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SP559 Crop Tree Release in Precommercial Hardwood Stands

The University of Tennessee Agricultural Extension Service

UT Extension
SP559

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THE UNIVERSITY of TENNESSEE

Contents

Crop Tree Release in Precommercial Hardwood Stands

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The length of time necessary to grow quality hardwood trees is perhaps the greatest deterrent preventing private landowners from practicing hardwood management. Valuable trees such as white and red oaks, cherry, ash, yellow poplar and black walnut require decades to reach financial maturity. This publication describes how to accelerate growth rates in your young hardwood forest, which is vital to keeping your interest alive during the critical and dynamic time between seedling establishment and final harvest.

Timber Stand Improvement (TSI) is a forest management tool used to enhance growth rates of timber and shorten the time required for hardwood crops to mature. TSI provides an opportunity for you to become actively involved in managing your timber, while increasing the possibility of a more favorable financial return.

Defining TSI and Crop Tree Release

TSI is controlling, manipulating and improving the growth, quality and species composition of a timber stand. One method of TSI is **Crop Tree Release** (CTR), the practice of deadening selected trees in younger, overstocked forests for the benefit of releasing desirable crop trees. Overstocked indicates a forest stand having more trees than is desired, causing the growth rate on individual trees to decline. CTR can be used to alter species composition within the forest, and to concentrate diameter growth on desirable, potentially valuable crop trees. When applied properly, CTR results in a faster-growing, healthier woodland composed of a greater percentage of more acceptable trees. Similar to the principles applied to gardening, CTR allows you to guide your forest, leaving it with well-spaced crop trees whose crowns are capable of rapidly responding to increased growing space. CTR can be first applied to younger, pre-commercial stands (trees that are too small for market), with diameters ranging from 4 to 8 inches (measured at 4.5 feet above the ground).

CTR allows you to guide your forest.

For clarification, CTR is not the practice of beautifying a forest. For example, clearing undergrowth to improve the appearance or visibility of a forest or cleaning up tree tops left after a timber harvest are cosmetic practices having little effect on the growth of your forest investment.

Other practices of TSI not addressed here include: improvement harvesting, fertilizing, deadening culls, controlling wild vines, pruning and, to some extent, prescribed burning and site preparation.

The white and red oak groups have traditionally commanded the highest price and should take top priority.

Apply CTR on the Best Sites

Most hardwood forests could benefit from CTR to some degree, but the greatest benefit will be realized on more productive sites. This is where measurable growth response will occur and where returns on your investment will be realized more quickly. Sites with deep, fertile and moist soils, sites protected from hot and dry southwest winds, and sites where hardwood trees typically can reach a height of at least 70 to 75 feet tall in 50 years are the best choices. These sites are typically found along rivers, creeks and drainages, on north- and east-facing slopes and in coves and ravines. Ridgetops and slopes with a southern or western exposure are drier and usually support less desirable species, such as blackjack and post oaks, blackgum, red maple, sourwood, elms and hickories.

The condition of trees growing on a site can further indicate site quality. Trees found on better sites will have smooth, thin and tight bark. Their tree tops are expanding (rather than stunted or flat-topped) and they will often have long, merchantable, log length.

Select Stands with Desirable Species

Once the best sites have been located, desirable trees must be present. Not all of the best sites are composed of tree species worthy of CTR. Through past treatment (or mistreatment) of the forest, often the more acceptable and valuable trees have already been harvested. Many times, the residual trees were left because they were undesirable species with low market value or poor form. When this is the case, CTR is not recommended. Instead, regenerating the stand is the priority.

Species found within the white and red oak groups have traditionally commanded the highest price and should take top priority. They are the mainstay of the Tennessee forest products industry and are likely to remain so. Speculating on the trends of future markets also can help you decide which species to favor. For example, market cycles periodically cause sharp increases in price for alternative species such as yellow poplar, black cherry, black walnut, maples and ash. Managing for a diversity of tree species can help you benefit from uncertain future timber markets. A mixture of tree species also offers diversity in wildlife food sources, particularly for smaller non-game species.

Likewise, markets fluctuate according to location. A study of the historical demand for wood products in your region, as well as seeking input from professional foresters, is essential before implementing CTR.

Use Correct Materials

A variety of tools such as hatchets, axes, hypo-hatchets and tree stump injectors have been used to conduct CTR, usually in combination with a systemic herbicide applied to the cut surface. Some herbicides can be applied directly to the base of thin-barked trees for their deadening, while others require the bark and cambium to be severed and herbicide applied to the open cut. Following the label instructions is crucial. Contact your local University of Tennessee Extension office for recommended herbicides.

