

# FORESTRY FACTS



COLLEGE OF  
AGRICULTURAL  
& LIFE SCIENCES  
UNIVERSITY OF WISCONSIN-MADISON

Department of Forest and Wildlife Ecology

---

No. 82

November, 1996

## How To Manage Red Pine

Jeff Martin and Craig Lorimer

### Species

Although red pine plantations are usually pure red pine, many natural associations are found containing other species along with red pine. If more than 50 percent of a stand is in pine, with red pine predominant, we typically call it a red pine type.

On sandy soils, jack pine, white pine, aspen, oak, paper birch and red maple are commonly found with red pine. On heavier, loamy soils, white pine, black cherry, balsam fir, sugar maple, basswood, yellow birch, white spruce and hemlock will often occur in a natural red pine stand.

### Values and Uses

Red pine is a very valuable timber species in the Lake States. Red pine is used for pulpwood, posts, poles, cabin logs, dimension lumber and treated landscape timbers. Modern technology has enabled the conversion of smaller trees into sawn products, thus opening new market opportunities for landowners.

Red pine plantations have often been criticized for having little value as wildlife habitat. When densely planted plantations reach poletimber size, the canopy closes and little sunlight reaches the ground. With limited light, few, if any, herbs and shrubs become established. In many dense stands the ground is covered with pine needles and nothing else.

However, most plantations today are planted with greater spacing between rows and trees and the wildlife impact is not so negative. If plantations are fairly small in area, not too densely planted, and mixed with other cover types, red pine stands can play a positive role for wildlife habitat on your property. Red pine stands can provide thermal cover, visual cover, nesting habitat and food (also see **Wildlife and Aesthetics** on page 4).

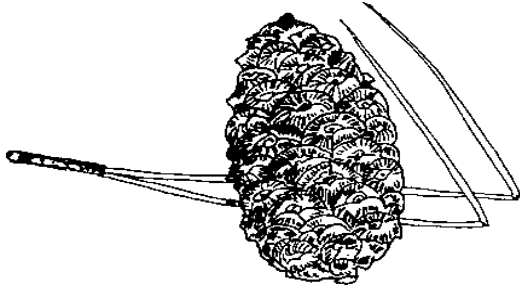
It is interesting that a study of bird populations in southern Wisconsin conifer plantations revealed 50 breeding bird species, only slightly lower than the number found in natural hardwood forests. Half of the bird species found in these conifer plantations were regionally uncommon or rare.

### Regeneration and Growth

Natural red pine regeneration is unpredictable and seldom successful. Therefore, to establish red pine, we must either plant seedlings or seed an area directly. Since red pine is intolerant of shade, the plantation must be established in open areas, such as clearcuts or old fields.

*University of Wisconsin, United States Department of Agriculture, and Wisconsin counties cooperating. UW-Extension provides equal opportunities and programming, including Title IX requirements.*

RED PINE (Norway pine)  
(*Pinus resinosa*)



Knowing the quality of the planting site is also important. The best growth of red pine occurs on deep, loose, very well drained loamy sands or gravels. Natural red pine stands are not found on loamy soils. If your planting site is on heavy soils, the competition from hardwoods, grass, shrubs, etc. may kill the young pine seedlings.

A well-managed red pine plantation (one that is periodically thinned) can produce over a cord of wood per acre per year during its first 40 years after planting. A 15 inch pine can be grown in 75 years if the right management techniques are used.

Stand growth on good-quality sites that are periodically thinned should be at least 700 bd. ft. per acre per year from age 40 to time of final harvest. Currently in the Lake States region, stands are usually grown to an age of 40 years (high-quality, industrial pulpwood production sites) to 120 years (on public agency, sawlog production sites). The length of time before a final harvest cut depends upon your objectives as a landowner.

**Establishing  
A New Stand**

Many planting sites must be prepared prior to placing trees in the ground. This **site preparation** helps to minimize competition and makes the planting job easier. The method used to prepare the site depends on whether whole-trees or just logs were harvested from the previous stand, and on whether the planting will be done by hand or machine. Site quality, and size and volume of residual material must also be considered.

