

Thinning and Underburning Effects on Productivity and Mensurational Characteristics of Jeffrey Pine¹

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Abstract

Thinning utilizing cut-to-length and whole-tree harvesting systems with subsequent underburning were assessed for their influence on stand productivity and mensurational variables in uneven-aged Jeffrey pine (*Pinus jeffreyi* Grev. & Balf.) on the Tahoe National Forest. Both intermediate and a combination of dominant and codominant crown class trees were selected within each treatment to evaluate stand productivity based on measurements of pre- and posttreatment ring widths from sample cores, while stand mensurational attributes, derived from trees ≥ 10.2 cm DBH, were collected from permanent measurement plots. These trees were further subdivided into two size categories: (1) ≥ 17.8 cm DBH, ≤ 19.8 m tall and (2) ≥ 25.4 cm DBH, based on their likelihood of either becoming or retaining their status as long-term stand constituents, respectively. Radial growth responses to treatment in both intermediate and dominant/codominant crown class trees clearly demonstrated a thinning effect, with cut-to-length and whole-tree subunits of the stand exhibiting responses ranging from negligible change to substantial increases in posttreatment increment. In contrast, trees in unthinned stand portions exhibited considerable declines in this regard compared to pretreatment values. Neither the fire treatment nor the interaction between thinning and fire treatments exerted a significant influence on radial growth. Comparisons of post- to preburn mortality revealed significant thinning and fire main treatment effects as well as significant interaction between these two treatments in both tree size categories. However, mortality increased most in the small size class within the burned portion of the whole-tree subunit, whereas the values of this variable among the larger trees rose most sharply in that of the cut-to-length subunit. Post- to preburn shifts in live crown, expressed as a percentage of total tree height, were significantly affected by both thinning and fire main treatments in the small and large tree categories, while the interaction of these treatments was also significant in the latter. Within both size classes, decreases in live crown percentage were greatest in the burned portion of the unthinned subunit, with the second highest losses occurring within that of the cut-to-length subunit. These results present land managers with plausible outcomes of differing forest management field practices presently being employed to enhance forest health and reduce wildfire risk in the Sierra Nevada.

¹ Poster presented at the National Silviculture Workshop, June 6-10, 2005, Tahoe City, California.

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