Another reliable method, with regard to both effectiveness and efficiency, is the chainsaw. A lightweight but powerful saw complete with safety features and a 14- to 16-inch bar length is sufficient. Using a double-girdle method with

the chainsaw will eliminate the need for herbicide (see procedure section). Other safety equipment, such as ear and eye protection, leg chaps, gloves and steel-toe boots are recommended.

Releasing Crop Trees

After the best sites and trees are found and your equipment is ready, you can begin releasing crop trees from unwanted competition. You'll need to locate those crop trees with good future growth potential. Availability of sunlight is the leading limiting factor of tree growth. When crowns of adjacent trees touch each other, growth rates are reduced. Thus, by deadening unwanted trees whose crowns are touching the crown of your crop tree, more space is created for expansion.

Condition your eye to locate trees needing release, not trees needing to be deadened. In other words, first find the crop tree, then ask, "Deadening which trees will improve my crop tree's growing condition?"

When selecting crop trees, look for the following:

- Healthy trees — those with potential for further development;
- Trees with good form, relatively straight and with few forks;
- Better-grade trees (those with few knots);
- Those whose average age is between 15-30 years old (stands that are too young won't have reached proper height, and older stands might not successfully respond to the release); and,
- Those in the upper levels of the forest canopy.

The target is to release no more than 36 crop trees per acre. This equates to crop trees with an average spacing of 35 feet between each other. Spacing can be increased or decreased according to the stand conditions. For example, some 35-foot cells may not contain an acceptable crop tree, and that cell should be left. As a general guide, at least one-half of the 35-foot cells per acre should contain crop trees for the project to be justifiable.

You should deaden all trees whose crowns touch the crown of the crop tree on three to four sides. Special note: deaden only those trees whose crowns are affecting your crop trees. Those in-between or below and not affecting the crop trees should remain. The leftover trees help to protect crop trees from wind damage and epicormic branching (unwanted branching on the lower bowl often caused by sudden increases in sunlight).

Procedure for Girdling Trees

Determine the trees to deaden. Using a chainsaw, turn the saw sideways and cut a complete girdle (ring) around the tree at a comfortable height (usually around 3 feet). Use proper safety procedures, as is outlined in your saw safety manual. Then, cut another girdle at least 6 inches above or below the first one. Each girdle should be cut completely through the bark and into the live wood at least 3/4 inch. Make sure that each girdle meets at both ends so the vascular flow of water is completely severed.

Locate trees needing release, not trees needing to be deadened.

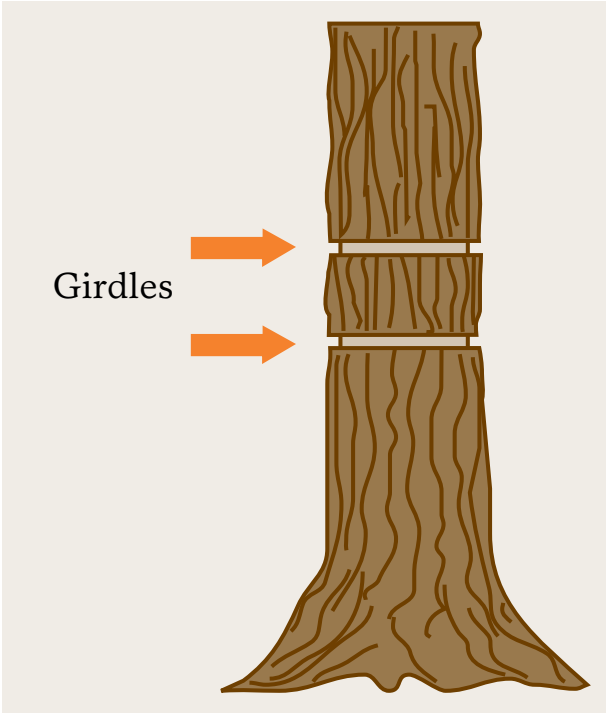

Figure 1. Girdles on a Hardwood Tree.

