

AN ABSTRACT OF THE THESIS OF

Eric J. Dinger for the degree of Master of Science in Forest Science presented on June 4, 2007.

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Abstract approved:



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Early in the establishment of Pacific Northwest conifer plantations, herbaceous weeds often decrease seedling growth through competition for soil moisture during the dry summer months. Critical period studies have reported that reductions in competitive weed cover are necessary during the initial years of establishment to avoid reductions in seedling growth. Six herbicide treatment regimes commonly applied over the first two years of plantation establishment were studied in a randomized block design to understand Douglas-fir seedling growth response. First season results demonstrate that seedling growth was improved when competing vegetation cover was reduced through the regimes examined. Volume growth increased from 5 cm<sup>3</sup> in the untreated control to greater than 20 cm<sup>3</sup> when total weed cover was reduced below 10%. Multiple vegetation surveys within a single season revealed that reductions in total vegetation cover were associated with the treatments and tracked distinct changes to the species composition of the weed communities that remained in these plots. Soil moisture and xylem water potential were intensively measured and demonstrated that

the vegetation management regimes utilized in this study improved growing conditions. While all herbicide regimes in the experiment increased seedling growth relative to the untreated control, the incorporation of a site preparation spray and a spring release was the most effective treatment. This regime had a profound impact on seedling growth, vegetation cover, soil moisture, and xylem water potential during the initial season of the critical period.