

## Thinning: An Important Forest Management Tool

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Thinning is the term foresters apply to removal of some trees from a stand to give others more room (and resources) to grow. As Extension Forester, I've recommended thinning to hundreds of Douglas County landowners – as a tool for improving timber value, making sites more productive, and – perhaps most commonly, for keeping trees healthy. Let's take a look at the subject and see if thinning is the right answer for your trees.

Nature generally plants forests thick. An area disturbed by fire, wind damage, or disease may regenerate with thousands of seedlings per acre. Spaced closely together, these trees compete for sunlight, water and nutrients. As these trees grow, each places increasing demands upon the site's resources. The larger trees simply need more water, nutrients, and sunlight than they did when smaller. Eventually, the site reaches a point where it can no longer support all of the young forest's trees. Growth rates decline and individual trees best suited to the site outgrow the others. In the language of forestry, this process is called "differentiation." The strong trees are called "dominants" and "codominants", depending on their relative heights, and the weak trees are called "intermediates" and "suppressed." Eventually, weak trees die from resource limitations, and the remaining trees each get a bigger proportion.

If differentiation always worked perfectly, trees would always be in balance with their site's ability to support plant life. Only the least well-adapted trees would die, and the forest would always have strong, healthy trees remaining. Unfortunately, differentiation doesn't work perfectly. In Douglas County it's not uncommon to see thick stands of tall, spindly trees with few living branches. We call these "stagnant" stands, and they develop when trees fail to differentiate. Too many trees remain alive, and all suffer from a lack of resources until they become so stressed the entire stand dies. This condition is common in our lower elevation, droughty, interior sites.

Foresters use thinning to help optimize nature's process and meet specific management objectives. Individual trees are removed before a stand becomes overcrowded, allowing the remaining trees to maintain higher growth rates. Foresters can choose what trees to leave - trees well suited for wood production, wildlife habitat, regeneration, resistance to disease, or any of a number of objectives.

It's these objectives that define when and how a thinning operation should be conducted. If the objective is spotted owl habitat, repeated thinning may be needed to promote growth of large trees with plenty of open space below for foraging habitat. An objective of keeping a forest healthy may be met by removing any trees that show signs of decline, thereby minimizing stress on the remaining trees. If the objective is to maximize wood production for today's market (with mills most strongly desiring long, straight logs of moderate diameter) then an early, precommercial thinning and final harvest between 35 and 45 years of age is probably appropriate. For landowners that want to hold their forests in "big" trees for longer periods of time, additional commercial thinning will be required. This final objective requires trees to be thinned out frequently enough to prevent the remaining trees from having too much of their crowns (living branches) become shaded out – so timing of thinning operations becomes critical. Doughty site? Thinning may be absolutely necessary to keep trees healthy.

Douglas County's numerous young stands present ample opportunity to utilize thinning to increase timber value, enhance resistance to insect attack, and meet other objectives. It's important to understand a few basics before undertaking the activity.

1. Tree species vary in tolerance to shade. Some species grow best when exposed to full sunlight, while others need to be in the shade. Thus, a species that is intolerant of shade may respond best when widely spaced in a stand, while a shade tolerant species may perform well in a stand with much closer spacing. Douglas-fir is classified as intermediate in shade tolerance, and grows well in stands that are managed to maintain moderate densities.
2. With many species, trees grown in dense stands for too long may exhibit a negative response to thinning when it does occur. Trees in these stands may have thin bark that makes them susceptible to sun-scald (damage to the cambium from overheating), they may have needles that are not well adapted to direct sunlight, and they may have only a small crown area. By thinning before a stand begins to stagnate, growth rates can be maintained and tree health can be maintained. First thinning of local Douglas-fir will often be required within 15 to 20 years of planting. If still unthinned at 30 years, the stand may be too stagnant to respond effectively.
3. To achieve maximum usable fiber yields, thin when the crowns of the trees are beginning to overlap. (This is typically called a precommercial thinning, because the material removed is too small to go to a sawmill.) Thinning before this point has little impact because the trees are not yet competing significantly. Waiting beyond this point will result in reduced growth rates and smaller trees. A second thinning is probably not economical if final harvest will occur before the stand reaches 45 years of age.
4. Recurrent thinning may be needed to grow older, larger trees. Tree value (and stand form, health, and aesthetic appeal) are almost always best improved by removal of trees with poor form and/or lower growth rates. Close attention must be paid to crown extent. Trees should be thinned before the crowns recede, as discussed in item 2, above.
5. Foresters use various guidelines to help them determine how many trees to leave on a site. These may be based on tree diameter, crown closure, site conditions, and several other factors. The important thing is to use a guideline to ensure that you will meet your management objectives.
6. Thin in the late summer and early fall if possible. At this time the trees will be least susceptible to damage from the thinning operation, and the populations of insects that would be attracted to the freshly thinned stand will be low. Winter is also an acceptable time to thin, but caution must be exercised to avoid soil compaction and erosion.
7. On droughty sites (i.e., much of interior Douglas County) thinning to wide spacing (along with control of competing vegetation) may be necessary to keep trees alive. This is particularly true if trying to maintain trees with limited drought tolerance (see the fact sheet *Why are Trees Dying*). Trees on these sites may be fully utilizing the site even if their crowns appear widely separated. The competition here occurs underground, where roots expand long distances in search of moisture.
8. Avoid thinning Douglas-fir on sites with the invasive root fungus blackstain to prevent further spread of disease.
9. Remember that your objectives define when and how much to thin. If a primary objective is to maximize value, remove the trees with poor form and lower growth rates. For maximum timber volume Douglas County sites respond well to precommercial thinning then carrying a relatively high number of trees to an early final harvest. Longer rotations require additional thinning. Other objectives, such as the need for immediate income or the desire to produce wildlife habitat, will influence how many and what type of trees are removed.

As with all woodland management activities, you need a good working knowledge of thinning before undertaking the activity. I recommend the following Extension publications for further reading:

- Thinning Systems for Western Oregon Douglas-fir Stands. EC 1132.
- Using Precommercial Thinning to Enhance Woodland Productivity. EC 1198.
- Thinning, An Important Timber Management Tool. PNW 184.
- Managing Western Hemlock Forests in the Oregon Coast Range. EC 1490.
- Managing Hardwood Stands for Timber Production. EC 1183.

All are available on the web at [eesc.oregonstate.edu](http://eesc.oregonstate.edu) or may be purchased at any OSU Extension Office.