



Tree thinning for health and vigor

Your chain saw is revved up and you're about to sink the bar into a nearby Douglas-fir sapling. But which one? You're surrounded by hundreds of them, some smaller, some larger, all pretty close together, but not uniformly spaced. There are some madrone trees too, and cedar, and a few spindly pines. You heard somewhere that trees should be 10 feet apart ... 12 feet ... or was it 15 feet? You can't quite remember. What to do?

Many landowners ask about proper or optimum spacing when thinning trees. Don't get too hung up initially on spacing. Instead, focus on tree quality and health. If you leave primarily high-quality trees and take out mostly low-quality trees, your stand will be more vigorous, fire-resistant, and valuable.

Spacing guidelines should remain flexible for leaving the best tree.

That said, spacing is still important. Trees need adequate growing space to thrive. However, rigidly adhering to exact spacing may lead you to cut trees that should be left and to leave trees that should be cut. This is especially true in natural stands where the spacing between trees is highly variable. In plantations, where the spacing between trees is more regular, predetermined spacing makes more sense. Spacing guidelines should nevertheless remain flexible for leaving the best tree. As trees grow bigger, they progressively need more space, so space trees out wide enough so that they will grow well until the next thinning.

So what makes a high-quality, vigorous tree? Here are some guidelines for "leave" and "cut" trees. While these points focus on conifer trees, the basic principles also apply to hardwoods.

Characteristics of 'leave' trees:

- Good live crown ratio (30% or greater)
- Good height growth for species and age
- A-shaped crown ("pointy top")
- Abundant foliage with good color
- Good form (straight, without sweeps, crooks, forks, etc.)
- Species is well suited to the site over the long term

Characteristics of 'cut trees'

- Poor crown ratio (less than 30%)
- Poor height growth and crown form (flat or rounded top, lopsided)
- Foliage is sparse or off-color
- Poor form or has signs of damage or internal decay
- Species not well suited to the site

Crown ratio

Crown ratio is the percentage of the total height of the tree that is occupied by the live green crown. For example, a tree that is 75 feet tall and has crown on the upper 25 feet of the tree has a live crown ratio of one third or 33%. Crown ratio is important because the bigger the crown (the tree's "food factory"), the better the tree's growth.

Gradual, light thinnings are recommended for very dense stands where few if any leave trees have desirable crown ratios.

The rate of tree growth slows down in most species when the live crown ratio drops below 40%. Trees with crown ratios of 30% and greater often respond well to release (removal of surrounding competing trees), while trees with crown ratios below 30% often respond poorly. These trees may experience thinning shock or sunscald, or grow very slowly. Trees with very small crown ratios may simply die after thinning. This often happens after diameter limit thinning (removal of all trees above a certain diameter limit) or high grading. Gradual, light thinnings are recommended for very dense stands where few if any leave trees have desirable crown ratios.

Height growth

Height growth can be determined by examining the length of the leader, if visible, or, on many conifer species (including the true firs, pines, Douglas-fir), the length of internodes, which is the distance between branch layers or whorls. Trees with good height growth are referred to as leave trees.

Crown shape or form

Pointy-topped or A-shaped crowns indicate rapid height growth. Rounded tops mean height growth has slowed. Good height growth is a sign of good vigor.

Full, symmetrical crowns are preferred over ragged or lopsided crowns.

However, as trees age, height growth slows, and the tree tends to develop a round or flat top. Full, symmetrical crowns are preferred over ragged or lopsided crowns. Lopsided crowns develop when a tree is crowded on one or more sides. Trees with lopsided crowns are more vulnerable to blowdown and breakage in snow and ice storms.

Crown color/needle density

A dark green color indicates good vigor. Light green or greenish yellow foliage ("chlorotic foliage") is a sign of stress. This may be due to nitrogen deficiency, root disease, bark beetle attacks or simply moisture stress.

Crown sparseness

A sparse or thinning crown, resulting from needle loss and is another sign of stress. This can often be best determined by comparing a thin or sparse crown with a denser crown on a nearby tree. An abundant crop of undersized cones ("distress crop") is sometimes an indication that the tree is severely stressed and likely to die in the near future.

Tree form

The form of the tree trunk (stem) is an important consideration in thinning. All other things being equal, trees with straight trunks and little taper that are free of a defect are most desirable as leave trees from a timber perspective. However, trees that are very tall for their diameter, especially conifers, tend to be unstable and easily bent by the wind or snow, so some taper is important.

Defective trees may also make good wildlife trees, so aim for a balance.

Trees that have forked or broken tops, crooked trunks or evidence of rot and defect may be candidates for removal. However, defective trees may also make good wildlife trees, so aim for a balance. For example, large “deformed” black oak trees with broken branches or heart rot are some of the best habitat trees around. Unless they threaten to demolish your house or barn if they topple, consider leaving them alone.

Other considerations

These guidelines touch on a few key indicators of tree quality. You should also be on the lookout for evidence of insect and disease problems, some of which may warrant tree removal, regardless of other factors.

Make sure that the species is well suited to your site.

Tree species should also be considered. Many landowners like to leave a mixture of tree species, both for aesthetic reasons and because a mixed species forest is often thought to be less vulnerable to a pest problem that might devastate a single species stand (monoculture). That’s generally true, but make sure that the species is well suited to your site. For example, hot, dry south-facing slopes in the Applegate are good for pine and oak but aren’t so favorable for Douglas-fir.

In a nutshell, these guidelines follow the old adage, “cut the sick, lame, and lazy, and leave the better ones.” As you thin for quality, you will probably also be reducing stand density to more desirable levels. It may not be too scientific, but forestry, after all, is a science *and* an art.



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