WISCONSIN WOODLANDS:



Sources of Information and Guidance for Woodland Owners

Pine Plantation Management

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Forest Plantations Usually Need One or All of the Following 3 Practices

- 1. Release Removing or killing undesirable trees that are overtopping and competing with planted trees. Pine overtopped by undesirable hardwoods, for example, may be only four or five feet tall 25 years after planting. Free growing trees of the same age may exceed 35 feet.
- 2. Thinning A cutting in a plantation which can produce saleable wood products and increase the growth rate of remaining trees. Trees must be thinned when they become too crowded. As trees grow, they require more space. By proper thinning the landowner:
 - gains an early return on his investment;
 - speeds the growth of remaining trees;
 - · reduces insect and disease outbreaks;
 - improves the health and beauty of the plantation;
 - improves wildlife habitat.
- 3. Pruning Removing branches from standing trees to improve the quality of the final wood products. Ordinarily pruning is limited to trees which will eventually be harvested for sawlogs, veneer, or other products requiring large and high quality logs. Such trees are commonly referred to as "crop trees." They are relatively free of defects, including knots. Knots are the result of limbs extending from the trunk of the tree, If these limbs are removed at an early age, when the trunk and limbs are small in diameter the wood will grow over the wound and produce clear-grained wood, It is best to prune in fall or winter using a saw or pruning shears—never an axe. Prune as close to the trunk as possible without injuring surrounding bark. Never leave a stub.

Red Pine

- 1. Release planted red pine from lower quality trees such as scrub oak, aspen, black locust, and box elder that are overtopping the plantation wholly or in part. This release may take the form of cutting, girdling, poisoning, or ground or aerial spraying with suitable herbicides. Ask your forester about the cheapest and most effective method to use.
- **2. Thin** trees when they become too crowded. Table 1 shows the recommended number of trees per acre at various average diameters.

For example, if trees in your plantation have an average diameter of 6 inches and there are 900 trees per acre, thin the stand to keep it healthy, vigorous, beautiful, and producing at a maximum rate of growth.

If on the other hand, there are only 500 trees per acre and the trees average 6 inches in diameter, thinning is not required.

Determine average diameters by sampling 25 to 50 trees at random in the plantation. The number of trees per acre can be determined by counting the trees on a typical acre. An acre measures 208 feet on a side.

Selecting trees to be removed can be a complicated task. In even-aged plantations of pure red pine, row thinnings are *usually* prescribed by foresters for the first and often second thinnings. For example, the first thinning is usually delayed until the desired number of trees can be obtained by the removal of every other row. A plantation with 900 trees per acre can be easily reduced to 450 or 1,000 to 500 in this manner. Removing every other row in the first thinning has several other advantages. It allows easier felling of the trees, access for removal and simplified designation of trees to be removed.

Table 1

Average Diameter 4½ feet Above Ground	Trees per Acre
4"	900
6"	450
8"	300
10"	220
12"	170
14"	130
16"	110
18"	90
20"	75

To get from 450 trees to 300 in the second thinning, every third tree can be removed in uniform plantations.

In individual tree selection thinnings, trees to be thinned should be marked before they are cut, Remove slow growing and poorly formed trees before removing vigorous, high

quality trees. The temptation is usually just the reverse—taking the best trees first. It should be resisted because such a practice seriously damages the ability of the stand to remain healthy and productive.

Thinnings should be spaced at about 10-year intervals. Professional foresters use a measure known as "basal area" when determining the amount of thinning required. Their system of measurement is more accurate than the average diameter and number of trees per acre method described here. Seek out the advice of a forester before engaging in a large-scale thinning operation. He will be able to save you time and money...perhaps even your plantation!

3. Prune about 150 trees per acre which you have selected as final crop trees. These trees will be harvested for lumber and other high quality products when the stand approaches maturity, The pruned trees will not be cut until they are at least 12 to 16 inches in diameter.

The chosen crop trees should have the lower limbs pruned away so that knot-free lumber, poles, and piling will result. Pruning should proceed to at least 17 feet above the ground in one or more stages. Trees should not be pruned over one-half their total height at any one time, but may be pruned the full 17 feet by the time the trees are 34 feet tall.

The earlier the pruning, the better. If a tree is over 8 inches in diameter, pruning will have very little effect on ultimate value of the tree.

Only the straighter and more vigorous trees should be chosen for pruning as final crop trees.

Some landowners prefer to prune all the trees to at least 8 or 9 feet above the ground. Since many of these trees will be thinned for pulpwood such pruning is not absolutely necessary because knots are not degrading in pulpwood.

But pruning all the trees does have other benefits:

- · reduces fire hazard:
- simplifies the work of pulpwood cutters, in that they do not need to limb as many pulp sticks;
- makes the plantation more accessible for marking trees that should be thinned, and for locating crop trees;
- opens area for recreational use.

One disadvantage of pruning all trees is that this may lower the value of woods for wildlife cover.

