DESCHUTES COLLABORATIVE FOREST PROJECT

Unintended Consequences of DEQ/ODF Proposed Smoke Management Rules

- The science is clear that we can no longer delay the inevitable. The fire-prone dry forests of southwest, central, and eastern Oregon will burn sooner or later. **Our choice is when and how they will burn:** in a controlled way during carefully planned and implemented prescribed fire or during out-of-control wildfires.

- The science on fuel treatment effectiveness is clear: **thinning followed by prescribed fire has been shown to significantly reduce future wildfire severity**, even under extreme fire weather conditions.

- Reducing wildfire severity reduces the amount of material burned per acre, which has been linked to the **higher concentrations of a wider range of pollutants found in wildfire smoke** than prescribed fire smoke.

- **Wildfire poses a far more significant risk to our forests, communities, and firefighters than prescribed fire.**
  - As a result of the 2017 wildfires and smoke in Oregon, iconic events such as the Sisters Folk Festival, Cycle Oregon, and the Oregon Shakespeare Festival were cancelled, and untold small businesses lost weeks of their critical summer tourist revenue.
  - In 2017, the Northern California wildfires killed 44 people and hospitalized another 185. Over 8,000 structures were destroyed. The cities of Bend, Sisters, La Pine and countless others across southwest, central, and eastern Oregon are no better situated, with thousands of houses at risk in the wildland urban interface.
  - For example, since 2002, over 50% of the Sisters Ranger District of the Deschutes National Forest has burned, causing a loss of timber and recreational resources, forcing the evacuation of more than 6,000 homes, and burning 20 homes.
  - Since data was first collected in 1910, over 400 firefighters have been killed directly by wildfire, but only 3 fatalities have been linked to prescribed fire.

- For these reasons, the Deschutes Collaborative and other collaborative groups across southwest, central, and eastern Oregon agreed upon four key recommendations sent to ODF and DEQ that would enable increased use of prescribed fire while also increasing proactive public health messaging and mitigation:
  1. Incorporate language reflecting differences between dry and wet forests and their respective fire regimes.
  2. Align Oregon's smoke management rules with EPA's empirically-based 24-hour air quality standard.
  3. Provide maximum flexibility to implement prescribed fire in prioritized high-risk/high-value treatment areas, such as the Wildland Urban Interface.
  4. Develop and implement a public health strategy to protect people from short-duration prescribed fire smoke.

- Over 30 organizations and individuals from around Oregon sent letters urging DEQ and ODF to incorporate these recommendations into the new rules to allow for increased use of prescribed fire, including:

Eastern Oregon Counties Association	U.S. Forest Service Region 6
Deschutes County Board of Commissioners	Ochoco Lumber Company
Lake County Board of Commissioners	Collins Pine Co.
Klamath County Board of Commissioners	Lomakatsi Restoration Project
Deschutes County Public Health Advisory Board	Brooks Resources Corporation
Harney County Restoration Collaborative	The Tree Farm LLC
Deschutes Collaborative Forest Project	Jim Neal
Southern Oregon Forest Restoration Collaborative	Oregon Wild
Lake County Resources Initiative	Sierra Club

Ochoco Forest Restoration Collaborative
Upper Deschutes River Coalition
Oregon State University College of Forestry
City of Bend
City of Redmond
City of Sisters
Bend Chamber of Commerce
Sisters Area Chamber of Commerce
The Nature Conservancy
Deschutes Co. Rural Fire Protection District #2
Black Butte Ranch Rural Fire Protection District
Sisters-Camp Sherman Rural Fire Protection District
The Confederated Tribes of Warm Springs
Central Oregon Visitors Association
Visit Bend
Central Oregon Trail Alliance

- The current DEQ/ODF proposal in front of EQC and BOF only partially addresses these recommendations. In fact, the proposed 1-hour threshold **works in direct opposition to the recommendations to align with the EPA's 24-hour air quality standard and to provide maximum flexibility in the Wildland Urban Interface**, where wildfire risk to forests, communities, and firefighters is greatest. This is a direct contradiction to local, regional, and national goals and strategies, such as Community Wildfire Protection Plans, the Collaborative Forest Landscape Restoration Act, and the National Wildland Fire Cohesive Strategy.

- At first glance the DEQ/ODF proposal reduces the overall number of events considered to be intrusions. For example, Bend had 22 events characterized as intrusions (9 light, 4 moderate, 9 heavy) between 2011-2017. Analysis of hourly air quality data during this period indicates that had the proposed rules been in place, only ~40% of those, or 9 events, would be considered intrusions.

