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Donald P. Hanley, Ph.D.
Stephen Reutebuch, M.S.



Conifer Pruning Basics for Family Forest Landowners

Conifer Pruning

Conifer pruning is the practice of removing the lower branches from live green conifer trees. Without pruning, the lower branches on conifers, such as Douglas-fir, western larch, and ponderosa pine, may persist for up to 80 years.

The primary objective of pruning for wood quality improvement is to produce a small, uniform knotty core throughout the length of the pruned bole so that clear wood volume will be maximized. Achieving this objective may result in increased financial returns to the landowner when the trees are harvested.

There are many other benefits from pruning, even if clear wood production or financial concerns are of secondary importance. These include:

- Increased understory vegetation for wildlife. As young stands are thinned and the dominant and co-dominant trees are pruned, more light will reach the forest floor, resulting in increased grass, herb, and shrub vegetation over time. This new vegetation often attracts wildlife as forage, browse, and hiding cover.
- Reduced fuel ladders. A “fuel-ladder” is the pathway that a fire can travel from the forest floor up to the tree canopy. Unpruned trees in unthinned stands have many low branches that can increase the probability of a fire getting into the tree crowns. Once the fire is in the crown, the likelihood of tree death is high and the probability of rapid fire spread increases.
- Reduced incidence of disease. For some diseases, such as the introduced blister rust in white pine, pruning is a primary weapon in reducing the disease spread as blister rust fungi enters the tree through its needles near the ground. Less damaging, but nevertheless unsightly, fungi from western gall rust enter lodgepole and ponderosa pine in the same manner.

- Improved visual aesthetics. Many forest landowners like the looks of a thinned and pruned stand. It is “park-like” and appears neat and tidy.
- Improved access within stands. Access into stands for maintenance practices or to pick wildflowers or huckleberries is easier with less foliage near the ground.
- Improved stand vigor. When coupled with thinning, pruning improves stand and tree vigor by removing the least productive trees in the stand and by removing the least productive branches on the remaining trees. As tree vigor improves, the overall health of the stand and forest increases.

Pruning for Wood Quality Improvement

The basic premise of wood-quality pruning is to remove the lower branches of young trees, so that the tree can seal over the branch stub and from that time forward, produce higher-value clear wood until the tree is harvested. This intensive management practice should only be carried out on healthy, long-lived species that exhibit a premium when sold in clear or select grades. Up to this time in the Pacific Northwest, westside Douglas-fir is the best target species for wood-quality pruning. Forest economists also believe that in the future, ponderosa pine, western white pine, western larch, western redcedar, and sitka spruce may bring increased value through pruning. Wood-quality pruning is not advocated in any of the true firs (*Abies* spp.), hemlock, Engelmann spruce, or lodgepole pine. It should be noted that pruning in all species is a relatively new practice, so we cannot guarantee any price premiums.

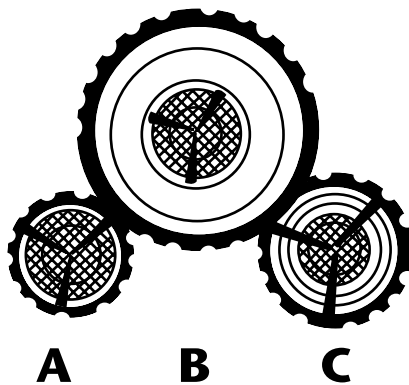


Figure 1. Trees from non-thinned stands (A) will produce small diameter trees with large knotty cores. If trees are thinned and pruned when young (B), the knotty core will be small with quality wood produced on the outside. Tree C represents a thinned but not pruned tree. From Hanley et. al, Forest Pruning and Wood Quality of Western North American Conifers.

Wood-Quality Pruning

- Minimize Knotty Defect Core. As young trees grow, they produce branches throughout their total height. These branches produce wood quality defects (Figure 1). We recommend that the pruned tree be about 4 inches in diameter (DBH) when pruning commences (about the size of a tuna fish can). On a relatively good growing site, trees typically reach this size in 8–10 years. If your trees are larger than this, it is still all right to prune, but your investment (financial and sweat equity) may not provide as great a return. Pruning should be done up the height of an 18-foot bole in three phases (called “lifts”).
- Pruning Operations—how to get the job done! Pruning is accomplished by removing the lower branches in three “lifts.” A few years may be required between each lift. As a general rule, never remove more than one-half of the live crown at any one time and never leave less than four whorls of branches. The diameter at the mid-point of the length of

Figure 2. As the tree grows, each successive lift removes the branches below the 50 percent crown level. From Emmingham and Fitzgerald, EC 1457, Pruning to Enhance Tree and Stand Value, courtesy of Oregon State University Extension Service.



bole to be pruned should be about 4–5 inches at the time of each lift (Figure 2). General guidelines for westside Douglas-fir follow:

First Lift: Remove lower branches from ground level up to 7–8 feet high on a 16- to 20-foot-tall tree. Prune about 130–150 of the best trees per acre from the dominant and co-dominant classes. Thin out poor quality trees prior to pruning.

Second Lift: The second lift will occur as the tree grows and usually is accomplished two to four years after the first lift. Remove lower branches up to 14–15 feet high on a 26- to 32-foot-tall tree. Prune about 115–130 of the best, previously-pruned trees per acre.

Third Lift: Remove lower branches up to 20 feet high on a 36- to 40-foot-tall tree. Prune about 105–120 of the best, previously-pruned trees per acre.