Site "prep" for red pine planting is best done in the fall, before trees are planted the following spring. Site prep may involve mechanical equipment such as a brush rake, disc, drum chopper, scarifier, or trencher. Chemical control of weeds or grass may also be needed, particularly after planting to reduce

competition for the young seedlings. Your forester will be able to evaluate your site prep needs and recommend the proper techniques to use.

**Planting** of bareroot seedlings is still the most common method, although use of containerized seedlings has increased. Containerized seedlings can be grown to plantable size in less time and the planting season can be extended by several months.

Most bareroot planting in the Lake States is done in the spring, beginning with ground thaw and continuing until late May. Planting success is strongly influenced by the care given to your planting stock. Seedlings should be protected from heating and drying before planting. Ideally they should be kept refrigerated at 34 to 36°F Tangled roots should be separated carefully. Keep roots moist, by misting, but not submerged in water.

Research has shown that maximum cubic-foot volume growth of red pine is attained with a stand averaging 800 to 1,000 established trees per acre at age 5. The optimal number of trees to maximize board-foot volume growth is much lower, around 200 per acre, and this is usually achieved over time with proper thinning.

Currently, the most common recommendation is to plant about 700 to 900 seedlings per acre. This means a spacing of about 6 x 8 feet (6 feet within a row and 8 feet between rows) to 7 x 9 feet. Sometimes spacings of 7 x 7 or 6 x 10 feet are used to achieve the same densities. Removal of every other row in a first thinning (as is usually recommended) results in 16 to 20 feet between rows for equipment movement.

SPACING CHART If the trees are this far apart, how many will I plant?	
Spacing (feet)	Trees Per Acre
5x5	1742
6x6	1210
6x8	908
7x7	889
6x10	726
7x9	691
8x9	605
9x10	484
10x10	436
Formula: Trees/Acre = 43,560/(w x b) Where: w = within row spacing (ft) B = between row spacing (ft)	

## Hazards and Pests

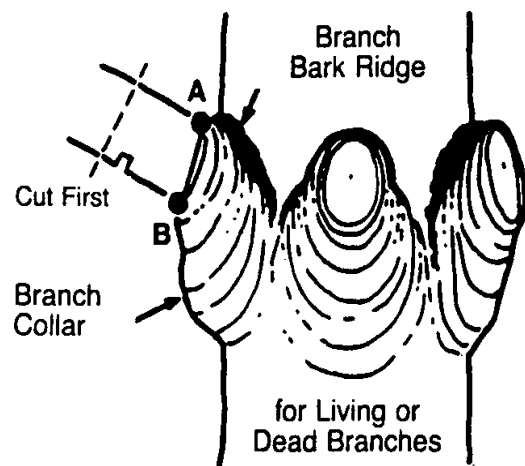
A number of insect and disease pests affect red pine foliage, shoots, branches, main stems and roots. Some of the major disease problems include red pine shoot blight, diplodia shoot blight and scleroderris canker. These are mainly problems in northern Wisconsin.

Insect pests that cause the most problems for Wisconsin red pine are the pine tussock moth (mainly in northwest Wisconsin), white grubs (when planting in old sod fields), pine engraver beetle (bark beetle) and the saratoga spittlebug. A number of other pests may also cause problems - consult your forester for more information.

## Tending Young Stands

If you have a seedling or sapling stand (average DBH of 0-5 inches) that is under stocked (less than 400 trees per acre) you may want to interplant more seedlings. With seedling stands, interplant with red pine; with sapling stands, interplant with white pine or white spruce. You may also need to control competing vegetation.

With fully stocked stands, a full release may be needed. Competition from woody sprouts, herbaceous species and grass can seriously inhibit seedling survival and growth. Release is needed before your trees become overtopped. Getting rid of this vegetation also reduces animal damage, as small mammals will move away in search of better cover.



*The best time to prune living branches is late in the dormant season or very early in spring before leaves form. Prune dead branches any time.*

If you plan to manage your stand for sawtimber, consider pruning the larger and better quality trees. This is especially important if the trees had been planted at wide spacing, which promotes the development of large knots that reduce lumber value.

As the stand moves into the sapling stage, pruning should start on about 150 crop trees per acre. Prune up to 9 feet when the trees are about 18 feet tall. In future years, as growth allows, continue to prune these crop trees to a total level of 17 feet. Never prune beyond 50 percent of a given tree's height.