- **The problem with such a cursory synopsis lies in the details** of the 9 remaining events. Analysis of the 2011-2017 hourly air quality and intrusion data for Bend show that:
    - 8 of the 9 intrusions resulted from underburning to achieve wildfire risk reduction, community and firefighter safety, and forest restoration goals (the 9th burn was fall pile burning).
    - 6 of the 8 (or 75%) were underburns located within 10 miles of the Bend SSRA.
    - 2 of the 8 underburning events in Bend exceeded the 24-hour EPA air quality standard.
    - Yet all 8 events exceeded the 1-hour threshold proposed by DEQ/ODF.
    - All 8 underburning events had their highest 1-hour smoke concentrations from midnight to 6:00am (average time was 2:15am), meaning intrusions into Bend are occurring overnight or early morning when most people are indoors and not active.
    - In other words, **the proposed rules most severely limit prescribed fire in the highest priority location – the wildland urban interface – and our ability to meet forest health, community safety, and firefighter safety goals.**

- **The 1-hour threshold will severely curtail our highest priority prescribed fire and DEQ/ODF did not provide a valid, scientific rationale for its use to define intrusions.** In fact, as of 2016 the Environmental Protection Agency stopped using a sub-24-hour standard, stating that "It is not valid to use shorter-term (e.g. hourly) data to calculate an Air Quality Index value."

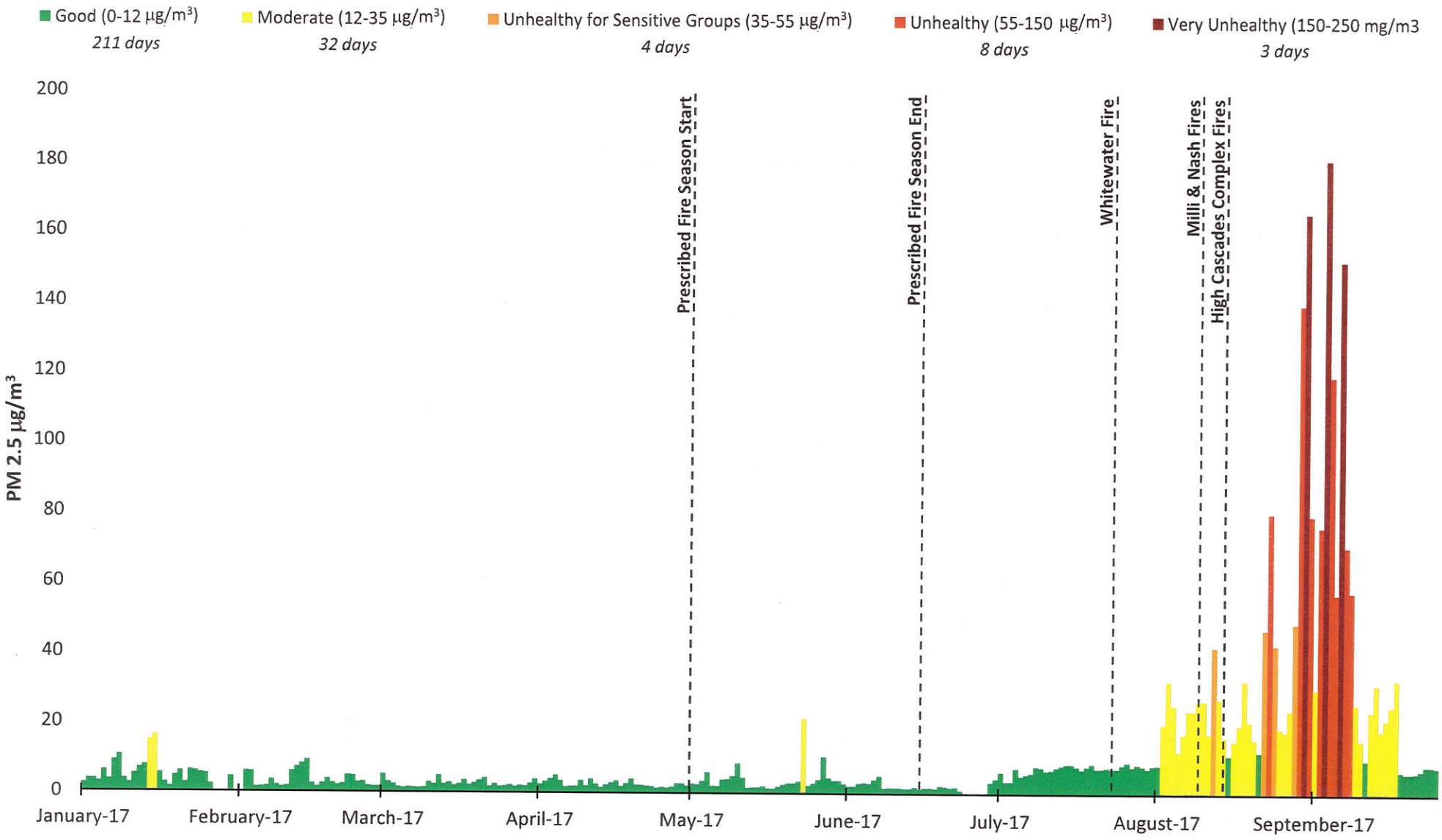
- Between 2011 and 2017 there were 627 days that exceeded the 1-hour threshold for air quality across the State. **Only 12 days (<2%) were the result of prescribed fire smoke.** The other 615 days were caused primarily by wildfire, woodstove smoke and winter inversions. **Over-regulation of prescribed fire is not the way to fix the particulate problem** in Oregon.

