



What We've Learned:

Fire resulted in the short-term homogenization of the shrub-bunchgrass mosaic. After five years, however, there was significant bitterbrush recovery, and the shrub community was on a trajectory to return to pre-fire shrub cover.

Does fire maintain a mosaic of bunchgrass and bitterbrush in a mesic meadow system?

The purpose of this project is to monitor whether fire maintains a bunchgrass / shrub mosaic in a mesic meadow complex near Burney Mountain that was partially burned in the 2014 Eiler Fire.

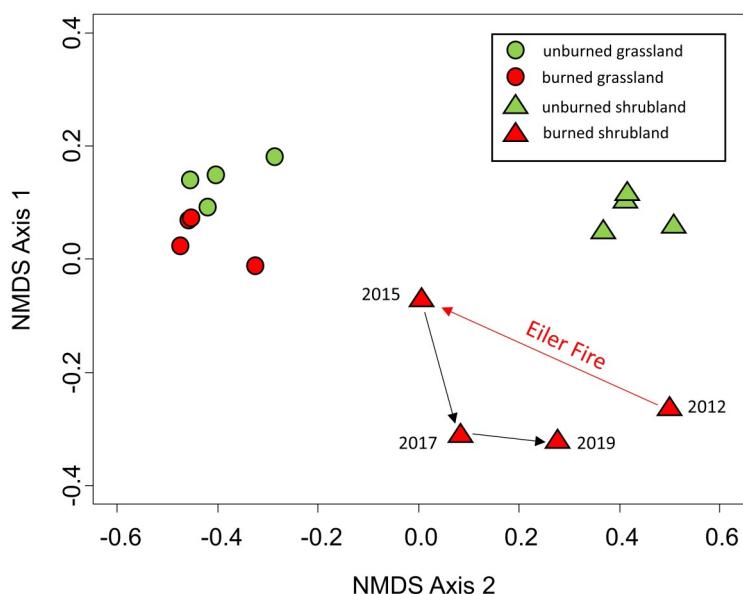
Key Findings (5 years post-fire)

- The Eiler Fire reduced shrub cover from 30% to 5%, killing most bitterbrush plants. Bunchgrass cover was unchanged even one year post-fire.
- One year post-fire, burned plots from the shrub community had become more similar in functional group composition to the bunchgrass community.
- Five-years post-fire, there is a trend toward the recovery of shrub cover in the shrub-dominated community.



Pre-fire, (2012, above), shrubs such as bitterbrush characterized portions of the meadow complex. Post-fire, (2015) most bitterbrush failed to resprout. Significant shrub recovery was observed in 2019 (above-right) as bitterbrush germinated from seed.

(right) NMDS ordination of functional group composition illustrates how burned shrub-dominated plant communities became more similar to bunchgrass-dominated plant communities one year post-fire (2015), but that this shift may be short-term in nature as burned shrub communities re-approach pre-burn conditions by 2019. Each point represents the centroid of a plant community in a given year.

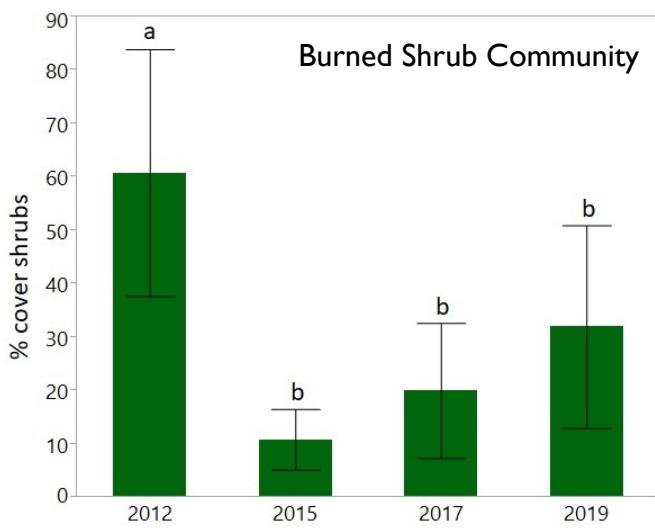




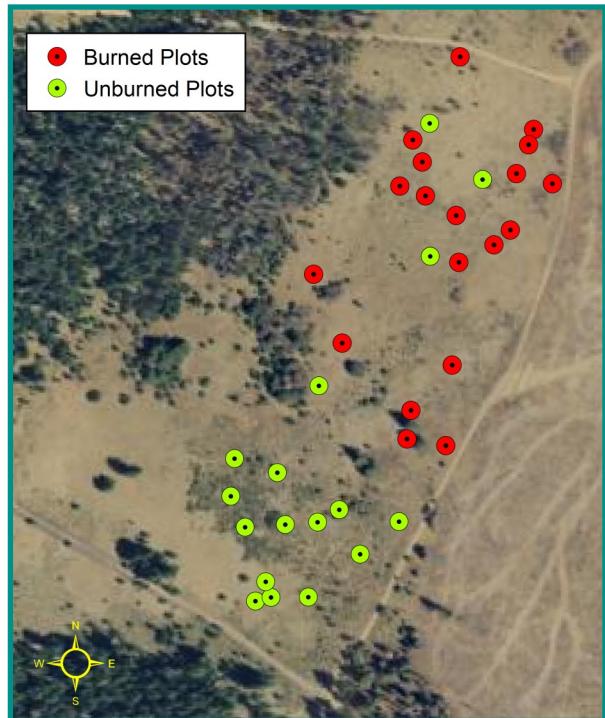
Monitoring Overview

The project was intended to monitor the effects of a prescribed underburn on the vegetative mosaic observed in an ungrazed mesic meadow complex near Burney Mountain in Shasta County. Forty 1-m² permanent plots were established in 2012. Before the underburn could be implemented, the Eiler Fire of 2014 burned through approximately half of the plots. We monitored fire severity in fall of 2014, then collected post-fire vegetation data in summer 2015 and 2017.

One year post-fire (2015), the bunchgrass community was little changed. Most perennial bunchgrasses (Idaho fescue, brome, squirreltail, California needlegrass) were top-killed, but grew vigorously from root crowns the following summer. The shrub community, however, changed significantly in burned plots. While top-killed goldenbrush (*Ericameria nauseosa*) resprouted from root crowns, bitterbrush (*Purshia tridentata*) did not, falling from 30% cover to 1% cover in burned plots by 2015. However, bitterbrush seedlings were observed in most burned shrub plots by 2017, averaging 21 cm in height that year, and 51 cm in height by 2019. Year Five monitoring suggests that although burned plots in bunchgrass and shrub vegetation types converged in functional group composition one year post-fire, they are on a trajectory towards pre-fire conditions that would maintain the mosaic of vegetation types in this system.



(above) Mean shrub cover within the burned shrub community fell drastically post-fire. Although the rebound by 2019 was not significant, the successful establishment of bitterbrush seedlings may lead to further future shrub recovery.



The Eiler Fire burned through approximately half of the existing bunchgrass plots, and half of the shrub plots.



(above) A Lassen NF biological science technician records species and cover in an unburned grassland plot.