3.14) Prescribed Fire and Heavy Fuel Effects on Mature Giant Sequoia Trees

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INTRODUCTION

As a result of public concern about the visual effects of fire, giant sequoia trees located in Special Management Area (SMA) restoration burn units were subject to preburn large fuel removal as specified in Appendix H of the SEKI Fire Management Plan. The appendix stated that unnaturally high fuel levels around sequoia trees greater than four feet in diameter must be removed prior to burning to limit bark char and crown scorch. Although Appendix H was amended in 1996 to relax this internal policy requirement (based on a compilation of studies), this study will provide managers with information about the actual impacts of burning the unnatural fuels around the giant sequoias. For the complete study plan for this investigation, see Keifer (1995) **Appendix 1** in the MKRRP 1995 Annual Report.

OBJECTIVES

This study was designed to assess the relationship between the amount of fuel surrounding giant sequoias prior to burning and the resulting fire effects. The specific objectives of the study are to: 1) determine the amount of heavy fuels surrounding giant sequoia trees prior to and following prescribed burning, and measure the resulting fire effects characteristics; 2) from these measurements, determine the relationship between the amount of large fuel and duff surrounding giant sequoia trees and resulting changes in fire effects characteristics (bark char, crown scorch, fire scars, and mortality); 3) provide the fire management staff with the study results to assist in making decisions regarding heavy fuel clearance in giant sequoia groves.

PRELIMINARY RESULTS

The study area, consisting of 60 giant sequoia trees located in the Atwell (#3) segment, was burned in 1995. Due to the late season burn and subsequent snowfall, the trees were not revisited until 1996, one-year postburn. In eight 7.6 m (25 foot) transects radiating out from the base of each tree, mean preburn litter depth was 2.03 cm (0.8 inches) and mean 1-year postburn litter depth was 0.03 cm (0.01 inches). Duff depth was also greatly reduced from a preburn mean depth of 11.68 cm (4.6 inches) to a 1-year postburn mean depth of 0.76 cm (0.3 inches). Fuel consumption (load, in kg/m^2) for litter, duff, and large woody fuel has not yet been analyzed.

Eleven of the study trees sustained crown scorch as a result of the prescribed burn. For these trees (trees without scorch not included), mean scorch height was 17.6 m while the mean proportion of the crowns scorched was 5.3%, ranging from 1 to 15%. New scars formed on 33 of the trees sampled, noted by the presence of areas on the trees where the cambium was lethally damaged and the bark exfoliated. Many of these new scars formed on the upslope side of the trees. No mortality occurred in any of the 60 study trees within 2-years following the fire. Complete results for the giant sequoia fuel and fire effects study are still being processed.