Alternative Proposal:

- **Maintain the proposed 24-hour threshold and eliminate the 1-hour threshold as a metric to define intrusions in the Smoke Management Rules**
- **Or, provide an exception to the 1-hour threshold in communities where effective and proactive prescribed fire and smoke communication and mitigation strategies are in place.**

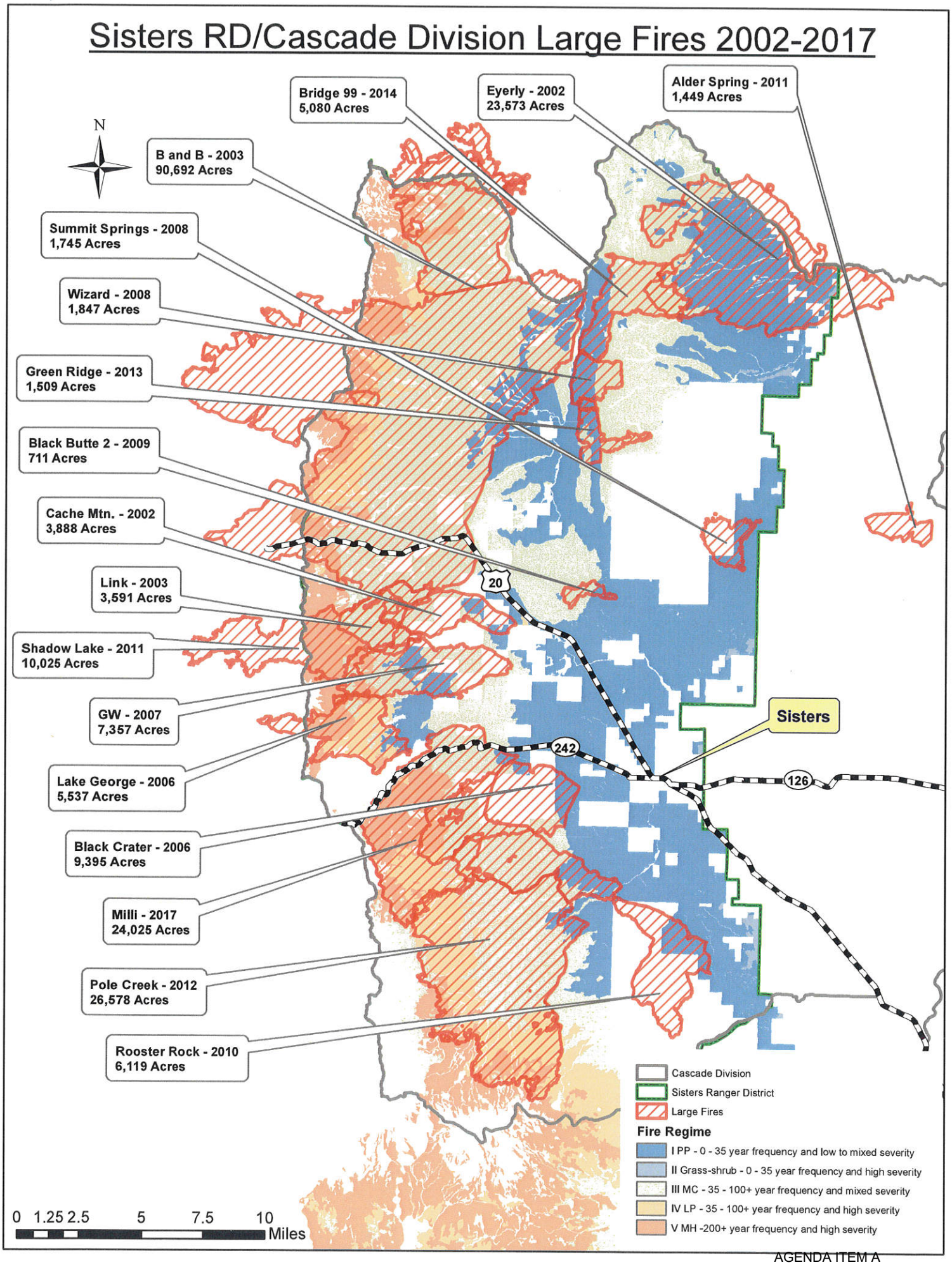
2017 City of Bend Air Quality

(as measured by 24-hour average PM 2.5 µg/m³ concentrations)



