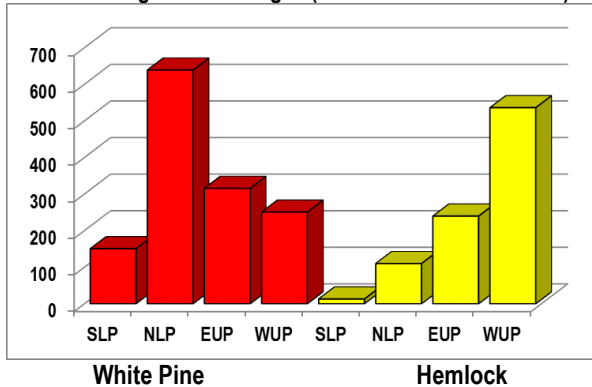


## MESIC CONIFERS

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Mesic conifers are softwood/evergreen tree species that grow on well-drained, reasonably fertile soils. "Mesic" refers to the middle area in a moisture spectrum from dry (xeric) to wet (hydic). Specifically, white pine and hemlock are what is usually identified in discussions of mesic conifers, particularly in terms of long-lived species. Sometimes, other conifers are included, such as cedar, short-lived balsam fir, and black spruce. The northern hardwood forest, the most common forest type in Michigan, once had a greater component of these mesic conifers. Many aspen stands also lack this ecological component. These trees provide valuable winter shelter for many resident songbirds and are of special importance to mammals such as white-tailed deer and martens. Once commercially important, neither white pine nor hemlock now carry high monetary value. However, for ecological and habitat purposes, there is an interest in re-establishing these trees where absent or reduced. Forest owners with a broad interest in wildlife habitat improvement will attempt to restore these trees in hardwood stands.

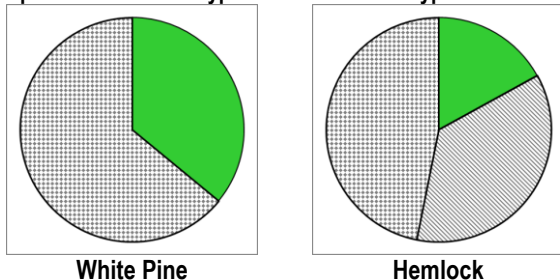
**Table 1. Distribution of white pine (red) and hemlock (yellow) across four regions of Michigan (millions of cubic feet volume)**



SLP: Southern LP, NLP: Northern LP, EUP: Eastern UP, WUP: Western UP

Source: USDA Forest Service, Forest Inventory and Analysis Data, 2010.

**Table 2. Volume distribution of white pine and hemlock in representative forest types and other forest types**



Solid color shows proportion of species volume in representative forest types. Stippled color shows species volume in other forest types. Striped area for hemlock is hemlock in northern hardwoods.

Source: USDA Forest Service, Forest Inventory and Analysis Data, 2010.

### The Trees, Ecology, and State Distribution

Both eastern white pine and eastern hemlock are in the top ten most common trees in Michigan, by total volume. White pine is fairly evenly distributed across the northern Lower Peninsula and the Upper Peninsula, but most of Michigan's hemlock grows in the U.P., particularly the western U.P. (Table 1).

**Eastern white pine** was once the king of lumber interests. Large stocks of Lake States white pine were harvested around a hundred years ago with little regard for the future. Subsequent rounds of wildfire eliminated white pine regeneration in many areas. Today, about a third of the Michigan white pine volume grows in White Pine / Hemlock forest types (Table 2). Most of the white pine volume is blended into other forest types, especially mixed upland hardwoods. Nearly half the volume grows in the northern Lower Peninsula and almost as much in the Upper Peninsula.

White pine are among Michigan's tallest and largest trees, pushing heights that can exceed 150 feet. The needles are joined at the base in groups of five. Cones are 4-6 inches long. Bark on smaller trees is smooth and metallic gray. On larger trees, the bark becomes deeply furrowed.

**Eastern hemlock** was less used for construction lumber, although many barns and mine shafts used hemlock timbers. The bark was often more valuable than the lumber. The high tannic acid content was used to cure leather. Hemlock tends to prefer cooler ravines and north side of steep hills. It also grows

commonly on moister transition soils between upland and lowland sites. Most of the Michigan hemlock volume grows outside a White Pine / Hemlock forest type, with a large portion in the Northern Hardwoods forest type (Table 2). Today, there are fewer forest stands dominated by hemlock than 200 years ago. The western U.P. holds about 60 percent of Michigan's hemlock volume, with a decreasing presence moving east and then down into the Lower Peninsula (Table 1).

