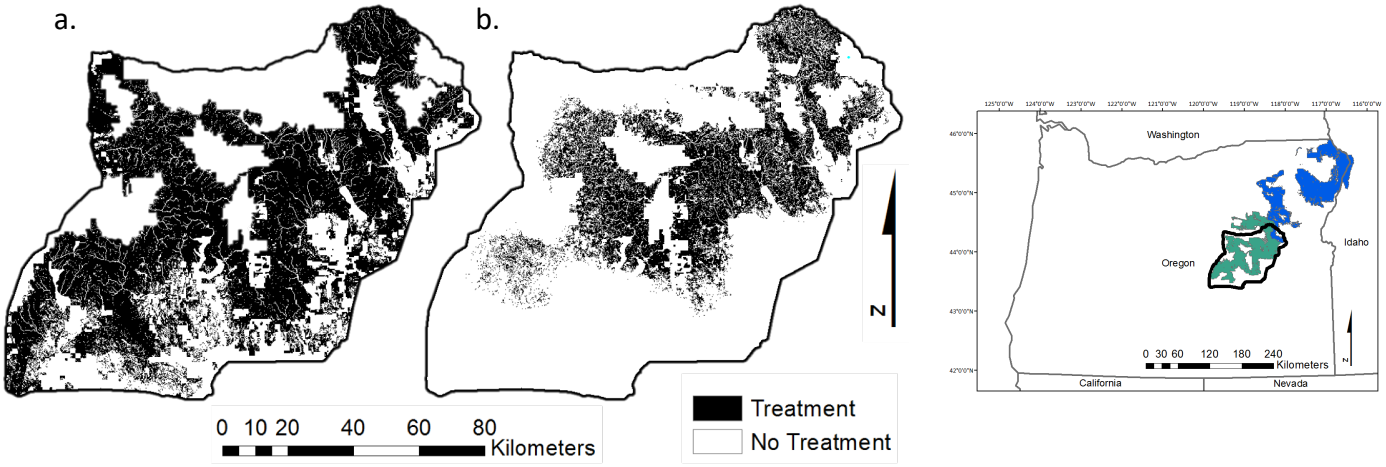
Dynamic Ecosystems and Landscapes Lab



Distributed (a.) and spatially optimized (b.) management maps. Areas on the landscape at the highest risk for high-severity fire make up 43% of available treatment areas. Concentrating mechanical fuel reduction treatments in those areas achieved similar reductions in annual area burned as compared with distributing treatments over the larger landscape. Study area comprises the southern portion of the Malheur National Forest in eastern Oregon and the surrounding area.

Spatially Optimized Fuel Treatments and Increased Prescribed Fire Reduce Wildfire Activity Under Extreme Weather

As the climate warms, more years with extreme fire weather conditions are projected in the intermountain western United States. Higher temperatures and reduced snowpack lead to increased wildfire activity and greater average annual area burned. Fuel reduction treatments, such as mechanical thinning and prescribed burning, can slow the spread of wildfire by reducing the continuity of fuels, but not all areas of the landscape are at equal risk of wildfire and therefore equal benefit from treatment. We ran simulations of a dry mixed-conifer landscape in the southern Blue Mountains of Oregon, USA to identify areas at highest risk for high-severity fire under extreme weather. We then simulated a range of fuel treatment strategies (untreated landscape, mechanical thinning + prescribed fire, doubled prescribed fire, and tripled prescribed fire) and compared their ability to reduce wildfire activity when distributed vs. concentrated in high-risk areas.

We found that concentrating fewer fuel treatments in the high-risk areas had a comparable effect on wildfire activity (fire severity and annual area burned) as distributing treatments across the landscape. We also found that doubling the area of current-day prescribed fire was insufficient to alter wildfire activity; however, tripling the area of prescribed fire led to a significant decrease in annual area burned. This effect was only apparent when the additional prescribed fire was applied to the distributed landscape, indicating that spatial optimization of mechanical treatments with more widely applied additional prescribed fire is an effective strategy for reducing the likelihood of large wildfires on this landscape.

Management Implications

Mechanical thinning and prescribed fire are both essential tools in reducing wildfire spread in dry mixed-conifer systems in this region.

Spatial optimization of mechanical treatments in areas at the most risk for high-severity fire can concentrate efforts in a smaller area while achieving similar reductions in annual area burned as distributing treatments across the landscape.

Additional reductions in wildfire spread can be achieved by increasing the area treated with prescribed fire annually, and these treatments are most effective when distributed widely across the landscape.

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