Fire Hazard and Silvicultural Systems: 25 Years of Experience From the Sierra Nevada

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Silviculture systems influence fire hazard by changing the arrangement and quantities of live and dead biomass. Each system regulates forest growth and development but their long-term influence on fire hazard is largely unknown. We determined if significant differences ($p < 0.05$) exist in fuel loads (1, 10, 100, 1000 hour, duff, litter), surface fuel height, crown cover, and height to live crown base from the single-tree selection, thin from below, overstory removal, group selection, and clear-cut silvicultural systems. Approximately 25 years of data from each of the systems were analyzed from young-growth (approximately 80 years old) mixed conifer forests at the University of California Blodgett Research Station located in the northern Sierra Nevada. These systems were also compared to adjacent 80-year-old unmanaged stands. All areas have experienced a policy of fire suppression the last century. Activity fuels were lopped and scattered with the exception of the clear-cut and group regeneration units that were tractor piled and burned. Significant differences were detected between silvicultural systems with the clear-cut having the lowest average fuel loads. Clear-cut had low surface loads but at 10-15 years of age they produced high horizontal fuel continuity and high hazards. No significant differences were detected between the single tree selection, overstory removal, thin from below, and unmanaged stands, which all averaged approximately 150 metric tons / ha of surface and ground fuels. Activity fuel treatment must be an integral component of silvicultural systems to produce forests with low fire hazards.

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