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U.S. DEPARTMENT OF AGRICULTURE



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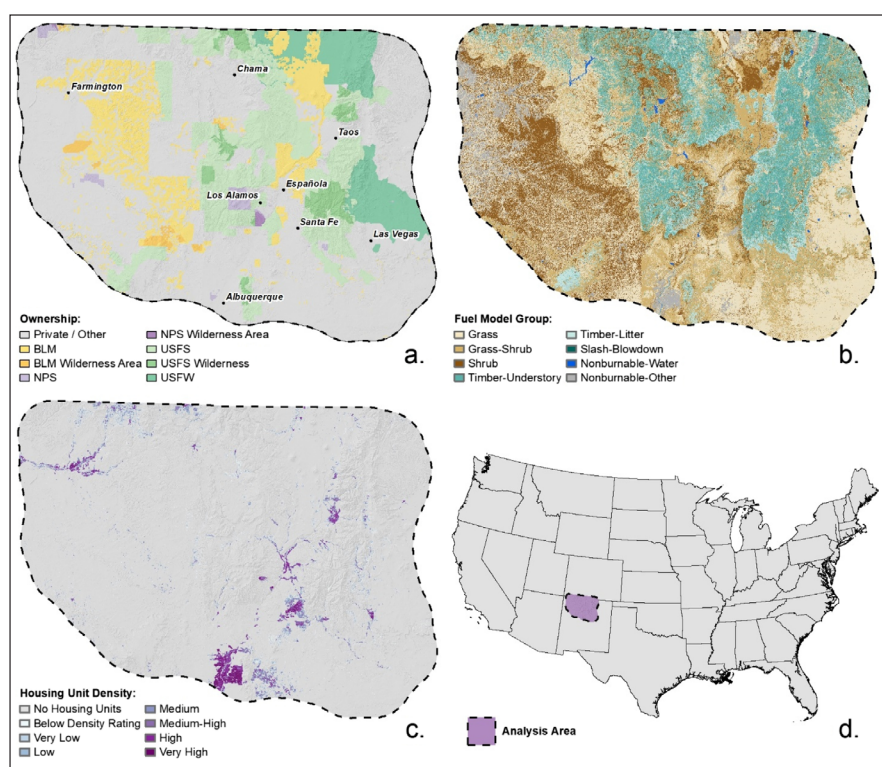
DECEMBER 2023

From Threat to Opportunity: Exploring Risk-Based Fuel Treatment to Safeguard Communities and Promote Ecosystem Health

Wildfires can serve as both threats and opportunities, depending on one's perspective. For people who live in the wildland-urban interface (WUI), where human development and natural vegetation intersect, wildfires pose an evident danger to lives and property. Conversely, for natural resource managers on Federal lands, wildfires present an opportunity to maintain or restore ecosystem health. The key to striking a balance between fire as a threat and as an opportunity lies in effective fuel management strategies.

"We can change the strategic orientation of fuel treatments on Forest Service lands to actually expand the footprint of beneficial fire, which we sorely need," says Matt Thompson, who until recently was a Research Forester in the Human Dimensions program with the Rocky Mountain Research Station.

Such an approach can provide a complementary benefit of reducing transmission and helping protect communities, without focusing entirely on fire exclusion.



In a modeling context, real-world landscapes serve as invaluable laboratories for studying wildfire management and fuel treatments. Thompson, along with Wildfire Analysts Kevin Vogler and Joe Scott with Pyrologix in Missoula, Montana, and Wildfire Ecologist Carol Miller with the Aldo Leopold Wilderness Research Institute, utilized wildfire simulation and risk analysis to evaluate different fuel treatment strategies in a 32,818 square mile landscape in north-central New Mexico. The area, which is slightly larger than the state of Maine, encompasses diverse land ownership, vegetation, and fire regimes, and includes WUI and wildland areas.

Optimizing protection and resource management

The research shows that on this landscape, most wildfires affecting communities are not likely to originate on Forest Service or other Federal lands.

Maps of fuel treatment risk analysis area showing the distribution of land ownerships (a), wildland fuel distribution (b), housing unit density (c), and location of the project analysis area (d). Sources: BLM, Bureau of Land Management; NPS, National Park Service; USFS, U.S. Forest Service; USFWS, U.S. Fish and Wildlife Service.



