Forest Types of Michigan

MICHIGAN STATE UNIVERSITY | Extension

NORTHERN WHITE-CEDAR FOREST TYPE

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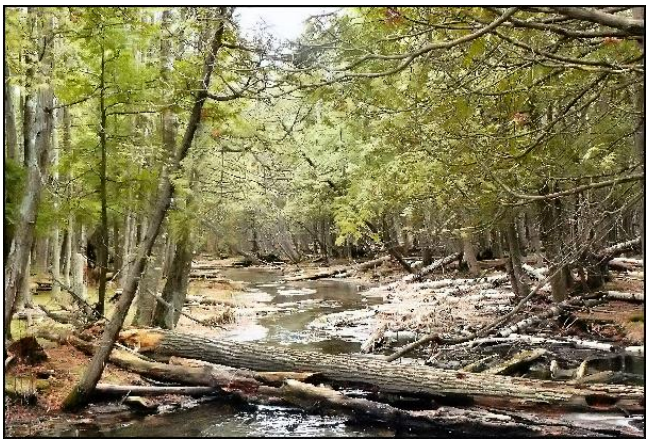
The northern white-cedar (cedar[1]) type occupies 1.3 million acres (about 6.5%) of Michigan's forest area.[2] Cedar stands are strongly dominated by northern white-cedar (*Thuja occidentalis*) with about 70 percent of the forest type volume as cedar. About 21 other tree species occur in the cedar forest type. The most common associates are black spruce, balsam fir, tamarack, paper birch, red maple, white pine, and white spruce, although each of these species represents less than four percent of the volume in the forest type.

Cedar also grows in other forest types. It is an occasional associate most commonly in northern hardwoods, swamp hardwoods, and aspen. About 30% of the statewide cedar volume grows outside the cedar forest type.



The Trees

Northern white-cedar is unique among Michigan trees; the only representative of its genus and family. It's one of the five most common trees in Michigan. Open grown trees are pyramidal in form. Bark is brown and shreddy at nearly all life stages. Cones are small with few paper scales. Foliage is flattened scales. Cedar is a medium-sized tree on most sites but can grow to diameters in excess of two feet. It's probably Michigan's longest-lived species, although few trees are older than 100 years due to past cutting and burning histories.[3] There are records of individual trees in the Great Lakes region exceeding 1000 years old, but they are few.[4] Cedar can propagate through vegetative layering, which is when live branches come into contact with the right soil surfaces and roots then grow from those branches. Cedar is also capable of rapid growth after years of suppression in the understory. Root systems won't survive in saturated conditions during the growing season, even though most cedar grows in swamps. The root systems occupy the drier microsites. Root systems are also sensitive to changes in hydrology.

Distribution

The range of northern white-cedar occupies much of eastern North America from the Great Lakes region to St. James Bay. It is common throughout the northern two-thirds of Michigan. Nearly 80 percent of the cedar forest type area lies in the Upper Peninsula, and most of that in the eastern U.P.

Ecology

The cedar forest varies from a rich association of many species, including rare species, to nearly pure stands of cedar with a largely barren understory. Most cedar types occur on wetland sites, although some of the best growth occurs on limestone escarpments along the northern shore of Lake Michigan. In places, cedar can be found on upland sites, sometimes invading old fields. Cedar is a prolific seeder in 3 out of 5 years. Seeds disperse in the fall and into the winter. Seed bed requirements are somewhat narrow, needing raised microsites (hummocks), rotting stumps, and large logs. Leaf litter and thick moss inhibits successful germination. Fire is uncommon on most cedar sites but when it does occur, excellent seed beds may result.

On good sites, cedar growth can be fairly rapid but on most sites growth is limited by soil and moisture conditions.

Over-browsing by white-tailed deer has prevented cedar seedlings from reaching sapling stage across most of northern Michigan for many decades. Most cedar stands have distinct browse lines in areas of high deer densities.