When your fully stocked stand reaches the pole timber size (average DBH of 5-9 inches) a commercial thinning should be applied. The first thinning should occur when the plantation reaches about 180 square feet of basal area per acre (typically around 25 to 30 years of age), and should reduce stocking to 90 sq. ft. of basal area per acre.

In even-aged plantations row thinnings are usually prescribed for the first thinning. Typically, you would want to remove one-half of the trees (every other row) in the first thinning.

If the stand has more than 180 square feet of basal area, do some selection thinning among the trees in the rows you are leaving. Normally, you would cut the smaller or crooked or forked trees and leave the bigger and straighter stems.

### **How to Prune**

1. Locate the branch bark ridge (BBR).
2. Locate "A" - outside BBR.
3. Locate "B" - where branch meets collar.
4. Stub cut the branch.
5. Make final cut at line AB (with power saws, make final cut on upstroke)

### **Do Not**

- make flush cuts behind BBR
- leave living or dead stubs
- injure/remove branch collar

Future thinnings are usually selectively marked, although sometimes every other, every third or every fourth tree in each remaining row is removed. The following table is a good guide for judging thinning; it indicates how many trees you should have depending on their average diameter.

For example, suppose you have 450 trees per acre and they average 8 inches in DBH. A glance at the table shows that the preferred stocking is 300 trees per acre. Therefore, you would want to remove one-third of the trees in a thinning.

The recommended number of trees in this table is slightly higher than the minimum acceptable stocking level. Reducing a heavily stocked stand to the minimum level, especially in the first thinning, may be too severe. Increased windthrow and other problems may occur.

In terms of basal area per acre, stands that average 9 to 15 inches in DBH should be thinned back to around 120 square feet per acre. Stands with larger trees, averaging more than 15 inches in DBH, should be thinned back to about 140 square feet of basal area per acre.

Ave DBH of Your Stand	Recommended No. of Trees per Acre <sup>a</sup>
4 inches	900
6 inches	450
8 inches	300
10 inches	220
12 inches	170
14 inches	130
16 inches	110
18 inches	90
20 inches	75

<sup>a</sup> The recommended number of trees in this table is slightly higher than the minimum acceptable stocking level. Reducing a heavily stocked stand to the minimum level, especially in the first thinning, may be too severe. Increased windthrow and other problems may occur.

## Harvesting Mature Stands

Red pine stands are normally managed with an even-aged system. After the series of periodic thinnings, a clearcut harvest is usually prescribed. Modifications are sometimes made, but this is the typical scenario.

Managed stands, those that have been thinned before 50 years of age, should be clearcut at about 90 years of age if sawtimber production is the final objective. Unmanaged stands should be allowed to grow for longer periods, typically around 120 to 130 years of age.

## Wildlife and Aesthetics

The value of red pine for wildlife has a lot to do with stand density (the number of trees per acre). In general, the fewer the trees planted (and the wider the spacing), the better for most wildlife species.

If you plant at 7 x 9 foot, 8 x 9 foot, or 9 x 10 foot spacing, instead of the more common 6 x 8 foot or 7 x 7 foot, you will allow more light to reach the forest floor. More sunlight stimulates growth of herbs and shrubs, wildlife food and cover.

If these stands are thinned early and heavily (to perhaps 60 to 80 square feet of basal area) the growth of understory plants will be improved even more. Pole and mature stands that have been thinned early and heavily provide better habitat for both game and non-game species than unthinned stands.

Thinning will also considerably hasten the development of large trees, which many people value for aesthetic reasons. If you want to increase biological diversity even further, leave a few logs on the forest floor, which will provide foraging habitat for some birds, mammals, salamanders, and other organisms.

When plantations larger than 50 acres are desired their negative effects on wildlife habitat can be minimized by altering the plantation's shape. For example, making the plantation long and narrow, rather than square, can improve habitat conditions. Other options are to leave "islands" of different vegetation within your plantation's border, or making the plantation irregular in shape.

For more information about forest management techniques and terminology, visit:

<https://woodlandinfo.org/publications/>

Also, contact a professional forester in your area for management advice and information. Find them by going to the Forestry Assistance Locator: <https://dnr.wi.gov/fal/>

For more Forestry Facts:

<https://forestandwildlifeecology.wisc.edu/forestry-facts/>