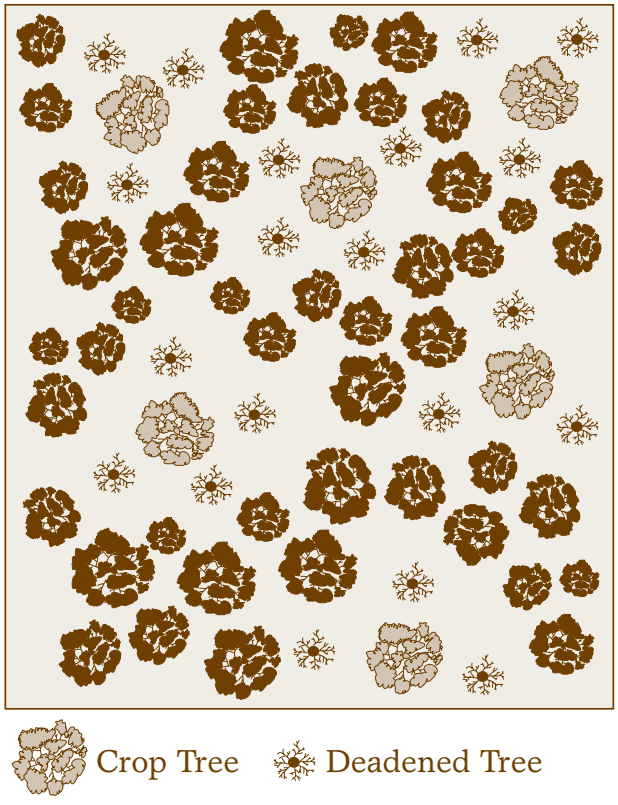

Figure 2. Aerial View of Released Crop Trees.

Wildlife Benefits from CTR

Trees may take up to a year to die, but once dead, limbs fall off creating "snags." Standing dead trees provide food (decomposing insects), as well as sites for nesting, roosting, denning and perching for many species of birds and mammals. Standing dead trees further benefit wildlife by allowing sunlight to reach the forest floor, increasing forage for deer and nesting cover for wild turkeys and many species of songbirds. Increased sunlight in the stand also allows the crowns of crop trees to expand, which increases mast production (e.g., acorns, beechnuts and cherries), further benefitting wildlife.

Why Deaden Trees If They Could Be Sold?

Younger stands of pine trees are commonly thinned by logging, thereby generating an income rather than an expense. Why can't the same early thinning be applied to hardwoods, as well? In some circumstances it can be feasible, particularly where markets allow and conscientious loggers are available; but in many cases, it's not. Several characteristics unique to pine stands lend well to early thinning:

(1) In Tennessee, the price for pine pulpwood is generally greater than for hardwood pulpwood. Normally, loggers are more willing to purchase small pine trees for profitability.

(2) Pine plantations are usually in straight rows and on level terrain.

Logging equipment can maneuver through pine stands easily, which keeps the logging production rate high and profitable. Hardwood stands, normally having grown up naturally (not planted), are mixed species with variable spacing and are often found on steeper terrain, making logging slow, difficult and expensive.

(3) Pine trees have flexible branches with conical-shaped crowns and can be felled and logged easily without causing excessive damage to residual trees. In contrast, logging younger hardwood stands often results in damage to the tops and bases of the very trees you are attempting to protect and release. For these reasons, manual CTR, rather than logging, should be considered in releasing your younger hardwood stands.

Conclusion

Private landowners are beginning to view their hardwood forests as a vital part of their farm assets. Demand for fine-quality hardwood products such as cabinets, flooring, furniture and veneer has increased and is expected to continue for the foreseeable future. As a result, prices have escalated, causing astute landowners to consider an active rather than an incidental approach to managing their hardwood crops.

The slow growth rates of hardwood trees have long been viewed as an obstacle to forest management. Through minimal investment, CTR is a way to energize your forest. Growth rate is enhanced, forest composition is improved, harvest rotation is shortened and revived enthusiasm for your forest investment results.

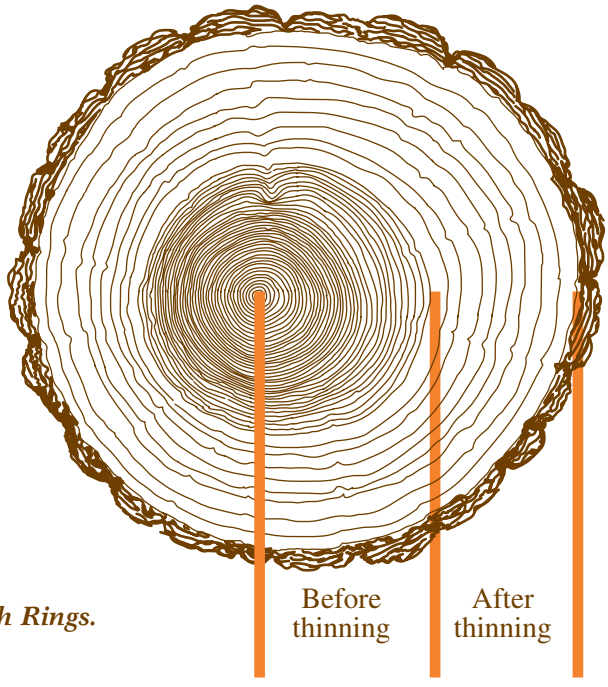

Figure 3.
Response of Annual Growth Rings.

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