

Effects of Management on Plant Community Development after Wildfire in the Klamath Mountains, CA

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Historically, public land management agencies have taken a variety of actions that were intended to mitigate the impacts of wildfires. Specific objectives of post-fire management activities have included: soil erosion prevention or reduction, salvage logging, and reforestation.

Management activities after fire have been seen from different perspectives (Sexton, 1998; Beschta et al., 2004; Sessions et al., 2004; Franklin, 2005; Donato et al., 2005). Salvage logging has been mentioned to have both negative (Beschta et al., 2004; Franklin, 2005; Donato et al., 2005) and positive (Sessions et al., 2004) effects on natural regeneration. Beschta et al. (2004) present a series of negative effects of salvage logging: mechanical damage to regenerating plants and soil, detrimental effects on the microhabitats of organisms associated with recovery and early successional vegetation, and increases of fine fuels. However, few studies have examined the effects of management after fire on plant community composition.

We sampled vegetation on sites ~20 years after wildfire in the Klamath-Siskiyou region of Northern California. The sampling was approximately equally divided between sites that had been managed after the fire and sites left unmanaged. We attempt to answer the following questions: does management after wildfire alter the vegetation composition? And if so, does the impact of management differ with aspect? Answering these questions will contribute to our understanding of post-disturbance plant community development.

METHODS

Study area and sample site selection

The study was conducted in the Klamath-Siskiyou region of northern California (Figure 1). The Klamath Region extends north and south for about 390 km, and westward from the Cascade Mountains about 120 km, to reach the Pacific Coast between 41° and 43° north latitude. The Siskiyou Mountains are the northernmost of the major mountain groups of the central Klamath Region. The Siskiyou extend in an east-west direction along and on each side of the California-Oregon border, north of the Klamath River and south of the Rogue River (Whittaker, 1960).

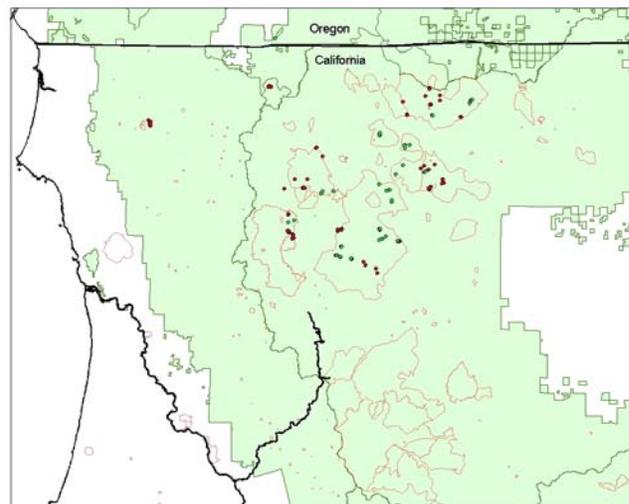


Figure 1. Site distribution on the Klamath-Siskiyou region. Red dots indicate unmanaged sites, green dots indicate managed sites.

The sample site selection criteria included: 1) old-growth prior to wildfire, 2) Douglas-fir dominated forest type before the disturbance, 3) soil within the same subgroup (serpentine soils were avoided), 4) north and south aspects including: south, south-west, south-east, north, north-east, north-west aspect, 5) areas of high severity burn (>90% of previous stand killed by fire), 6) elevation 500-1200m, and 7) similar management activities. Maps, aerial photos, and forest inventory data were used to identify and assess the sites prior to sampling.

Sampling methods

The sampling unit was a rectangular plot comprised of thirty 4x4 m (16m²) cells. Plot level measurements included aspect, slope, and elevation. Plots were located well within a management unit or forest opening due to fire or fire and salvage, with a minimum distance of 50m to a forest edge. For each cell, we tallied saplings by species and diameter at breast height (DBH) class. In each cell, we aged the largest shade-intolerant conifer (pine or Douglas fir), if present. For each cell, the percent cover of trees and shrubs by species and percent cover of grasses and forbs as two separate groups was visually estimated.



STUDY TIMELINE

Data collection was completed in September 2006. A total of 34 plots on management areas (16 south aspect and 18 north aspect) will be compared with areas under natural regeneration. Tree size, species diversity, and shrub

cover will be used as comparison parameters. Project completion is scheduled for September 2007.

MANAGEMENT IMPLICATIONS

Results from this research will identify changes in plant community composition and structure caused by post-fire management activities. Knowledge of these changes will provide forest resource managers with guidance on how tree species composition and growth is affected, how early seral wildlife habitat is affected, and how nitrogen fixation may be affected by management activities. Management actions can then be modified to mitigate any effects perceived as negative.

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The Cooperative Forest Ecosystem Research (CFER) program was developed to facilitate sound management of forest ecosystems, with emphasis on meeting priority research information needs of the Bureau of Land Management (BLM) and the Oregon Department of Forestry (ODF) in Western Oregon.

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