



# Improving Your Woodland for Timber Production

Kansas has 2.2 million acres of rural forestland. Approximately 95 percent of it is privately owned. As costs of land ownership increase, many landowners are looking for ways to increase their income. Woodland improvement provides one such opportunity.

Timber stand improvement (TSI) can increase growth and quality of a woodland by allowing the growth potential of the site to be concentrated on trees of high quality and value. Timber stand improvement will also enhance wildlife habitat and recreational use. The primary objective, however, is to encourage a stand of high-quality trees, called “crop trees,” to grow more rapidly in volume and value than if left untreated.

There are three specific objectives of timber stand improvement:

(1) increase growth of high value trees, (2) regulate number and distribution, and (3) improve trunk quality.

## Increase Growth of High-Value Trees

Select and mark crop trees so they may be easily identified. Crop trees are trees with no obvious defects such as lightning scars, fire scars, or other wounds. They should have medium to large crowns, relatively straight trunks, and high or medium commercial value. Species of high commercial value are black cherry, black walnut, bur oak, white oak, and pecan. Species of medium commercial value are basswood, black oak, chinkapin oak, hackberry, post oak, red oak, silver maple, and ash.

Remove trees with low potential for commercial use, undesirable trees, and grapevines that are competing with desirable trees for sunlight, nutrients, and water (Figure 1). In some woodland conditions, it may be desirable to favor low commercial value species. This may be done to encourage diversity in species composition to enhance wildlife and stream bank stabilization.

Most woodlands contain many trees that are diseased (cankers, rotten), damaged (fire scar, lightning, etc.), poorly formed (very crooked or forked below 8 feet), or are taking up more than their fair share of the woodland (wolf trees). These trees normally are the first to be removed (Figure 1).

Grapevines should only be killed when hindering growth of

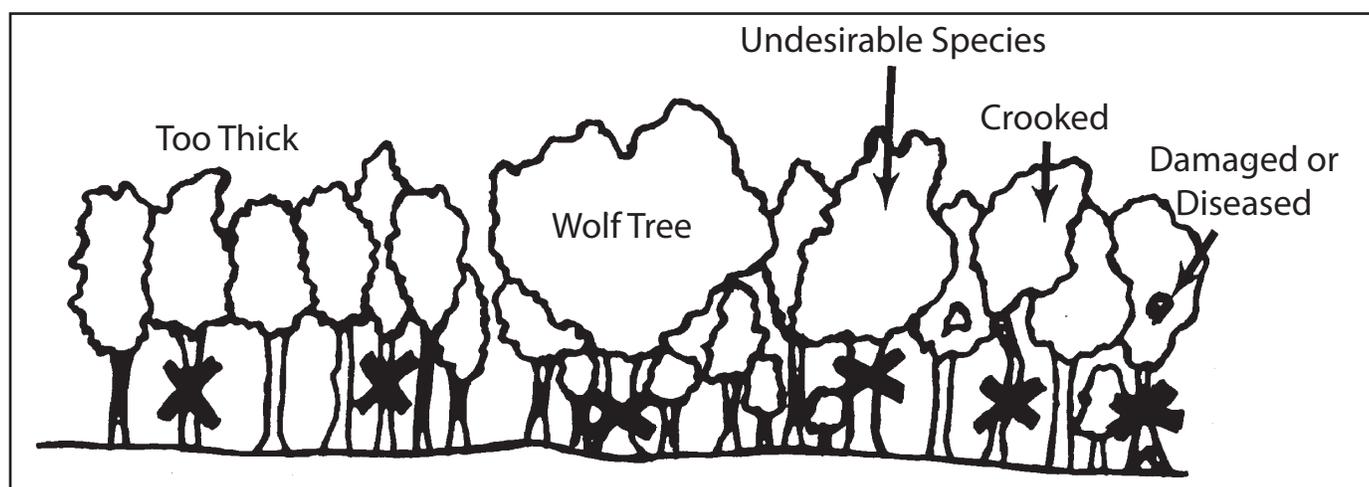


Figure 1. Eliminate trees marked with an X.