Data Source: *Environmental Protection Agency AirNow Tech*

Sisters RD/Cascade Division Large Fires 2002-2017



An Overview of Fuel Treatment Effectiveness in Western Conifer Forests

The Smoke Management Plan Review process has repeatedly surfaced questions regarding the use and effectiveness (i.e., performance) of fuels treatments (e.g., mechanical tree thinning and surface fuel reductions) to mitigate wildfire behavior. Such questions suggest the need for and potential value of a summary of existing science to support an informed discussion about the efficacy of various fuel reduction techniques (including prescribed fire) to modify wildfire intensity and severity. The following brief summarizes key scientific publications that evaluate the effectiveness of fuels treatments to mitigate wildfire behavior.

Given the sheer volume of published literature on this topic, several groups of researchers in recent years have used established systematic review and meta-analysis methods to compile robust syntheses of the fuel treatment effectiveness science (Table 1). These publications provide a comprehensive approach to quantify the magnitude of reported effects across multiple studies throughout the range of western conifer forests, the results of which offer a direct response to question of how effective various fuel reduction techniques are in terms of mitigating the severity of wildfire.

Table 1. Summary of literature evaluating fuels treatment effectiveness across multiple studies.

Publication	Forest Type	# of papers reviewed	Key Findings
Kalies & Kent, 2016	Dry pine, pine-oak, and mixed-conifer	56	• Fuel treatments reduce fire severity, crown and bole scorch, and tree mortality following wildfire. • Thinning followed by prescribed burning was most effective in terms of reducing fire severity, tree mortality, and crown scorch. • In contrast, prescribed burning or thinning alone had either less of an effect or none at all, compared to untreated sites.
Martinson & Omi, 2013		19†	• Fuels treatments are effective at reducing canopy scorch (by 60%) and scorch height (by 47%). • Treatments are most effective in ponderosa pine and mixed-conifer forests that were heavily thinned and subsequently prescribed burned. • Treatments that include surface fuel reduction, particularly by prescribed burning, moderate potential wildfire behavior and can remain effective for up to 10 years (see Figure 1). • Single treated stands are unlikely to moderate the total area burned by a large wildfire, aid in fire control efforts, or significantly impact total fire severity. Ultimately, fuel treatment effectiveness depends on cumulative treatment regimes applied across the landscape
Fule et al., 2012	Western ponderosa pine dominated forests	54	• Surface fuels are reduced in burn-only treatments, significantly increased in thin-only treatments, and unchanged in thin + burn treatments. • Tree density, basal area, and canopy cover were consistently reduced after treatments, and exhibited the most change where there was a combination of thinning and burning • Crown fire and torching potential were decreased in all treatment types, indicating that treatment reduces forest vulnerability to active crown fire and the transmission of surface fire to tree crowns.
Lydersen et al., 2017‡	Mixed-conifer	--	• Areas treated with prescribed fire, especially when combined with thinning, had the lowest proportions of high severity wildfire and the lowest fire severity of all treatment types (see Figure 2). • When moderate and high-severity fire encountered a previously treated area, fire severity was significantly reduced in the treated area relative to the adjacent untreated area. • Prescribed burning is a highly effective tool for mitigating the potential for future high-severity fire. • If reducing the overall extent and patch sizes of stand-replacing fire is a land management objective, then it is critical to increase areal coverage of treatments.

† This study initially reviewed a total of 60 papers where actual fuels treatments were exposed to actual wildfires. The authors subsequently removed from the analysis those studies that did not control for weather or topography, or that did not include metrics that were comparable to other studies, resulting in 19 total studies for the meta-analysis.

‡ This paper is not a synthesis. The authors investigate the effects of previous fuels treatments on wildfire severity in the 2013 Rim Fire, which burned part of Yosemite National Park and surrounding National Forest. This study highlights the efficacy of fuels treatments in mitigating wildfire severity even under extreme fire weather conditions.