Fuel treatments on Federal lands to reduce wildfire transmission were highly effective at reducing exposure from Federal land fires and at expanding opportunities for beneficial fire. However, when considered together with all sources of wildfire, including nonfederal lands, treatments on Federal lands contributed comparatively little to reducing housing exposure. The results suggest that efforts to implement fuel treatments near housing are more likely to maximize protection compared to treating fuels in more remote wildlands, which aims to reduce transmission potential.

Coordinated efforts for community safety

“If our objective is reducing the number of fires that burn into communities,” Thompson says, “it absolutely has to be coordinated with treatments on private, state and other ownership.”

The results of the analysis, which was conducted before the Forest Service Wildfire Crisis Strategy was released, aligns with the Strategy’s emphasis on treating lands neighboring those of the Forest Service to reduce the risk to communities. Of the 50 million acres the Strategy identifies for fuel treatment, 30 million are on state, private, tribal, and other lands.

KEY MANAGEMENT CONSIDERATIONS

- Reducing wildfire transmission and protecting communities, while complementary, are not identical. Reorienting fuel treatments on Forest Service lands can expand the footprint of beneficial fire, reducing wildfire transmission and protecting communities without relying largely on fire exclusion.
- Fuel treatments on Federal lands effectively reduce exposure from Federal fires and increase opportunities for beneficial fire but have limited impact on reducing housing exposure from fires originating from other lands.
- Prioritizing fuel treatments near housing and infrastructure may be more effective in minimizing the potential transmission of wildfires to communities than treating fuels on Federal wildlands.
- Coordinated efforts are essential for reducing the number of fires encroaching on communities, requiring treatments on private, state, and other ownerships in addition to Federal lands.

Redefining leverage for long-term risk reduction

Traditionally, “leverage” in fuel treatment terminology is measured based on the return on investment for future fire prevention. If you treat 10 acres today, how many acres can you prevent from burning tomorrow? However, Thompson’s research proposes a new perspective: evaluating how today’s treated acres can enable more acres of beneficial fire tomorrow.

This research sheds light on the potential of fuel treatments to enhance both protection and resource management. Reorienting fuel treatment strategies to expand beneficial fire on the landscape can achieve multiple benefits. Not only can it improve forest health and protect watersheds, but it can also bolster efforts to reduce community risk.

Embracing these innovative strategies will pave the way for a safer, healthier, and more resilient landscape, where the benefits of wildfire can be harnessed for the greater good.

LEAD SCIENTIST

Matt Thompson is a former Research Forester in the Human Dimensions program with the Rocky Mountain Research Station in Fort Collins, Colorado. His research sought to promote enhanced prefire planning, develop safer and more effective response strategies, and ultimately to inform and improve decision-making processes related to wildfire management and natural resources management with multiple objectives. Matt has recently accepted a position with Pyrologix and Vibrant Planet as of November 27th, 2023.

FURTHER READING

- Thompson, M.P.; Vogler, K.C.; Scott, J.H.; [et al.]. 2022. [Comparing risk-based fuel treatment prioritization with alternative strategies for enhancing protection and resource management objectives](#). Fire Ecology. 18: 26.
- Thompson, M.P.; O’Connor, C.D.; Gannon, B.M.; [et al.]. 2022. [Potential operational delineations: New horizons for proactive, risk-informed strategic land and fire management](#). Fire Ecology. 18: 17.
- Downing, W.M.; Dunn, C.J.; Thompson, M.P.; [et al.]. 2022. [Human ignitions on private lands drive USFS cross-boundary wildfire transmission and community impacts in the western U.S.](#) Scientific Reports. 12: 2624.

The Rocky Mountain Research Station is one of seven units within USDA Forest Service Research & Development. RMRS maintains 14 field laboratories throughout a 12-state geography encompassing parts of the Great Basin, Southwest, Rocky Mountains, and the Great Plains. While anchored in the geography of the West, our research is global in scale. RMRS also administers and conducts research on 14 experimental forests, ranges and watersheds and maintains long-term research databases for these areas. Our science improves lives and landscapes. More information about Forest Service research in the Rocky Mountain Region can be found here: <https://www.fs.usda.gov/research/rmrs/>.

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