Don't prune trees on the outside edge of a plantation if there are open areas adjacent to the plantation, Such a pruning allows undesirable drying winds to blow through the trees and over the forest floor. If there is danger that a surface fire might spread into low branches in the outer row, it may be desirable to prune lower branches up to about 4 feet.



Your plantation can be thinned like this. Pruning branches from trees in your plantation increases productivity.





A 15 inch pine like this can grow in less than half the normal time if you prune out overtopping inferior trees.



White Pine

1. Releasing planted white pine from all overtopping trees is usually not recommended. White pine exposed to full sunlight frequently falls victim to serious damage from white pine weevil. This insect does not kill the tree. It destroys the terminal leader which causes the development of a crotch or crook in the stem, thereby destroying much of the future value of the tree.

White pine may be released from overtopping trees when the plantation exceeds 25 feet in height. If less than 25 feet, a partial removal of the overtopping trees may be necessary for good growth. A forester should be consulted before attempting this operation.

- **2. Thinning** of white pine plantations should follow the same procedures outlined previously for red pine plantations.
- **3. Pruning** of white pine should follow the same recommendations as for red pine.

Jack Pine

- **1. Releasing** jack pine plantations from overtopping trees should follow the same procedures outlined for red pine plantations.
- 2. Thinning methods for jack pine are similar to red pine. (Table 1). Usually one or two thinnings are sufficient in jack pine.

Jack pine plantations reach maturity and should be harvested somewhere between 45-60 years of age. The exact age depends upon the soil-water-nutrient relationship. Consult a forester to determine the proper thinning method to employ and the maturity age.

3. Pruning is not recommended for jack pine plantations. The wood will probably be used for pulpwood, which is not degraded by knots.

Scotch Pine

Scotch pine has a large number of insect enemies, especially on sandy soils in Wisconsin. The tree rarely has value for any product other than Christmas trees because of insect damage and poor form.

Except under very unusual conditions, Scotch pine should be harvested as soon as possible. Clear-cutting is recommended. Release, thinnings and pruning are not recommended.

After the area is cleared it should be allowed to "lie fallow" for two years before replanting to reduce populations of insect enemies. Volunteer seedlings of Scotch pine should be eliminated and the area planted to a better species.

Mixed Pine Plantation

Many of the plantations in Wisconsin are not pure stands of one species. There are often mixtures of two or more species of pine and other conifers such as spruce, cedar and balsam.

Detailed recommendations for each possible mixture would require more space than is available. Mixtures frequently require special techniques that can best be prescribed by a professional forester.

Some rules of thumb on mixtures, however, follow:

- 1. Scotch pine should be removed.
- 2. Spruce grown in mixture with pine will probably be overtopped by the more rapid juvenile growth of the pine. Such plantations will require specialized thinning procedures to maintain spruce in the stand.

Pest Control

Carefully inspect plantations at least once each year. Check for outbreaks of insects, disease or other damage. Report outbreaks immediately to the local Department of Natural Resources or Extension forester. He will be able to recommend practices to reduce further damage to the plantation. In general, a good management program involving release, thinning and pruning will keep the plantation in a healthy, vigorous condition, best able to withstand pest outbreaks. Never leave cut or dead pine in your plantation from May through August. A serious bark beetle problem will develop.

Marketing

The best time to thin trees from a plantation is when the thinned materials can be sold. Markets for pulpwood, poles, and specialized products such as cabin logs, are available in most parts of the state. The thinned trees can be sold on the stump, cut and piled at the roadside, or delivered to the mill. Standing value (stumpage) can vary from 10 to 30 percent of the delivered value, and roadside value can vary from 60 to

80 percent of the delivered value. Never cut trees until your market is assured. If trees are sold on the stump, it is advisable to have a written contract with the cutter.

Growth

A well-managed pine plantation can produce over a cord per acre per year during the first 40 years after planting, and red and white pine plantations can produce at least 700 board feet per acre per year from age 40 to the time of final harvest. Without management these growth rates cannot be attained. A 15-inch pine can be grown in 75 years or 165 years depending upon the management techniques used.

Financial Assistance

Operations other than commercial thinnings, such as pruning, release and non-commercial thinnings, require a cash outlay. Because of the long term nature of the timber crop, the risks involved, and because of the public benefits derived from the plantations in the form of soil and watershed protection, wildlife habitat, and beautification of the landscape, the federal Agricultural Conservation Program offers cost-sharing assistance to landowners who are willing to carry out improvement measures in their plantations. For further information on this assistance, contact your county Agricultural Stabilization and Conservation Service office or your local Department of Natural Resources Forester.

Forestry Education and Assistance Technical Assistance

Since its impossible to present all of the technical details about the culture of pine plantations in one publication, you should use the information contained herein as a guide only. Whenever you need additional facts about pine management you should contact your local Department of Natural Resources Forester or a consulting forester. A publication containing addresses of professional foresters is available from your UW county Extension agent.

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