



What We've Learned:

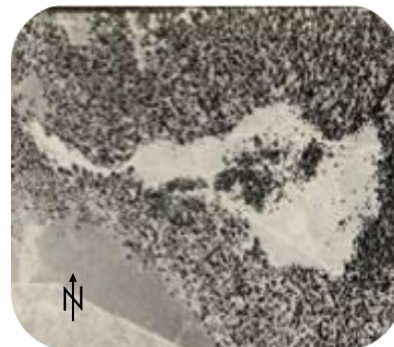
Lodgepole establishment was significantly associated with char height and understory burn severity.

Does fire promote lodgepole establishment in a mesic meadow system?

The purpose of this project is to assess whether the 2014 Eiler Fire promoted lodgepole pine establishment in a mesic meadow complex near Burney Mountain, and which fire variables (char height, percent crown scorch, understory burn severity) best predicted lodgepole seedling densities.

Key Findings

- Char height as measured along the bole was the best predictor of post-fire lodgepole establishment.
- Lodgepole establishment was higher at moderate understory burn severities relative to low understory burn severities.



The Burney Meadows Complex is characterized by an island of lodgepole pine that was less dense in 1941 (above right) relative to 2012 (near right). Scattered lodgepole have established among bunchgrasses and shrubs in the eastern portions of the meadow complex.



This tree had a 12 ft. char height, high % crown scorch, and the highest numbers of lodgepole seedlings post-fire.



This tree had a 12 ft. char height, low % crown scorch, and high numbers of lodgepole seedlings post-fire.



This tree had a 2 ft. char height, high % crown scorch, and no lodgepole seedlings post-fire.

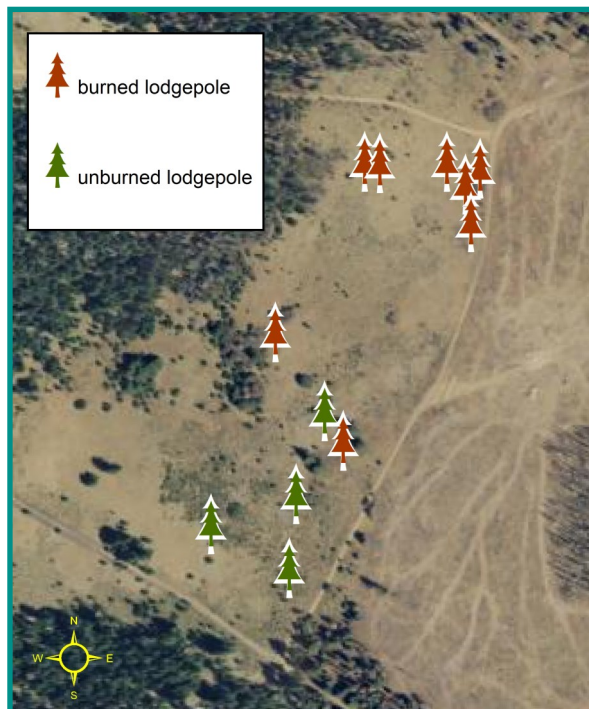


Monitoring Overview

The project was intended to monitor the effects of a prescribed underburn on lodgepole pine establishment in a mesic meadow complex near Burney Mountain in Shasta County, an area where lodgepole are thought to be predominantly non-serotinous. Twelve circular plots with a 4-m radius were established in 2012, with isolated lodgepole trees as plot center. Before the underburn could be implemented, the Eiler Fire of 2014 burned through two-thirds of the plots. We monitored fire severity attributes in fall of 2014, then collected post-fire data on lodgepole establishment in 2015. One year post-fire, a total of 21 lodgepole seedlings were observed, occurring in five of the eight monitoring plots that burned.

Analysis of this limited dataset showed significant correlations between both char height and burn severity on lodgepole seedling establishment (see below). We will collect data on plot tree mortality in 2017 to assess whether lower severity burns killed cone-bearing lodgepole. This study highlights the challenges of using fire to reduce densities of encroaching lodgepole. Low severity fire may not kill cone-bearing trees, but moderate severity fire may expose bare mineral soil that promotes recruitment from the seedbank or from surviving lodgepole in the vicinity.

Char height was positively associated with the number of lodgepole seedlings that established within burned plots (a). Plots with higher burn severities in the understory had significantly greater lodgepole establishment relative to plots that were lightly burned (b).



The Eiler Fire burned through two-thirds of the existing lodgepole plots.

Lodgepole establishment was positively associated with char height and understory burn severity.

