

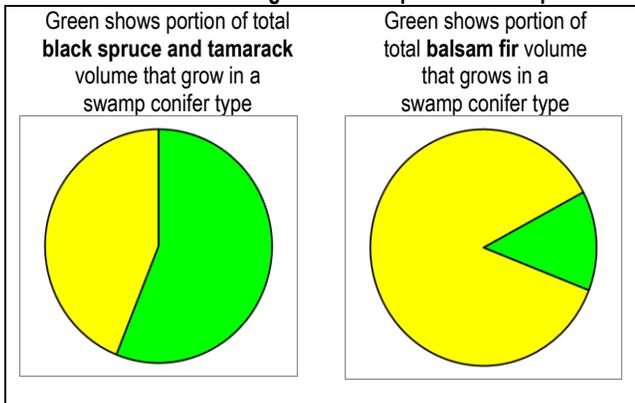
SWAMP CONIFER FOREST TYPES

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Swamp conifers include black spruce, tamarack, and balsam fir. Note that balsam fir also grows well on upland sites and in other forest types. Its ecological spectrum is wide, including many soils and water conditions. Northern white cedar is an important enough forest type in Michigan, occupying over half the overall swamp conifer acres, that it is described in its own bulletin.

Swamps are wetlands dominated by trees, as opposed to marshes which are dominated by brush, sedges, and grasses. Bogs are distinguished by the strong presence of sphagnum moss and can sometimes be forested. Different wetlands also can be distinguished by hydrological factors and pH.

Table 1. Distribution of signature swamp conifer tree species



The Trees

About 60 percent of the volume in swamp conifer types, statewide, consists of black spruce, tamarack, and balsam fir. Michigan lies at the southern edge of the ranges for each of these three species. Black spruce and tamarack are most common in swamp conifer types, but balsam fir more commonly occurs in forest types of aspen, northern hardwoods, and cedar.¹ (Table 1). There are another 21 species, conifers and hardwoods, which occur in swamp conifer types. Black spruce is capable of layering, where branches in contact with the soil can sprout roots and make new trees.

On wetter sites, growth can be remarkably slow. On better sites, growth can be quite good. Black spruce is a signature species of boreal forests, which are more common at latitudes north of Michigan. Black spruce, tamarack, and balsam fir tend to

be very straight. Spruce and fir retain newer needles year-round. Tamarack loses all of its needles late in the fall. Both spruce and fir have narrow, pointy crowns but fir tends to have more uniform density lower into the canopy. Tamarack is a lighter colored green and crowns tend to be broader and more irregular. Each spruce and fir needle grows independently from the twig. Tamarack has clusters of needles erupting from a stubby spur branch.

Distribution

Swamp conifers cover about 1.1 million acres of Michigan's 20 million acre forest. Over 85 percent of the Michigan swamp conifer type grows in the Upper Peninsula.

Ecology

Swamp conifers are forested wetlands of several kinds. Where water flows, even slowly, understories tend to be dominated by brush, grasses, and sedges. Where stands are fed only by groundwater, are perched, and/or are acidic, bog mats of sphagnum and other mosses accumulate. Floating bogs mats can extend over water. On particularly infertile sites, stunted black spruce and tamarack might be over 100 years old. Interesting, rare, or endangered bog flora can be found, such as pitcher plant, sundew, Labrador tea, leatherleaf, and cotton-grass. Many of these species are adapted to desert-like conditions, despite saturated soil conditions.



Carnivorous Sundew

Average timber volumes are quite low, about half of statewide volumes, although some stands can be productive (30 cords per acre or more). Part of the definition of a "forest" comes from the ability of a site to produce a minimal amount of wood per acre per year. The U.S. Forest Service uses 20 cubic feet as the measure, which is about a quarter of standard cord. Some of these swamp conifer stands would be classified as "unproductive forest". Most



stands were originated by wildfire and were even-aged. With the control of wildfire, some stands are becoming more multi-aged as younger trees, mostly the more shade tolerant black spruce, fill gaps created by dying trees. However, these younger trees grow poorly and would do better in full sunlight.²

Management & Silviculture

Where conditions permit, clearcutting is the method to harvest and regenerate swamp conifers. Rotations (years from regeneration to harvest) increase as site quality declines. Partial cutting may be financially unsound and opened stands expose remaining trees to windthrow. Pulpwood is the main harvested product. Clearcutting can occur across an entire parcel at one time, or variations of strips and area cuts can be employed. Prescribed burning will help prepare seedbeds for optimum seed germination. Loss of certain stand components, such as mature tamarack to drought or balsam fir to spruce budworm, may not warrant a timber sale. Natural regeneration may already be present and the dead and dying trees may provide desirable habitat aspects. Winter harvesting with frozen ground conditions will reduce site damage. Wetland road and trail construction guidelines can be found in Michigan's "Sustainable Soil and Water Quality Practices On Forest Land".³

Tree Health Issues

Changes in water levels may be the most serious threat to swamp conifer stands. Beaver flooding, road issues, and drought are common causes. Porcupines will girdle tamarack. Witch's brooms (dwarf mistletoe) can disfigure black spruce crowns and eventually kill trees. Spruce budworm will kill balsam fir. Larch sawflies and larch casebearers will defoliate tamarack. Successive years of defoliation can cause widespread mortality. All swamp conifer species are vulnerable to butt rots, heart rots, windthrow, and fire damage. Drought can lead to infestations of bark beetles and subsequent mortality.



Wildlife Habitat

Swamp conifers support a suite of wildlife species, the most notable may be the spruce grouse. Stands with recently killed conifers will attract arctic three-toed woodpeckers, which are somewhat uncommon in Michigan. In parts of the U.P., moose will browse regenerating stands with young willow. Some uncommon warblers, such as the Blackburnian may be found in swamp conifers, as well as the white-winged crossbill. Stands with dense overstories may serve as deer yards during severe winters.

Landowner Tips

- Develop a management plan
- Harvest and regenerate with a clearcutting system
- Schedule harvests when ground is well frozen
- Overmature stands are increasingly subject to windthrow
- Changes in water conditions can lead to mortality
- Rare and unusual species may be present
- Consider prescribed fire as regeneration method

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

¹ Relative volumes of species are derived from the USDA Forest Service, Forest Inventory and Analysis Data [<http://www.fia.fs.fed.us/tools-data>].

² Johnston, W.F. 1977. **Manager's Handbook for Black Spruce in the North Central States**. USDA Forest Service, GTR Report NC-34. 19 pp.

³ Michigan DNR and DEQ. 2009. **Sustainable Soil and Water Quality Practices On Forest Land**. [http://www.michigan.gov/documents/dnr/IC4011_SustainableSoilAndWaterQualityPracticesOnForestLand_268417_7.pdf]