

Increase Woodland Products Through Timber Stand Improvement

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John Slusber and J. M. Nichols, School of Forestry, Fisheries & Wildlife;
Eldon L. Heflin, Missouri Department of Conservation; and Ivan L. Sander, U.S. Forest Service

What Is Timber Stand Improvement?

Timber Stand Improvement (TSI) denotes management practices that improve the vigor, productivity, and quality of stands of trees.

In Missouri, young tree stands have become established readily following cutting or fire. But, tree quality, species composition, and individual tree form are often undesirable. Further reduction in quality comes when the better trees are harvested leaving the bad ones, and when fire scarred trees remain. The average Missouri woodland contains about 20 percent cull trees and produces at less than one-third its potential.

Using Timber Stand Improvement

Many options are open to a woodland owner. He may use a TSI program to increase the woodland's value for timber products, water, recreation, forage, wildlife, natural beauty, or for special products. Fortunately, work done to improve one use also benefits others in most cases.

Various practices used and tree species selected should fit the chosen emphasis for the woodland. The number of trees to keep depends on species, type of site, management goals, and size of the trees. Professional foresters are available to help determine a woodland's potentials and limitations and to help develop and carry out a suitable management plan.

Types of trees usually removed are:

1. Cull trees and wide spreading "wolf" trees.
2. Trees inferior because of their species.
3. Trees interfering with the growth and development of selected desirable trees.
4. Damaged trees (broken off, bent over, fire scarred, seriously barked, etc., but expected to live at least one cutting cycle)
5. Seriously diseased trees or trees serving as a breeding ground for undesirable insects.

It is important to remove or kill these types of trees as soon as possible after an area has been logged to properly release younger trees. Variety is important in a woodland environment so those trees necessary for den trees, aesthetics, or special foods should be selected and retained in the stand when beginning a program of TSI.

The following practices are among those used in Timber Stand Improvement:

Site Preparation for Natural Reproduction in Understocked Stands--preparing the site to allow natural seeding or resprouting of desirable species, or underplanting seedling stock to fully use the available growing space. This practice is used in poorly

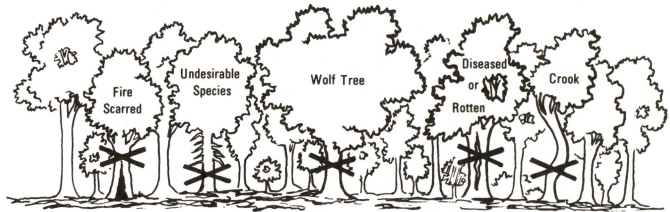


Figure 1. Eliminate your (X) trees. They steal plant food, moisture and space from your desirable trees.

stocked stands to fill large openings and increase stand density, or to improve the species composition.

Thinning--cutting trees from an immature stand to increase rate of growth and improve form of the remaining trees. Proper space varies depending on species, purpose of management, and site quality. Table 1 gives a range of spacing for trees of various diameters.

Release--removing or killing undesirable older overtopping trees to encourage fast growth and better quality of vigorous young desirable trees.

Pruning--removing lower limbs, to produce the maximum clear lumber or veneer in the butt log. Prune only selected hardwood trees where high-value species are grown on good sites. This is recommended primarily in managing black walnut.

In pruning lower limbs of young trees, don't remove too much of the food producing leaf surface of the tree. At least one half of the living crown of the tree should be left intact. Generally trees should be pruned before they reach 8 inches in diameter. Limbs to be removed should be pruned before they reach 2 inches in diameter to reduce the wound size, insuring proper healing, and to lessen the danger of entry by insects or disease organisms.

Table 1

Tree Diameter (in.)	Spacing Range (ft.)	Tree Diameter (in.)	Spacing Range (ft.)
2	4.6- 6.5	9	14.3-18.7
3	6.1- 8.2	10	15.6-20.4
4	7.6- 9.9	11	17.0-22.1
5	9.0-11.6	12	18.1-23.8
6	10.3-13.4	13	19.4-25.6
7	11.6-15.0	14	20.8-27.2
8	13.0-17.0	15	21.9-29.0

Certain species or management purposes may require other spacings. In any thinning the tallest desirable trees are usually favored.

Source: Even-Aged Silviculture for Upland Central Hardwoods -- USDA Agriculture Handbook 355.

Vine Removal--On some areas vines do considerable damage to trees. Vines not retained because of wildlife food value, fall color, etc., should be killed at the same time other stand improvement work is done. Remove them by cutting them as low to the ground as possible and immediately treating the stump with an herbicide.

Special Problem of Sprout Selection in TSI

Many Missouri hardwood species sprout heavily after fire or cutting. Sprouts grow rapidly and often form multiple-stemmed clumps. Use these guidelines for deciding how to handle sprout clumps.