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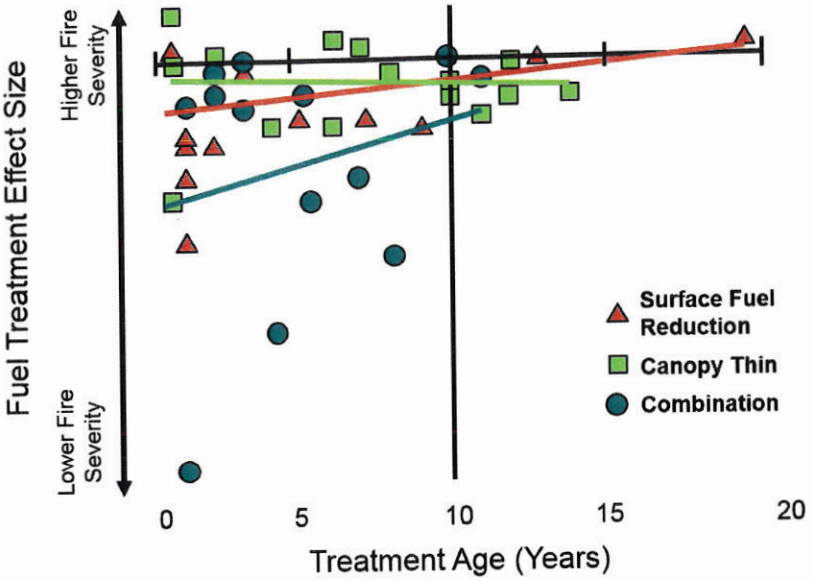

Figure 1. Fuel treatment effect size versus treatment age distinguished by treatment type. All studies were conducted in coniferous forests. A combination of thinning and burning treatments were most effective at lowering subsequent fire severity. Treatment effects lasted up to 10 years. Figure adapted from Martinson & Omi, 2013. © USFS Rocky Mountain Research Station

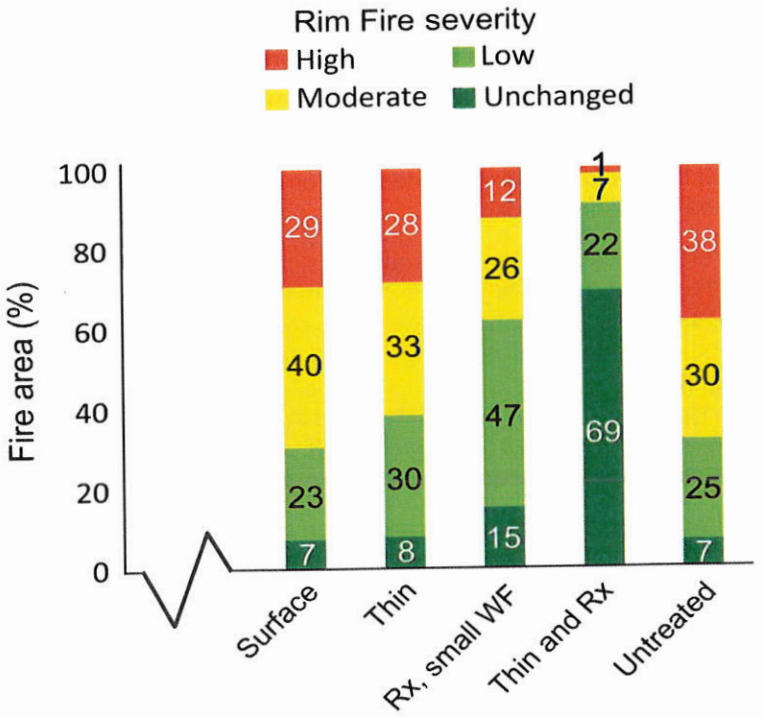

Figure 2. Evidence of fuels management influencing fire severity in an extreme fire event. The authors evaluated fuels treatments that reduced surface fuel loads (e.g., mastication), canopy fuel loads (e.g., thinning), prescribed fire, and a combination of treatments to untreated stands. Stands treated with a combination of thinning and prescribed burning had the lowest amount of high severity fire (1.7%) when burned by the Rim Fire in 2013. Figure adapted from Lydersen et al. 2017 © Ecological Applications

Key Findings

The consensus emerging from these studies is clear: stand-level fuels reduction treatments significantly reduce wildfire severity compared to nearby untreated areas, even under extreme fire weather conditions.

In particular, the combination of heavy thinning and prescribed fire has a been clearly shown to reduce a range of metrics commonly used to measure wildfire severity, including crown and bole scorch, and tree mortality.

Interestingly, neither treatment applied independently is as effective as the combination of the two. In short, fuel treatments in western conifer forests work, and are most effective when they include thinning followed by prescribed fire.

References

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