



## Research Brief for Resource Managers

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**Contact:**  
Marc Meyer

**Phone:**  
559-297-0706 ext. 4929

**Email:**  
mdmeyer@fs.fed.us

Sierra Nevada Fire Science Delivery Consortium | One Shields Avenue, Davis, CA 95616

# Using Fire to Increase the Scale and Benefits of Forest Fuel Treatments

*North, Malcolm, Brandon Collins, and Scott Stephens. 2012. Using fire to increase the scale, benefits, and future maintenance of fuels treatments. Journal of Forestry 110(7): 392-401.*

[http://www.fs.fed.us/psw/publications/north/psw\\_2013\\_north004.pdf](http://www.fs.fed.us/psw/publications/north/psw_2013_north004.pdf)

Fuels reduction is a priority of national forests in California and throughout the western United States. However, a 2012 study by North and others indicates that less than 20% of national forest and national park lands in the Sierra Nevada are experiencing fuels treatments needed to mitigate continuing degradation from either the lack of fire or wildfire burning at high severity.

The authors estimated current fuel treatment rates in the national forests and national parks of the Sierra Nevada and compared these to historic rates of burning based on the historic fire return interval, or the length of time between fires in a particular vegetation type. Their analysis included 8 national forests and 3 national parks in 10 “actively managed” and 8 “passively managed” vegetation types, totaling nearly 7.8 million acres.

Even when wildfire is included as a fuels treatment, the authors estimated the Forest Service is currently reducing fuels at an annual rate of 87,923 acres per year total, which is only 18% of historic levels based on the mean historic fire return interval. Estimates for National Park Service lands were only 17% of historic rates. These results suggest that the current “pace and scale” of implemented fuels treatment projects

### Management Implications

- In frequent fire regime forests, the pace and scale of current fuels reduction treatments is too limited to mitigate increasing fire severity trends, with less than 20% of Sierra Nevada forests receiving needed fuels treatments.
- One potential solution to this problem is to concentrate large-scale fuels reduction efforts and move treated areas out of fire suppression into fire maintenance.
- This fundamental change in approach would restore ecosystem processes and emphasize treating entire firesheds, especially large and contiguous areas outside the Wildland Urban Interface.



The use of fire on a landscape scale, such as the Lion Fire (2011) on Sequoia National Forest, is essential for increasing the pace and scale of fuels treatments.

*Image Credit: Phil Strand, USFS.*

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are well behind that necessary to make a meaningful difference across the region.

North and others contend that current fire suppression policies and federal land management practices intended to protect valued natural resources (e.g., Protected Activity Centers, Riparian Conservation Areas) inadvertently put these resources at a greater long-term risk of uncharacteristically large and severe wildfire. Additionally, other considerations, such as fuel treatment cost per acre, further limit the application of fire and mechanical approaches, especially at smaller spatial scales (fire) and in less accessible or lower commercial value areas (mechanical).

At current rates of treatments, the maintenance of existing fuel reduction efforts will result in a perpetual deficit of forestland “in need” of treatment. The authors estimate that this backlog (i.e., forests that are never treated and always have uncharacteristically high fuel loads) will be approximately 2.9 million acres or 60% of Forest Service lands in the Sierra Nevada, of which 1.7 million acres or 60% are yellow pine dominated forests.

According to the study, one potential approach for reducing this backlog is to concentrate fuels reduction efforts in entire firesheds, defined as contiguous areas with similar fire history and potential fire characteristics where a coordinated fire management effort would be most effective. Moreover, these managed firesheds are areas where fire is not suppressed but restored as an active ecological process through the use of managed wildfire and prescribed fire.

This managed fireshed approach requires two sequential steps: (1) “scaled-up” (to 50,000 to 150,000 acre) fuel treatment strategies are implemented to reduce atypically high fuel loads and “prime” the landscape for future restoration using fire; and (2) treated areas are then moved out of fire suppression and into fire maintenance, thereby increasing the scale of restoration efforts, reducing future maintenance costs, and restoring key ecological processes. However, the authors emphasize that successful execution of this approach will require prompt action, as current

constraints and challenges (e.g., increasing fuel loads, expanding population growth in the wildland urban interface, declining budgets) are expected to intensify in the near future.

#### **Additional references for this topic:**

Collins, B.M., and S.L. Stephens. 2007. Managing natural wildfire in Sierra Nevada wilderness areas. *Frontiers in Ecology and the Environment* 5:523–527. Open access.

Collins, B.M., S.L. Stephens., J.J. Moghaddas, and J. Battles. 2010. Challenges and approaches in planning fuel treatments across fire-excluded forested landscapes. *Journal of Forestry* 108:24–31.

Mallek, C., H. Safford, J. Viers, and J. Miller. 2013. Modern departures in fire severity and area vary by forest type, Sierra Nevada and southern Cascades, California, USA. *Ecosphere* 4(12):153. Open access.

Manning, A.D., D.B. Lindenmayer, and J. Fisher. 2006. Stretch goals and backcasting: Approaches for overcoming barriers to large-scale ecological restoration. *Restoration Ecology* 14:487–492.

Ryan, K.C., E.E. Knapp, and J.M. Varner. 2013. Prescribed fire: needs and challenges in North America. *Frontiers in Ecology and the Environment* 11, no.1: e15-e24. Open access.



Fire is a critical tool for the renewal and maintenance of key ecological processes in frequent fire regime forests of the Sierra Nevada, such as this mixed conifer stand on the Sequoia National Forest. *Image Credit: Quentin Johnson, USFS.*