Fuel Treatments Can Address Wildfire Severity

Research demonstrates benefits of thinning forests, economic challenges remain

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California has gotten so good at putting out wildfires that we have created conditions that put today's forests at greater risk of damaging wildfires.

Fuel accumulations have put goshawk, California spotted owl and Pacific fisher habitat at risk of being removed from the landscape.

For centuries, low-intensity fires cleared the conifer forests on the west side of the Sierra Nevada of litter, downed branches, and small trees before fuel loads could accumulate. Fires stayed close to the ground and kept the forest relatively open.

Human fire-suppression activities during the past 100 years have created denser, more crowded forests and shifted the fire regime in Sierran mixed conifer forests from one of frequent, low-level fire to one where high-intensity wildfires are more common. High-intensity wildfires burn hotter, can kill canopy-sized trees and strip soils of nutrients necessary to regenerate the landscape. Severe wildfires impact water quality and wildlife habitat.

If we remove fire from the landscape, we must replace it with something else.

Researchers have increased efforts to understand wildfire behavior and the effectiveness of fuel-reduction treatments. Treatments typically involve mechanically harvesting small and medium sized trees to create gaps in the forest canopy so fire cannot spread from tree to tree. Sometimes intentionally set fires are used alone or in combination with harvesting to remove understory vegetation and debris on the ground. When fire is not an option, chopping ground fuels up through a process called mastication can provide an effective but expensive means to control surface fires.

The Sierra Nevada Adaptive Management Project (SNAMP) is a joint effort by the University of California, state and federal agencies, and the public formed in 2004 to assess how treatments designed by the USDA Forest Service to

>> A forestry infrastructure that includes sawmills and loggers is critical to sustainably managing forest resources. Using wood provides substantial environmental benefits compared to using non-renewable building materials.

prevent severe wildfires affect fire risk, sensitive wildlife populations, forest health and water resources. SNAMP is in year five of an ambitious 7-year experiment to evaluate the effectiveness of management strategies to modify fire behavior across the landscape.

SNAMP has examined real-world fires and developed computer models to evaluate wildfire severity and environmental impacts in response to fuel-reduction treatments looking 30 years to the future. In its Northern Sierra project covering roughly 30,000 acres, SNAMP evaluated three different treatment scenarios. In each case, fuels were reduced across approximately one-third of the study area, and all treatments showed substantial reductions in high-intensity wildfire across the landscape, not just treated areas for 20 years after implementation.

Wildfire behavior and habitat conservation

In many Sierran forests, management has been excluded in order to preserve nesting and den sites for species that prefer mature forests such as the goshawks, California spotted owl and Pacific fisher. But in the absence of low-intensity fire and active management, fuels have accumulated and put these areas at risk of severe wildfire that could remove the desired habitat from the landscape. SNAMP is exploring the question whether careful thinning can retain complex habitat structures while reducing the risk of high-intensity wildfire.

The most critical component of effective fuel reduction is removing surface fuels and small trees that can carry fire into the forest canopy. Unfortunately, these are the most expensive fuels to treat.

The decline of California's forestry infrastructure further complicates matters. Many Sierra Nevada sawmills have gone out of business in the past decade, resulting in longer haul distances and higher costs for transporting harvested biomass to processing facilities. Only one sawmill remains to serve the southern Sierra.

A healthy infrastructure is critical to sustaining healthy forests. Many Sierran forests have grown too dense to safely introduce prescribed fire without first treating fuels mechanically, but higher costs and limited options for processing harvested vegetation can restrict the number of acres that can be treated with available funds. Mastication has proven to be an effective fuel-reduction treatment. However it is expensive, and requires skilled operators and a supporting infrastructure.

» Forestland in Northern California after thinning done as part of SNAMP research that studied the impact of fuel-reduction treatments. Establishing markets for the biomass removed during thinning operations could help fund forest restoration that might otherwise go undone.

Overcoming obstacles to restoration

Research has shed considerable light on how to reduce severe wildfire risks in the Sierra Nevada. SNAMP is addressing fuel-reduction treatments across a host of forest resources, but more needs to be done. Often the biggest challenge is economic since the cost of treatments often exceeds the value of any timber sold. Developing markets for the byproducts of thinning, such as encouraging investment in bioenergy production using forest residues, could generate funds to help treat more acres.

Education is also essential. Mutual learning among scientists, resource managers, and the public is incorporated into all SNAMP projects. Field trips that show people all stages of the process of sustainable forest management have great value. Outreach by the Forest Service and others has led to growing consensus that inactivity on many forestlands has put values from wildlife habitat and water resources to recreation and timber at significant risk.

Severe wildfire is on the rise. Moreover, we face a future with a warmer, possibly drier climate and a longer fire season. Doing nothing will not preserve the Sierran forests for the long-term. We need to manage forests for today as well as tomorrow. ■

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