

Fire Effects Monitoring - Devils Postpile National Monument 1993 Preliminary Report

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INTRODUCTION

Fire effects data was collected following the 1992 Rainbow Fire to document post-fire change in fuel load and vegetation in Devils Postpile National Monument (DEPO). The immediate post-fire data for fuel load, overstory tree density, seedling density, and understory vegetation has been summarized for burned and unburned plots. The plots located in areas that burned under low, moderate, and high intensity fire were combined into one burned category due to small sample sizes and lack of multiple-visit data. After long-term data has been collected (at least 2 visits), comparing the burned plot data by relative fire intensity may be useful.

RESULTS

Fuel Load

Mean total fuel load for burned plots was 8.2 tons/acre (± 10.2 standard deviation (sd), n=6 plots) compared to 110.7 tons/acre (± 92.4 sd, n=2 plots) for unburned plots (Figure 1). The large standard deviation values are likely due to the small sample sizes and a highly spatially variable fuel load in this forest. Assuming that pre-fire fuel load was similar in burned and unburned plots, fuel load was greatly reduced following the fire (93% reduction estimate). The litter and duff component comprises only 16% of the total fuel load in the burned plots while in the unburned plots the litter and duff component is 79% of the total fuel load. This result indicates that the fire may have consumed a much higher proportion of litter and duff than woody fuels. Larger woody fuels may not have combusted as completely as the smaller, drier fuels. As pre-burn data is not available, whether the burned and unburned plots had similar total fuel loads and/or similar proportions of woody and litter and duff fuel components is unknown.

Overstory Trees

Total number of live and dead trees by species varies between the burned and unburned plots (Figure 2). In the burned plots, 78% of the white fir trees were dead compared to none dead in unburned plots. Seventy-three percent of red fir were dead in burned plots and 9% dead in unburned plots. Lodgepole pine in burned plots included 42% dead compared to 8% dead in unburned plots. All western white pine and nearly all Jeffrey pine were dead in the burned plots. As pre-fire data is unavailable, the proportion of trees that were dead before the fire is unknown.

Examining tree density rather than total numbers allows a better comparison of species composition between burned and unburned plots. Lodgepole pine occurs in the same density and other pines are small components in both burned and unburned plots (Figure 3). White fir is more dense in the burned plots (130/ha) than in unburned plots (15/ha). However, red fir occurs in a much higher density in unburned plots (370/ha) than in burned plots (122/ha). The high density of red fir in the unburned plots may indicate more moist sites that were less likely to burn. Density and mortality by size class will be analyzed at a future time.

Seedlings

Detectable seedling mortality (fully scorched but needles intact) in the burned plots was approximately 30% for white fir, red fir, and lodgepole pine (Figure 4). However, numerous seedlings were likely fully consumed by the fire. Similar to overstory trees, red fir seedlings dominated in the unburned plots.

Understory Vegetation

Insufficient data due to small sample size does not allow for any meaningful summary for this sparsely vegetated forest understory at this time.

FUTURE PLANS

The one-year post-fire monitoring visit to each DEPO plot will be conducted 13-16 September 1993 with a four-person crew led by Peter Stanzler. Methods will again follow standard guidelines for Western Region (WR) Fire Effects Monitoring (see enclosed 1992 preliminary plan, and details in 1992 WR Fire Monitoring Handbook). Data summary and comparison to immediate post-fire results will occur during 1993-1994.