

Silvicultural Challenges for Coast Redwood Management¹

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Coast redwood silviculture is probably more varied at present than at any time in the history of redwood forest management. For some forest products companies, management utilizes a series of intensive silvicultural operations where density, composition, competing vegetation, and rotation length are carefully controlled. At the other extreme, some ownerships are beginning to use silvicultural operations to enhance old forest characteristics or favor other non-timber values. Several trends are influencing current silviculture but are also continuing the historical trend of widely divergent approaches to forest management. These include expanded use of tree breeding to improve growth, an increasing recognition of the role of natural disturbances in guiding silvicultural operations, and basing silviculture on a more fundamental understanding of production ecology and stand dynamics.

Current silviculture is presented in the context of using operations to direct stand development on a variety of pathways or trajectories. Silvicultural operations are combined into systems that meet different management goals. These include the role of early density control of a sprouting species with complex spatial patterns of stems and complex early growth patterns. The relationship of leaf area index (LAI)—a surrogate for growing space occupancy—to stand density and growth is used to describe several silviculture systems. Assuming a maximum LAI of 14.0, a system designed to achieve old forest characteristics might use a precommercial thinning treatment to adjust initial spacing and then allow the stand to develop without intervention (*fig. 1*). A multiaged system might use a 20-year cutting cycle but would attempt to maintain LAI within a range that is less than the maximum. The intensive system uses a 50-year rotation and also maintains LAI at less than 12 over the rotation. Two thinnings are used to adjusting density during each even-aged rotation.

Leaf area index has potential as a unifying variable to link management for objectives associated with stand management with other resource management objectives such as hydrologic response, wildlife habitat, or attainment of prescribed levels of forest cover. For stand management, LAI can be arranged in different structures that have a profound influence on stand productivity. A variety of silvicultural operations can also be described using LAI and LAI represents a viable way of describing the trajectories of stands following treatment.

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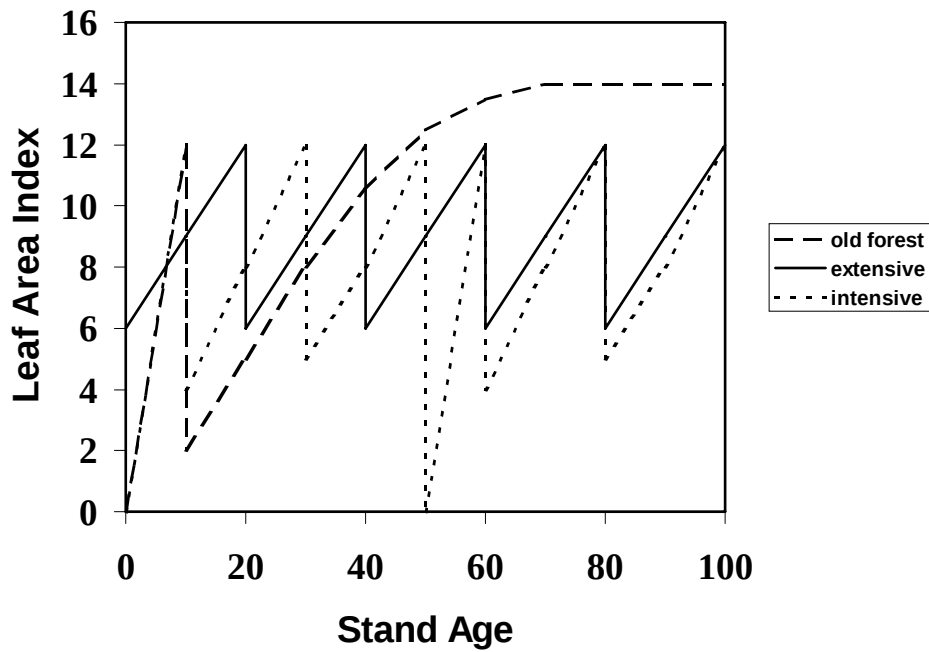


Figure 1—Hypothetical development of LAI for three different management systems. The “old forest” system is designed to restore a cutover site to and old forest. The “extensive” system is a multiaged system with five cutting cycles that fluctuate in LAI from 56 to 12. The “intensive” system is an even-aged regime where LAI develops rapidly after clearcutting, a precommercial thinning treatment at age 10 and a commercial thinning at age 30.