising awareness about landscape-scale wildfire risk, especially risk posed by conditions on nearby public land, may compel owners to reduce fuels on their properties and cooperate with others on fuel reduction.
- Arrangements that bring owners into collective units and allow for the negotiation of terms may help owners overcome the distrust and social norms about private property ownership that seem to limit cooperation on fuel management.

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Joan O'Callaghan writes and edits publications about a variety of issues, including environmental protection, resource conservation, and energy efficiency. Her company, Communications Collective, is based in Bethesda, Maryland.

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