

FORESTRY FACTS



UW
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COLLEGE OF
AGRICULTURAL
& LIFE SCIENCES
UNIVERSITY OF WISCONSIN-MADISON

Department of Forest Ecology and Management • School of Natural Resources

No. 85

July, 1997

How To Manage Jack Pine

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Species

Jack pine commonly grows in pure or nearly pure stands. In other stands, jack pine will be found in association with red and white pine, aspens, paper birch and scrub oaks. Less often, jack pine will be associated with black and white spruce, red maple, black cherry and balsam fir.

Characteristics

Jack pine is a pioneer species found on dry, sandy sites. It is very intolerant of shade, and is naturally adapted to colonizing burned areas or bare, sandy soils.

In presettlement times, jack pine often occurred in dense, nearly pure even-aged stands that originated after intense fire. In some places, it was also found as thinly scattered trees in savanna-like stands known as "jack pine barrens."

Jack pine is not usually able to regenerate under its own shade. On the more fertile sandy soils, it is gradually succeeded by more shade-tolerant species unless a fire or other disturbance sets back the natural processes.

Although it is not a large tree, jack pine is very valuable for pulp. It usually has one of the highest monetary values per cord of any Wisconsin species.

While jack pine can tolerate extremely dry sites, best growth and development occurs on the more fertile loamy sands that have a midsummer water table 4 to 6 feet below the surface.

Jack pine is susceptible to severe losses from several diseases and insects, as well as from browsing or girdling by animals, and from breakage by wind, ice, hail, and snow. Fires also readily kill jack pine but they are important for establishing many new stands by killing other vegetation, preparing a seedbed, and melting the resin on cone scales to release seeds.

Regeneration and Growth

Jack pine cones are usually serotinous, that is, they remain closed long beyond the time of maturing. The cones may remain closed for 10 to 25 years until opened by the heat from fires or from direct sunlight as they lay on or close to the ground following logging. Some cones open during very dry weather, others may open on the sunny part of the crown, and still others may open during extremely low winter temperatures.

Jack pine seedlings will typically reach a height of 4 1/2 feet in 5 to 8 years. After that point, jack pine typically grows faster than most other conifers such as red pine, white pine or spruce. On good sites it will reach a height of about 30 feet by age 20. On average sites, jack pine will grow about one foot in height per year up to age 50.

Like most pioneer species, jack pine is a short-lived tree. On good sites, even apparently vigorous mature trees will begin to die at age 80-100. On poor sites, breakup of the stand occurs at even earlier ages, usually after 60 years. Because of its relatively short lifespan, jack pine stands managed for forest products are usually harvested by age 70 on good sites and age 40 on poor sites.

Jack pine
(*Pinus banksiana*)



from *Forest Trees of Wisconsin*, Wisconsin Dept. Of Natural Resources, 1990

Hazards and Pests

Stands of jack pine are subject to pine bark beetle attack from early May to the end of August. Logging can be conducted during this period if the tops and limbs are lopped low to the ground.

Jack pine budworm is another major insect pest. To limit problems from the budworm, avoid unthrifty, stagnant and overmature stands. If a budworm outbreak occurs, remove mature stands adjacent to young stands to avoid damaging the younger stand.

To prevent pine root weevil infestation, avoid planting old fields to jack pine. Don't mix red pine and jack pine in plantations.

Establishing A New Stand

Like most species that are intolerant of shade, jack pine seedlings need full sunlight and will not usually survive or grow well in small openings in the canopy created by cutting scattered mature trees. For this reason, selection cutting or uneven-aged management is not usually feasible in jack pine.

When the stand is harvested, all the mature trees must be removed over a relatively short period of time. This can be done using any even-aged technique, such as clearcutting, seed tree, or shelterwood methods.

Jack pine stands may be established from natural seedfall (when the cones open), by direct seeding, or by planting seedlings.

Site preparation, however, is often needed before you can successfully establish a new stand of jack pine. Treating slash (left after harvesting the previous stand), controlling competing vegetation, and exposing mineral soil, may all be required.

Sometimes, you can accomplish all three objectives with a single site prep treatment. Other times, separate operations may be necessary. Slash treatments include prescribed burning, chipping, discing, chopping and breaking it up with drags.

Full-tree skidding or good slash treatment may provide the needed vegetation control in your woodlands. If not, scalping, furrowing, discing, shearing, roller-chopping, rootraking, herbicides, etc. may be needed.

Mechanical treatment, as described above, may provide enough bare mineral soil, the best seedbed for jack pine. Sometimes you may find a prescribed burn more appropriate, but you will need a hot fire to prepare good seedbeds.