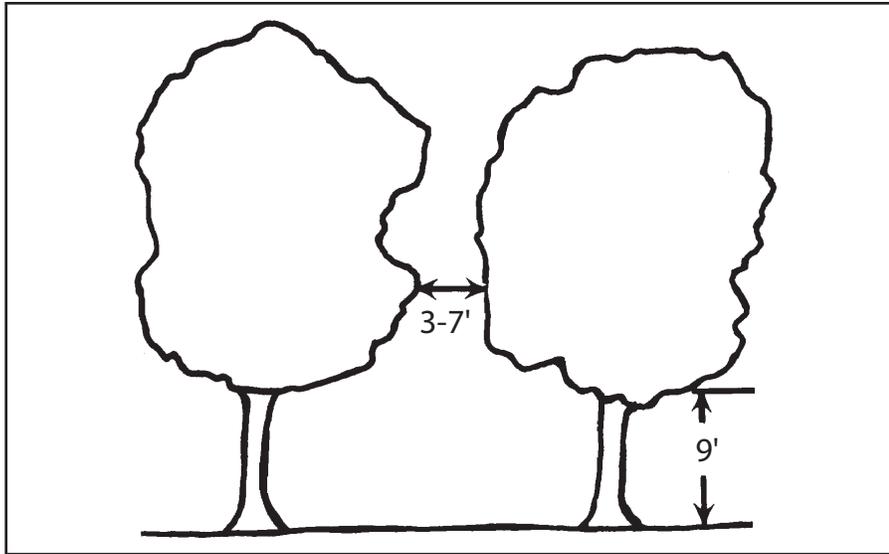


Figure 2. Crop trees should be spaced to allow 3 to 7 feet between their crowns, and should be pruned to a minimum height of 9 feet.

walnut, bur oak, green ash, and pecan. Other species will tolerate grapevines; and since grapevines are beneficial to wildlife, they should only be killed when necessary.

Do not remove all defective trees and trees of little or no commercial value just because they are in the woodland. Remove them only if they are hindering the growth of more desirable trees or to create openings for underplanting or natural regeneration. Many species benefit from nurse trees to help them grow straight and to enhance self-pruning. Noncrop trees may be left to serve as nurse trees. Many of these noncrop trees make excellent habitat for wildlife. Some of these noncrop trees will develop into den trees. Den trees provide valuable habitat for several species of wildlife.

### Regulate Number and Distribution of Trees

After removing defective and low commercial value trees, there still may be areas where trees are too close together for optimum growth (Figure 1). In such cases, some desirable trees will need to be removed to allow the remaining

trees (crop trees) to develop well-rounded and healthy crowns. Remaining trees should be spaced to allow 3 to 7 feet between their crowns (Figure 2). Figure 3 shows a “crown-touching” release where a crop tree was released on 1-4 sides of its crown by removing trees with competing crowns. A full release (on all four sides) may be beneficial for saplings and pole-sized trees, while a partial release (typically on three

sides) is best for larger trees. Unless they conflict with management objectives, sub-canopy trees whose crowns are not competing with a crop tree’s crown should be retained to prevent excess limb development. More space is required as individual trees grow, so several thinnings may be necessary.

Be careful not to thin a stand too early or too late. Thinning too early may result in excess limb development. If an area is thinned too late, the remaining trees will not grow as rapidly.

### Improve Trunk Quality

Trunk quality can be improved by pruning lower branches. The purpose of pruning is to produce defect-free wood for harvest. Species most commonly pruned to produce high-quality products are walnut, bur oak, and pecan. Pruning other species usually does not increase their value sufficiently to pay for the labor. Pruning is not economical on sites with low growth potential.

