

Long-Term Reduction of Fire Hazards from Prescribed Fire in Coniferous Forests of Western National Parks

High amounts of forest fuels (e.g., needles, downed branches and logs) allow wildfire to spread and make fire control difficult. Following more than a century of fire exclusion, heavy fuel accumulation has become a wildfire hazard in many forests of the western U.S. Prescribed fire, which is fire intentionally introduced under controlled conditions, is a common tool used to remove fuels. However, new fuels can begin to accumulate soon afterwards. Gaining a better understanding of prescribed fire's capacity for controlling forest fuels and subsequent fires can aid resource and forest managers' efforts to conserve the forests of the West.

To measure the longevity of prescribed fire's effects, USGS, National Park Service (NPS) and university researchers evaluated changes in forest fuels and modeled fire activity (flame lengths, probability of crown fire) up to 20 years following prescribed fire. The team used observations from a national-scale monitoring program organized by the NPS. The study is published in *Forest Ecology and Management*.

Research plots spanned seven states and nine NPS units in the western U.S.: Bandelier National Monument, Bryce Canyon National Park, Grand Canyon National Park, Lava Beds National Monument, Lassen Volcanic National Park, Sequoia and Kings Canyon National Parks, Whiskeytown National Recreation Area, Yosemite National Park, and Zion National Park. Forest monitoring plots were measured before the use of prescribed fire and multiple times up to 20 years post-fire. Managers re-burned a subset of these plots with continued monitoring.

Analyses showed that prescribed fire leads to an immediate reduction in fuels and fire hazards. Depending on the measure of hazard, reductions may last a decade or longer in some western forests. The results also indicated that fuels and the potential for crown fires, which spread rapidly from treetop to treetop, were reduced for at least seven years following prescribed fire, in general agreement with earlier studies conducted in western forests. While there were a limited number of sites burned multiple times, observations suggested that repeated burning reinforced changes following initial burning, reducing surface fuels that had built up since the first fire.

This Brief Refers To:

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Prescribed fire can be an effective forest management tool for removing dead leaves, logs and other hazards that can cause destructive wildfires. Eric Knapp/USGS.

MANAGEMENT IMPLICATIONS

- Following prescribed fire, surface fuels that can contribute to uncontrolled wildfires were generally reduced for more than seven years.
- Some measures of fire hazard (e.g., forest canopy heights) did not return to pre-fire levels after more than seven years following fire.
- These patterns appeared to be reinforced with second-entry prescribed fire.

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