1. Seedling sprouts, originating from severed seedlings, are as good as seedlings if the clumps are thinned to reduce crown competition and to avoid bad stump conditions from developing at the base when the trees become older.

2. Tree-stump sprouts are less desirable than seedling sprouts but may develop into good quality stems, depending on the size of the stump and the origin point of the sprout. Many hardwood sprouts decay through the large wound left at the base of a sprout when the parent stump rots away.

Sprout stands are best managed before they reach 20 years of age. Early treatment permits better selection of trees from the standpoint of attachment to and size of the parent stump, and greatly lessens the danger of decay from wounds left in cutting companion sprouts.

The best trees to leave come from seedlings, seedling sprouts, or sprout clumps arising from stumps 4 inches or less in diameter. Sprouts from larger stumps may be selected if they arise very low on the stump and if the parent stump wound is small.

If early treatment is made in a young stand it will enter maturity with the crop trees primarily single stemmed. Where there has been no early treatment, pole stands of sprout origin are likely to consist of sprout groups. After companion sprouts, joined at the base with a V-shaped crotch, have grown several inches in diameter, it is usually difficult to remove one without leaving a large wound at the base of the other, through which decay will develop. Twins of this type should be let alone. Where the sprouts have a low U-shaped crotch between them, however, or are entirely separated from each other above ground, one or more can be removed. (See Fig. 2)

TSI Cost Sharing & Technical Assistance

Cost sharing practices are available for TSI. For further information contact your Extension Center, Missouri Department of Conservation District Forester, or County Agricultural Stabilization Conservation Service Office.

Free technical assistance on all timber management practices is available through local District Foresters of the Missouri Department of Conservation.

Methods of Removing Trees from Competition

The landowner should keep in mind that in many cases a properly conducted timber sale (improvement harvest) can accomplish a great amount of TSI. Undesirable trees not

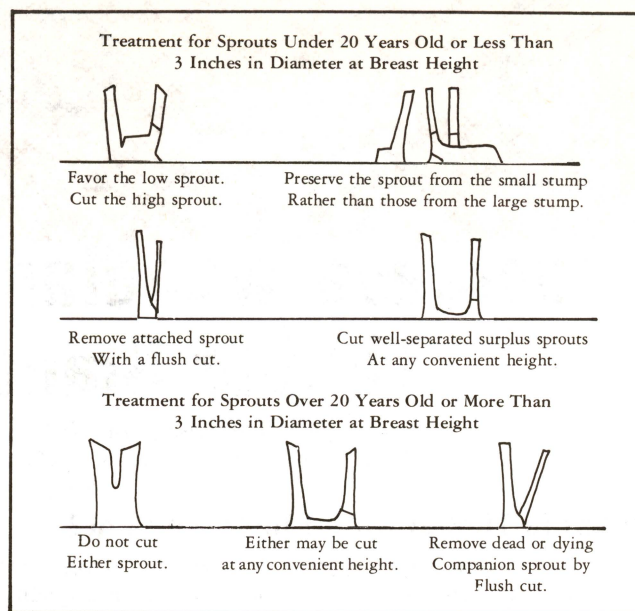


Figure 2. From USDA, "Timber Stand Improvement in the Southern Appalachian Region," No. 693.

merchantable may be removed by cutting, dozing, brush-hogging, girdling, or by chemical control. Chemically treating large trees is more economical than felling and is more certain to kill them than is girdling. Where control of resprouting is desired, chemicals are most effective.

Silvicides and herbicides are chemicals which act in several ways: As translocation poisons, plant hormones or growth regulators, contact poisons, or soil sterilants. Some of the more common herbicides used in TSI operations are 2,4-D, Amitrole and Ammate.

All these chemicals can injure sensitive trees, crops or ornamental plants if not used properly according to label instructions.

Many are volatile and their vapors and spray drift will damage desirable plants, especially on windy days.

Silvicides and herbicides can be applied as follows:

1. **Frilling or Mechanical injection**--cuts are made through the bark and into the growing tissue of the tree completely around the tree. Undiluted 2,4-D amine is then applied to the fresh cuts until the chemical starts to flow from the cut. Mechanical injectors can be purchased or rented which apply the chemical at the time they make the cut.

2. **Stump treatment**--of trees that have been cut. The stump should be thoroughly wet with chemical-carrier mixture immediately following cutting.

3. **Basal spraying**--may be used effectively on trees less than 4 inches in diameter. Spray chemical-oil mixture on lower 12 inches of the trunk wetting the bark thoroughly.

For details about chemical mixtures, regulations, and precautions on these methods see UMC Guide 4865, *Woody Plant Control*, available at local University of Missouri extension centers or by writing: Extension Publications, Whitten Hall, University of Missouri-Columbia, Columbia, Mo. 65211.

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