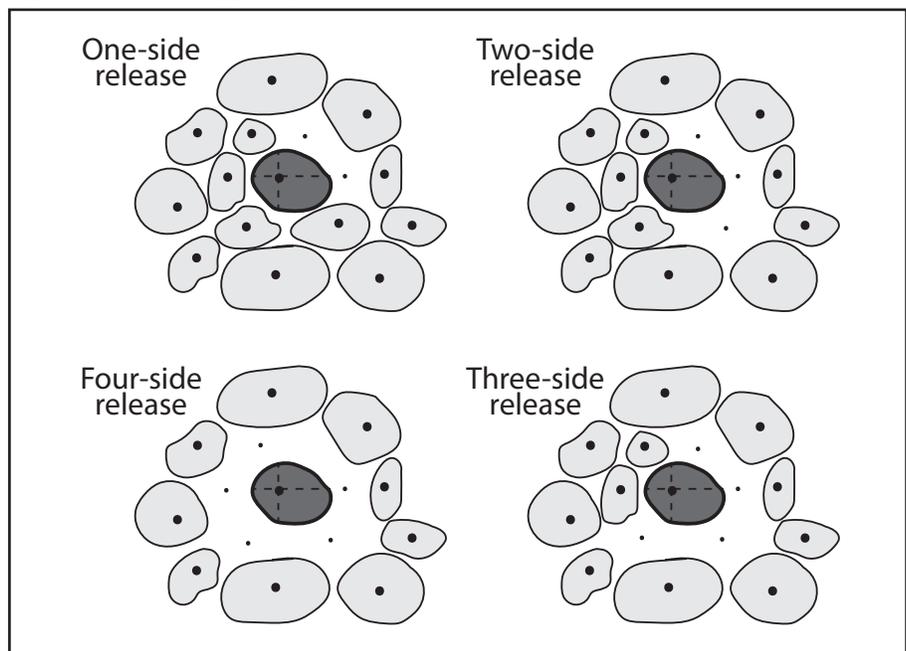


Figure 3. A crop tree crown (dark gray) shown from above the forest canopy. The diagrams illustrate a partial and full crown-touching release where one, two, three or all four sides of the crop trees are released. (Adapted from Miller et al.)

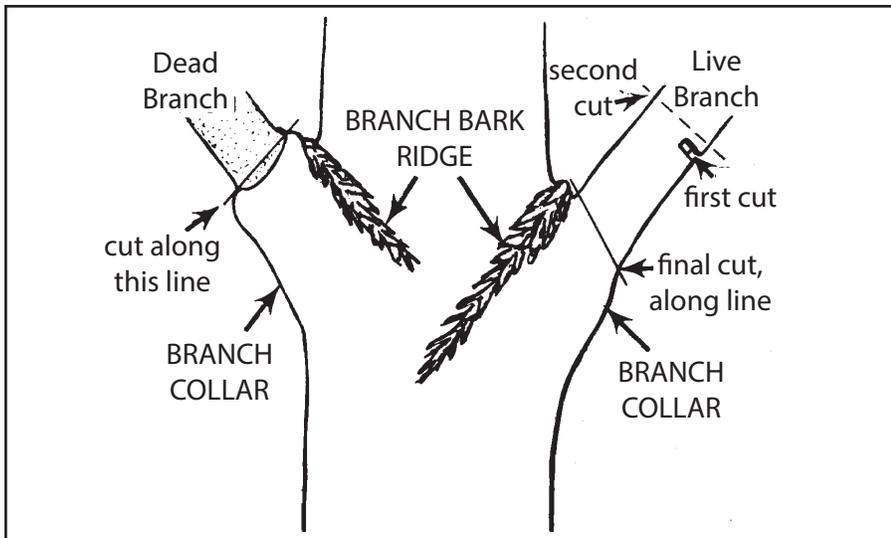


Figure 4. Proper pruning of live and dead branches.

Trees should be pruned to a minimum of 9 feet with a sharp chain saw or handsaw. Since the foliage provides energy for future growth, be sure to leave enough crown to sustain full potential growth of the tree. Never prune more than one-half of the total height of the tree. Cut live limbs at the branch collar (Figure 4). If there is no obvious branch collar, make the cut ¼ inch from the main stem. Do not remove live branches larger than 2 inches in diameter because larger wounds will close slowly and eventually result in a defect. To prevent tearing of bark down the trunk, make three cuts to remove a live limb (Figure 4). Remove all dead branches and stubs to a height of 9 feet. Do not treat the pruning cut with a wound dressing.