Hemlock diameters rival those of white pine but hemlock usually does not achieve the height growth of white pine. The needles short and flat, with two white lines running the length of the underside, and joined to the twig with a thin stem. Cones are small and roundish, maybe a half-inch in size. Bark on smaller trees is a flat gray color without much texture. More mature bark is deep and furrowed but has a more reddish cast



than that of white pine. Crowns tend to appear quite lacey.

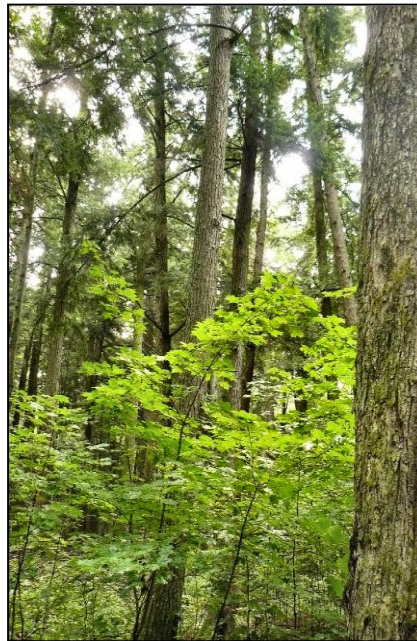
#### Management & Silviculture

Both white pine and hemlock are good seeders. Seed germination is best on mineral soils with appropriate moisture and warmth. Hemlock seedlings are especially intolerant of drought. Silviculture that opens up the canopy to more light and exposes mineral soil will increase seedling germination, seedling survival, and recruitment of seedlings to large size classes, especially with white pine. Therefore, various selection and shelterwood silvicultural systems work well, especially with summer harvesting. Existing understory hemlock may not respond well to significant increases in light from heavy thinning. White pine will do well with this type of thinning and release. Unfortunately, both white pine and hemlock are favorite deer browse, especially in late winter and early spring. Regions of Michigan with moderate to high deer pressure may experience recruitment failure due, in part, to seasonal deer browsing.

Group selection systems can be used to favor white pine and hemlock in northern hardwood and upland hardwood forest types (see Silvicultural Systems bulletin in this series.) when mature white pine and hemlock are present in the stand. However, many upland hardwood stands don't have a mesic conifer component. In these cases, planting will be necessary to re-introduce these species, often after a harvest. Planted trees, in many situations, will need to be protected from deer and, sometimes, rabbits and hares.

#### Tree Health Issues

White pine is vulnerable to white pine blister rust (an exotic disease), white pine tip weevil, deer depredation, and porcupine girdling. Foliage also browns along heavily salted roadways. Blister rust is a widespread stem disease especially common in cooler, more humid regions, such as along lakeshores. Currents



*Northern Hardwood Stand with a White Pine Component*

and gooseberries (*Ribes spp.*) are alternate hosts. Tip weevils kill the leader. Repeated attacks will disfigure trees to a brushy condition.

More common hemlock pests include the hemlock borer and yellow-bellied sapsuckers. The wood borer seldom attacks healthy trees but trees stressed by drought or other factors can become susceptible. Sapsuckers create orderly rows and columns of holes from which sap exudes. These wounds allow wood rotting fungi which can lead to stem breakage. A pest to watch for is the hemlock woolly adelgid.<sup>1</sup> Several Michigan introductions have been identified and successfully eradicated. This sucking insect has killed much of the hemlock in eastern states.

#### Wildlife Habitat

Habitat improvement and ecological restoration are primary reasons for forest owners to increase the amount of mesic conifers in upland hardwood stands. The main avian beneficiaries are migratory and resident songbirds that use the foliage for, thermal cover, shelter from extreme weather and predators, nesting, and feeding. These conifer crowns attract a variety of insects that birds will feed upon. Additionally, mesic conifers in hardwoods provide a visual component that many forest owners enjoy, especially during the winter months.

#### Landowner Tips

- Develop a management plan
- Assess mesic conifer presence and potential
- Consider silvicultural solutions to expand mesic conifer component
- Consider planting to re-establish mesic conifers
- Protect regeneration from deer browsing

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

<sup>1</sup> For more information on the hemlock woolly adelgid, see [[http://www.michigan.gov/dnr/0,4570,7-153-30301\\_30505\\_30830-33881--,00.html](http://www.michigan.gov/dnr/0,4570,7-153-30301_30505_30830-33881--,00.html)] or [<http://na.fs.fed.us/fhp/hwa>].



*Northern Hardwood Stand Without a Mesic Conifer Component*