

Harvest Operations for Density Management: Planning Requirements, Production, Costs, Stand Damage, and Recommendations

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Presentation Abstract

Since the early 1990s, several studies have been undertaken to determine the planning requirements, productivity, costs, and residual stand damage of harvest operations in thinning treatments designed to promote development of complex forest structure in order to enhance ecological functioning and biological diversity. These studies include the Oregon State University-led cooperative Coastal Oregon Productivity Enhancement (COPE) project, the Willamette (National Forest) Young Stand Project (WYS), and the Siuslaw (National Forest) Thinning and Underplanting for Diversity (STUDS) project. Treatments focused on 35- to 50-year-old stands with density management targets included light thinning (100–120 residual trees per acre, tpa [~250–300 trees per hectare, tph]), heavy thinning (50–60 residual tpa [~125–150 tph]), very heavy thinning (30 residual tpa [~75 tph]), and light thinning with gaps. A second treatment was applied to the STUDS stands that had light and heavy treatments on the first entry.

Logging planning and layout costs were studied for the WYS project. Production and costs results for harvest operations include skyline yarding, ground-based skidding, and mechanized cut-to-length systems. Damage to the residual stand was studied for the STUDS stands.

Planning and layout efforts are beneficial to efficient and successful harvest operations. Harvest production influences related to the density management treatment were relatively small. More importantly, these studies have demonstrated important aspects of successful harvest operations for density management in planning, conducting, and assessing residual stand damage. Results of the stand damage assessments show high incidence of tree damage close to the yarding corridor / skid trail. A stand damage assessment methodology, DAMQUICK, was developed.

This presentation will (1) summarize what we have learned from the harvesting studies for successful planning and implementation of density management stand treatments, and (2) report the cable harvesting production and stand damage results from the STUDS second thinning entry.

Keywords: harvest planning, thinning costs, logging productivity, skyline yarding, tractor skidding, mechanized harvesting, cut-to-length, young stands, commercial thinning, partial cutting, timber harvesting, Douglas-fir, logging damage, riparian buffer.

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Han, H.; Kellogg, L. 2000. Damage characteristics in young Douglas-fir stands from commercial thinning with four timber harvesting systems. *Western Journal of Applied Forestry*. 15: 27–33.

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Photos, facing page—Top left: Anemone in the rain. Photo by Brad Catton, USFS. **Top right:** Coastal Giant Salamander, *Dicamptodon tenebrosus*. Photo by Loretta Ellenburg, USFS. **Center left:** Ensatina (*Ensatina eschscholtzii*). Photo by Brad Catton, USFS. **Center right:** Groundcone, *Boschniakia* sp. Photo by Brad Catton, USFS. **Bottom:** Road at Keel Mountain. USFS photo by Mark Meleason.