For best results, **direct seeding** (artificially scattering seed on the site) of jack pine should be limited to areas where competition from other vegetation will be low. This usually rules out high quality sites. For successful seeding, your site should have a lot of exposed mineral soil; site

preparation will probably be needed. In Wisconsin, direct seeding is best accomplished in early spring.

Jack pine seedlings grow fast enough on many sites to outgrow competing trees and shrubs. However, on some of the better sites, jack pine seedlings can become easily overtopped by scrub oaks and shrubs. In such cases, release of the jack pine seedlings may be needed.

Release can be accomplished by spraying the hardwood foliage or the base of the stem with an appropriate herbicide. Check with your forester for specific recommendations.

Management Options

Even-aged management, with intermediate thinnings based on site quality, is usually recommended for jack pine stands.

If your stand is nearly **pure jack pine**, thinnings should be applied when the stand density reaches 130 square feet of basal area per acre. Reduce your average basal area to 80 to 100 square feet per acre. In general, limit your thinnings to dense plantations, or stands on higher quality sites.

Suppose your stand contains a fair amount of **red and/or white pine mixed with jack pine**, say one third or more of the basal area. In such situations you may want to manage for the red and white pine and favor these species in thinning operations. With less red and white pine, you should manage for jack pine, but the other species will add variety to your stand.

If your stand contains **fir and spruce mixed with jack pine** you have several management options to consider. If you wish to manage for jack pine, clearcut the stand, which will remove all fir and spruce seed sources. Then scatter and disc the slash, which will eliminate fir and spruce regeneration and help the seeding of jack pine.

Or, you could favor the fir and spruce by using a shelterwood harvest that removed mostly jack pine in the first cut. This would help more fir and spruce seedlings become established.

And lastly, you could clearcut the stand now and plant red or white pine seedlings. This would convert your stand from jack pine to another species. The same is true if you have a mixture of aspen and jack pine or oak and jack pine.

With **aspen-jack pine mixtures**, you could also treat individual aspen stems (with a basal application of herbicide) prior to a final harvest in the stand. This would reduce the aspen in your next stand. Such a treatment may be feasible if aspen numbers are low.

Another option, when you have such mixtures of aspen (or oak) and jack pine, is to clearcut the mixture and apply methods to encourage jack pine regeneration. The next stand will probably contain some aspen (or oak) but the added variety may be acceptable for aesthetics or wildlife or both.

Harvesting Jack Pine What are your options?

- Clearcut** your stand then scatter the slash, and disc if necessary.
- Use a **Shelterwood** harvest. Similar to clearcut, but spread over 5 years.
- Leave 12-25 **seed trees** per acre during harvest, then burn the slash.

Regenerating Jack Pine What are your options?

- Scarify ground to expose mineral soil before harvest cut. Scatter slash after the cut. Rely upon natural jack pine regeneration
- Direct seed the site after prescribed burning or exposing mineral soil mechanically
- Plant jack pine seedlings.
- Convert site to other species.

On the better sites, trees intended for use as poles or small sawtimber can be grown in about 70 years, especially if the stand is thinned at least once to 80 square feet of basal area per acre. Cordwood production is better in denser stands and may culminate as early as 40 years. Stands on poorer sites will not reach merchantable size as early.

Wildlife and Aesthetics

Jack pine is usually considered a medium preference deer food. Young trees may be heavily browsed where deer populations are high. Dense sapling and pole-sized stands offer a little protection from the wind, but winter shelter is better in most other conifer stands.

Pine plantations are often considered to be relatively poor habitat for game and nongame wildlife because of the dense shade, lack of undergrowth, and paucity of natural woody debris. However, jack pine stands provide favorable habitat for some regionally uncommon bird species such as the Connecticut warbler, the Nashville warbler and the black-billed cuckoo.

Thinning jack pine stands periodically will improve habitat for most wildlife species. Thinning stimulates undergrowth, creates canopy gaps, and leaves some residual woody debris such as discarded treetops and small logs.

Older jack pine stands are usually more open than other conifers. This allows an understory of shrubs and herbaceous plants to develop and provide wildlife food. Stands containing some oak mixed with the jack pine usually provide greater wildlife benefits than pure jack pine stands.

Stands having a mixture of species, jack pine and other pines, jack pine and oak, etc. offer greater visual variety. Such stands may be more aesthetically pleasing than a pure jack pine stand.

Stand diversity can also be enhanced by maintaining some variety in tree sizes whenever possible. This is difficult in even-aged stands, but small "islands," containing younger (or older) trees could be maintained to improve the aesthetic appeal.

For more information about forest management techniques and terminology, UW-Extension and UW-Madison Department of Forest Ecology and Management have a variety of publications available. For more information on obtaining other publications, contact:
UW-Extension <http://www1.uwex.edu/ces/pubs>
608-262-3346

Also, contact a professional forester in your area for management advice and information.

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