General Pruning Rules

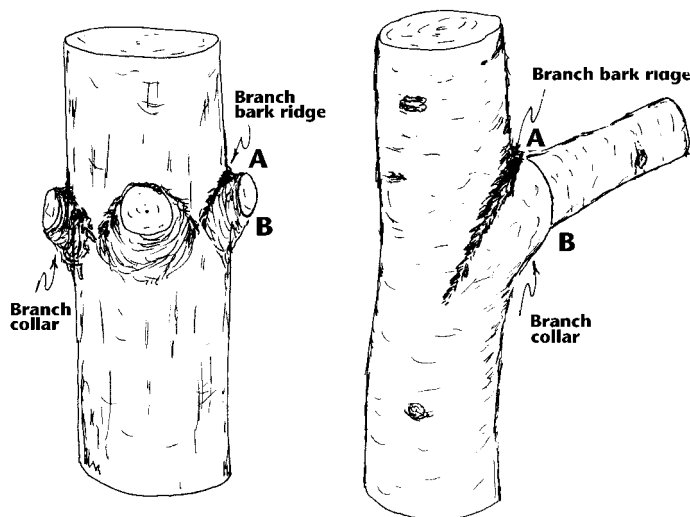


Figure 3. The proper way to prune branches on conifers (left) is contrasted to hardwoods (right). Most timber stand pruning of small branches is downward from A to B outside the branch bark ridge or collar. Prevent additional tree injury when cutting large branches by cutting partially from B to A, and then finishing the cut from A. The use of a sharp saw or shears will minimize bark tearing below the cut. From Hanley et. al, Forest Pruning and Wood Quality of Western North American Conifers.

- Pick the best trees to prune. Do not prune stagnated, diseased, or crooked trees.
- Pick high quality sites and stands that are well stocked and not over-sized. Average DBH should not be over 6 inches at time of first lift. If stands are over-stocked and stagnated, thin trees first.
- Prune correctly to high quality standards. Don't leave long stubs (sometimes called coat hangers) or jagged cuts. Prune flush with the branch collar (Figure 3).
- Cut off all epicormic sprouts. Don't leave these small attached branches that may occur on the bole near the ground.

- Maintain records for pruned stands. The best place to maintain these records is in your forest management or stewardship plan. The pruning objective, date, and pruning height should be recorded for future reference. Record keeping is extremely important for receipt of the premium price when trees are harvested
- Do not use a chain saw for wood-quality pruning unless it is expressly designed for this purpose. Bark tearing and branch collar damage often result when a chain saw set up for falling and bucking is used for branch removal. Bole scarring can invite the introduction of stem rot fungi into the tree.
- There is no need to apply any kind of “wound dressing” to the prune scars.

Time of Year for Pruning

We often joke with landowners at educational programs that pruning can be accomplished anytime that you can get your teenage son or daughter into your forest for an hour of good old-fashioned work! Seriously, pruning is a cultural practice that can be done anytime except when the bark on young trees is soft. Soft, easily damaged bark and branch collars occur when the tree is actively growing—from about mid-March to mid-July. If in doubt, wait until later in the summer or until winter to do your pruning.

Leaving Un-pruned Trees to Prevent Sunscald

Sunscald commonly occurs on trees that are on the south or west edge of stands. In addition, sunscald can occur throughout a stand if all trees are pruned and stand density is low. This may especially be a problem in the first lift. Therefore, it is recommended that a maximum of half of the trees in a stand be pruned (dominates and co-dominates), leaving the other trees unpruned until thinned. These unpruned trees provide shading on the boles of the pruned trees. Also, a row of unpruned trees should be left for a few years on the south and west side of the stand if these sides are not shaded by adjacent stands. Particularly severe sunscald has occurred when relatively large trees (height of 25–30 feet) in low density stands have been pruned up to 18 feet in a single lift.

Manual Pruning Equipment

Many different pruning tools exist, from simple handsaws and shears to sophisticated mechanical tree climbing and cutting equipment. If you are new to pruning, we suggest that you start

simple. A handsaw for first-lift pruning is a good place to start. As your experience and needs increase, consider using pruning shears designed for conifer pruning with an extension ladder or a handsaw on a telescoping pole for second- and third-lift pruning. Many people prefer to keep their feet on the ground, so a telescoping pole saw may be a good investment. When implementing production pruning, experienced crews and landowners often use ladders and specifically-modified shears to get the job accomplished quickly and appropriately.

Safety Concerns

As with all activities in a forest, safety should always be stressed. Personal protective clothing is necessary, including eye protection. Sawdust has a nasty habit of getting in your eyes when cutting branches off above your head! Sturdy boots with good soles must also be worn (remember—no caulk boots on aluminum ladders!). We can always summarize safety recommendations as, “Simply use common sense.”

For Further Reading

The most complete reference on forest pruning was developed from a 1995 Forest Pruning Symposium at the University of Washington:

Forest Pruning and Wood Quality of Western North American Conifers. 1995. Edited by Donald P. Hanley, et al. College of Forest Resources, University of Washington, Seattle. 435 pages.

Another excellent publication for family forest landowners is:

Pruning to Enhance Tree and Stand Value. 1995. W. Emmingham and S. Fitzgerald. Publication number EC 1457, Oregon State University Extension Service. Available on the Web at www.eesc.orst.edu.

Pruning equipment is displayed on the WSU Extension Forestry Web site at the following URL:

<http://ext.nrs.wsu.edu/handtools/tools/pruning/index.htm>

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