

Aspen

Minnesota Silvicultural Fact Sheet

This document is adapted from the Minnesota DNR, Division of Forestry's cover type guidelines. This fact sheet provides a brief overview of silvicultural considerations for aspen in Minnesota.

About aspen communities

Aspen is managed on a wide range of soil textures and drainage classes. Best growth occurs on medium textured soils (loam through silt loam) which are somewhat poorly to moderately well drained. A rooting zone of 18 to 24 inches or deeper is required.

Stands on richer soils have longer biological rotation age, superior growth, and lower incidence of heart rot. Big tooth aspen tolerates coarser, drier, and slightly less fertile sites than trembling aspen.

Major tree species

Trembling aspen (*Populus tremuloides*), bigtooth aspen (*Populus grandidentata*), balsam fir (*Abies balsamea*), white pine (*Pinus strobus*), paper birch (*Betula papyrifera*),

Range in Minnesota

Aspen grows well throughout the Laurentian Mixed Forest province (northeastern Minnesota). On the right sites, it also grows well in the Eastern Broadleaf province (central Minnesota).



Laurentian Mixed Forest province (left) and Eastern Broadleaf Forest. MNDNR images.

Silviculture

Because of aspen's extreme shade intolerance, clearcutting is the recommended silvicultural system for aspen in Minnesota. Although there has been some investigation of aspen thinning in recent years, aspen thinning can lead to volume loss from disease and decay. Aspen does not compartmentalize damage well, so decay can spread rapidly through damaged trees.

Rotation ages

On poorer sites aspen stands should be grown on shorter rotations (30-35 years) to avoid damage from stagnant growth and reduced vigor. On better sites aspen should be grown on 45-60 year rotations for pulp and 50-70 years for sawtimber.

Regeneration considerations

A minimum of 20 sq. ft. basal area (or 50 evenly distributed aspen trees/acre) in the parent stand is needed to assure adequate regeneration. To increase the chance of dense regeneration, harvest all trees on site. Aspen suckers do not tolerate shade well. If residuals are left on site, leave clusters rather than dispersed individual trees.

Adequate sprouting after 2 years is > 3000 stems per acre. Dense sucker stands provide the best protection from insects and disease. To maximize regeneration density, harvest in winter whenever possible.

Disease and pest considerations

The forest tent caterpillar (*Malacosoma disstria*) occasionally defoliates large areas. Gypsy moth (*Lymantria dispar*) may increase future defoliation in Minnesota. Severe defoliation reduces growth but rarely causes mortality unless coupled with other stress.

The major diseases of aspen are Hypoxylon canker (*Hypoxylon mammatum*), and white rot (*Phellinus igniarius*). Both can dramatically reduce merchantable volume. As stand age increases, volume losses due to insects and disease increase.

Management recommendations to reduce losses: If 15 to 25 percent of the trees are infected with Hypoxylon, harvest the stand early but keep it in aspen. If more than 25 percent of the trees are infected, harvest immediately and convert to other species.

If surveys indicate white rot infection over 30% of basal area, harvest early to minimize losses. Assume that you can only see conks in half of infected trees. Lightly infected stands can be managed on rotations longer than 40 years.

In stands that have sustained 2 to 3 years of successive defoliation, rotation age can be adjusted with years added in the absence of severe Hypoxylon or white rot infection.

The extent of losses due to insects and diseases varies within aspen species and between clones. Since bigtooth aspen is five times as resistant to Hypoxylon as quaking aspen, and balsam poplar is rarely infected, these species should be promoted in heavily infected areas.

Wildlife considerations

Aspen communities have a good to excellent overall rating for wildlife. They are an important source of food and cover for a wide variety of game and non-game species. For species such as white-tailed deer and ruffed grouse, small clearcuts and a mix of ages make the best habitat.

Special silvicultural considerations

1. Avoid soil compaction. Soil compaction and rutting can seriously impair resprout potential. These problems are particularly serious in stands on moist, poorly drained soils. Harvest only in winter if stands are poorly stocked or soils are moist and prone to damage. Refer to Minnesota's *Site Level Forest Management Guidelines* (reference below) for ways to minimize negative soil impacts.

2. Residual clumps. If wildlife habitat is a top priority, consider leaving up to 15 sq. ft. basal area of residual trees or hard snags. Reserving oak clumps or scattered individual oaks will increase mast production, which is good for some wildlife species.

References for more detail

Field Guide to the Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province. 2003. MNDNR, St. Paul, MN.

Field Guide to the Native Plant Communities of Minnesota: The Eastern Broadleaf Forest Province. 2005. MNDNR, St. Paul, MN.

Managing Northern Forests for Wildlife. Gordon W. Gullion. 1984. Ruffed Grouse Society. Can be purchased at <http://www.ruffedgrousesociety.org/viewdetails.asp?id=151700>.

Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers, and Resource Managers. 2005. Minnesota Forest Resources Council, St. Paul, MN.

Silvics of North America. Agriculture Handbook 654. Online at http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm. 1990. USDA, Washington, DC.