Westside Thinning and Underplanting Study in 50- to 55-year-old Douglas-fir and Douglas-fir/Hemlock Stands

Elizabeth C. Cole and Michael Newton

Poster Abstract

Public agencies in the Pacific Northwest have engaged in managing for late-successional features or structure on lands which also have the possibility for high timber production. This study examined the potential for developing understory structure while maintaining a productive overstory on two sites (Willamette Valley foothills and coastal) in western Oregon. Treatments included thinning 50- to 55-year-old Douglas-fir (*Pseudotsuga menziesii*) or Douglas-fir/Western Hemlock (*Tsuga heterophylla*) stands to three or four overstory densities 30 to 65 percent below full stocking, either in a uniform pattern or by creating gaps. After thinning, plots were underplanted with three or four species with varying shade tolerances. Seedling, vegetation, and overstory measurements have been made periodically for 10–15 years after thinning. To determine potential timber yields, stand conditions after thinning were input into ORGANON and growth projected for 50 years after thinning. Tenth-year survival of underplanted seedlings varied by site and species, with the coastal site having higher survival than the Valley site. Survival at the Valley site was lowest with the highest overstory density, but density did not affect survival at the coastal site. In general, the highest-density overstories led to the smallest seedlings and the lowest-density overstories the largest. Seedlings were usually larger in gaps. Browsing affected growth of Douglas-fir and Western Redcedar (*Thuja plicata*). Natural regeneration of Western Hemlock was abundant at the coastal site and resulted in areas of hemlock "thickets", which limited light for other understory vegetation. Projections from ORGANON indicated that overstory trees are dynamic and continuing to grow after thinning. Based on these projections for the higher-density thinnings, it is likely that underplanted seedlings will have a limited potential for creating a secondary structural layer. Repeated thinnings may be necessary to insure adequate growth and survival of underplantings, but removal of overstory trees may result in damage to the understory trees. Gaps, especially the larger gaps, may provide an opportunity for underplanted seedlings to develop a secondary layer.

Keywords: Late-seral vegetation; understory structure; thinning.

Elizbeth C. Cole is a senior faculty research assistant, and **Michael Newton** is emeritus faculty, Department of Forest Engineering, Resources & Management, Oregon State University, Corvallis, OR 97331; mike.newton@oregonstate.edu.