## Removing Competing Trees

Unwanted trees can be killed standing or cut and dropped to the ground if crop trees will not be damaged. An approved herbicide can be applied to the cut surface to prevent sprouting. Some woodland owners let stump sprouts grow to

provide additional wildlife food and cover.

Standing trees may be killed by using one of the following methods:

### Hack and squirt treatment.

Make cuts through the bark and into the cambium with a hatchet, ax, or similar device at 1- to 3-inch intervals completely around the tree. Place a small amount of herbicide in the cuts.

**Basal treatment.** Use a garden sprayer to soak thin-barked trees such as Osage-orange or honeylocust from the ground up to 15 inches on the stem of the tree. This method can be used on trees less than 6 inches in diameter.

**Single girdle treatment.** Make a single cut with a chain saw or overlapping cuts with a hatchet or ax completely around the tree. Apply herbicide to the entire cut around the tree.

**Double girdle treatment.** Cut two continuous, connecting circles, 1 to 2 inches deep and about 3 inches apart, around the tree trunk with a chain saw (Figure 5). No herbicide is necessary unless stump sprouts are to be controlled.

## Summary

Woodland improvement can be beneficial to the production of high-quality trees. This is done by pruning crop trees and removing undesirable trees and vines. In most cases, trees removed can be used as sawlogs, firewood, and posts. Additional benefits include improved wildlife habitat, recreation, and personal gratification.

Technical assistance in improving your woodland can be obtained by contacting your county K-State Research and Extension office or county Conservation District office. Arrangements will be made for a district forester to visit your woodland. You may also contact a district forester from our website.

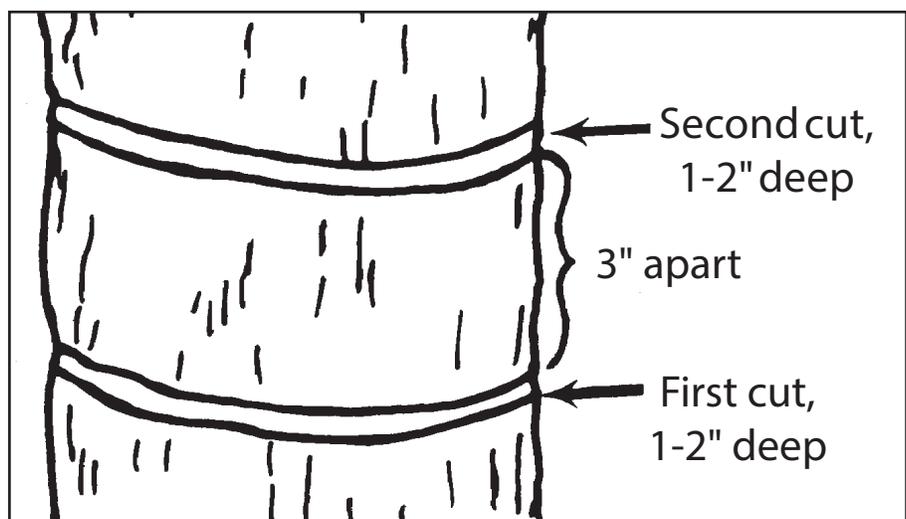


Figure 5. Double girdling with chain saw is one way to kill unwanted trees.

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## Related Publications

MF2103, *Chain Saws: Safety, Operation, Tree Felling Techniques*

C542, *Marketing Kansas Timber*

L847, *Kansas Forest Service: Serving Your Needs*

MF773, *Managing Your Woodland for Firewood*

MF805, *Windbreaks for Wildlife*

PB1774, *Technical guide to crop tree release in hardwood forests*, Gary W. Miller, Jeffrey W. Stringer, David C. Mercker, *University of Tennessee Extension*



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