Management & Silviculture

The overriding factor in cedar management is the population levels of white-tailed deer. If deer pressure is low, then site conditions and regeneration status will help determine choices between an even-aged or uneven-aged silviculture. Eligible management systems range from clearcutting (including patch and strip cutting), shelterwood harvests, and selection silviculture.[5] A consulting forester should be engaged to assess conditions for a particular stand. Tops and thick brush may be retained to deter browsing of regeneration. Sites with thick moss may need partial scarification, but be cautious to avoid flattening the microtopography.

Thinning will provide better light conditions in over-stocked stands but care should be taken to avoid creating an environment for undesirable competition (e.g. fir, spruce, et al.) and certain invasive species (e.g. buckthorn). In thinnings, smaller and suppressed stems are often the best trees to remove first, and then manage for stand density. Cedar stands generally should carry higher densities than most Michigan forest types. Desired stand densities range from 90 to 150 square feet, depending on stand age, average tree diameter, and site conditions.

Care should be taken to avoid altering hydrology through building permanent roads and trails. Roads can serve as dams, raising water levels, and flooding cedar. Increased drainage through ditching or similar structures can dry out cedar stands, resulting in cedar mortality and failed regeneration.

Tree Health Issues

Northern white-cedar, as a species, has few serious insects and disease threats, although the exotic Japanese cedar long-horned beetle may cause significant damage should it arrive in Michigan. Young cedar and the forest type are very vulnerable to browsing by white-tailed deer. Heavy browsing pressure has prevented cedar recruitment in many stands for decades.

Snowshoe hare can damage or kill young cedar, too. Stripped bark in late winter or early spring may be caused by red squirrels collecting nest material.

Wildlife Habitat

Cedar foliage is a favorite winter food for white-tailed deer, although deer will not eat cedar during the summer. Thermal cover is a more important habitat feature in the Upper Peninsula, at the northern range of deer habitat. Winter temperatures are warmer under dense cedar cover, wind speeds are substantially reduced, and snow depths are less than in hardwood stands. A deer will lose less energy by eating nothing under a cedar stand, than foraging for food in conditions of deep snow and cold temperatures. Deer will seek out these stands for the thermal cover, not so much for the availability of browse. These thermal features also benefit a wide range of other species, as well. Seed crops are favorite food of many small birds, mice, and voles. Dense stands provide good cover for animals that nest in trees. Elongated, deep cavities are created by pileated woodpeckers. These cavities serve as nesting places for many other species.

Cedar Foliage

Landowner Tips

- Develop a management plan
- Highly variable stand and site conditions make a single management system prescription inappropriate
- Deer densities are a critical factor
- Retention of thick slash can deter deer
- Cedar is a long-lived species
- Tree growth can be increased through thinning
- Microtopography is a critical site factor for regeneration

See http://michigansaf.org for Forest Management Guidelines from the Michigan Society of American Foresters.

[1] Northern white-cedar is commonly called "cedar", although it is not a true cedar. "Arbor vitae" is common horticultural name for this species and others in the genus *Thuja*. Arbor vitae is Latin for "tree of life" because early French explorers would reportedly drink a tea of cedar foliage to prevent scurvy.

[2] Acreages and volumes of species and forest types are derived from the USDA Forest Service, **Forest Inventory and Analysis Data** [*http://www.fia.fs.fed.us/tools-data*].

[3] Heitzman, E., K.S. Pregitzer, and R.O. Miller, 1997. **Origin and early development of northern white-cedar stands in northern Michigan**. Canadian Journal of Forest Research, 27(12): 1953-1961, 10.1139/x97-157.

[4] Hofmeyer, P.V, L.S. Kenefic, and R.S. Seymour. 2007. **Northern White-Cedar (Thuja occidentalis, L.): An Annotated Bibliography.** Cooperative Forestry Research Unit, University of Maine. 30 pp.

[5] Boulfroy, E. et al. 2012. **Silvicultural Guide for Northern White-cedar**. Gen. Tech. Report NRC-98. USDA Forest Service and Natural Resources Canada, Canadian Forest Service. 75 pp. *http://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs98.pdf*