Chaparral shrublands on the east slope of the Central California Coast Ranges support some of the last remaining large patches of California chaparral. These vegetation communities are dominated by a xeric-adapted, evergreen, ever-flowering shrub layer that includes many species of Arctostaphylos, Helianthemum, and other sun-loving taxa. These shrubs typically support an understory of annual grasses, forbs, and perennials that are often fire-adapted and occur during fire closures and fire exclusion treatments.

In the Sierra Nevada foothills, repeated fire suppression and increased urbanization have created a fire regime characterized by infrequent fire and the suppression of seedling recruitment. This fire regime has supported the development of a highly flammable, highly dynamic plant community that covers 13 million acres in the Sierra Nevada foothills. Rapid urbanization across much of this area creates challenges for safe, effective, and sustainable use of chaparral shrublands. These challenges are further compounded by increasing wildfire frequency and severity, which threaten to overwhelm existing fire management strategies and create fire-suppression costs, even for small fires. As fire frequency increases, the need to understand chaparral ecosystems becomes increasingly important.

Our study site lies in a high fire-hazard zone where long-term fire suppression and infrequent fire have allowed for the development of a highly flammable, dynamic chaparral vegetation community that covers 13 million acres in the Sierra Nevada foothills. Our study was conducted in this high fire-hazard zone, where frequent fire is an extreme risk. The study site is located within a National Forest and is surrounded by a National Park, which is managed under a fire exclusion program. This study was funded by the University of California Kearney Foundation for Soil Science and the Stanislaus National Forest Tuolumne County Resource Advisory Committee.

We measured ground cover and herbaceous biomass to determine the effect of fire frequency on vegetation. We collected runoff and sediment from six 1 x 5-m plots in each of two soil types and two fire frequencies; 24 plots total. We measured total yield of runoff, sediment, and nutrients from 17 runoff events, January 4 to May 17, 2005 (average totals from six 1 x 5-m runoff plots in each of two soil types and two fire frequencies; 24 plots total).

**Conclusions**

- **Reduction of moderately frequent fire in this association should yield multiple benefits of reducing wildfire hazard and improving resistance to fire, resilience, and sustainability, while improving biodiversity and hydrological attributes.**
- **Improved stand structure and ecosystem biochemistry from the low fire frequency treatments suggests that relatively frequent burning is desirable, but it may not be feasible in some areas. However, extending the fire frequency to 20 years does not generate desirable effects; fire effects are no longer present.**
- **Chaparral management that results in one-time burn of mature or decadent stands by either prescribed fire or wildfires can result in rapid shrub regeneration and offset beneficial effects of current fire frequencies.**

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