Fuel Loading and Moisture Dynamics in Thinned Coast Redwood – Douglas-Fir Forests in Headwaters Forest Reserve, California

Radoslaw Glebocki, 246 S. Sacramento St., Willows, CA 95988; (707) 601-3090; radex7@yahoo.com

Rosemary Sherriff, Jeffrey Kane, Humboldt State University, J. Morgan Varner III, USDA Forest Service, David H. LaFever, Bureau of Land Management.

The majority of coastal redwood forests are young (< 50 yr old), even-aged forests with historically unprecedented high densities of Douglas-fir. These second-growth forests offer diminished biological diversity and wildlife habitat value than remnant old-growth forests, prompting recent efforts to accelerate the development of old-growth characteristics using forest thinning. The effects of restoration thinning on fuel characteristics in these forests are largely unknown.

Fuel characteristics resulting from restoration activities in the region were assessed across a chronosequence of stands thinned one to seven years prior, and compared with conditions in the unthinned stands. The moisture content of litter and woody fuels was monitored over a five-month fire season. The microclimatic conditions including relative humidity, temperature, and wind speeds in thinned and unthinned stands were monitored across the 2013 fire season (May through October).

Restoration thinning significantly increased loading of fine woody fuels (< 7.62 cm in diameter). Results revealed that loading of fine fuels in recently thinned stands was 56% higher than loading in oldest thinnings. Fuel moisture content in all but the 100-hr fuels was found to be lower in thinned stands, but the pattern of moisture loss was similar in thinned and unthinned stands. Although moisture content did not vary with age of fuels, weak trends were observed during drying and wetting periods. Changes in forest structure due to thinning have altered the microclimate at the forest floor, resulting in relative humidity lower by 4.6%, and air temperature higher by 1.6°C.

Results of this study suggest that restoration thinning may exacerbate potential fire behavior in young coast redwood - Douglas-fir forests by increasing loading and availability of forest fuel, highlighting the need for subsequent fuels reduction treatments, or alternative thinning prescriptions that better reduce potential fire hazard. While current restoration thinnings in young redwood forests may improve the stand from silvicultural standpoint, these efforts may have the unintended consequences of increasing fire hazard that would limit the desired effectiveness of these treatments.