

## Forest Types of Michigan

# Swamp Hardwood

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Swamp hardwoods are a combination of eight U.S. Forest Service forest types characterized by forested wetlands dominated by hardwood tree species. Site wetness and related access are important management factors. The role of emerald ash borer in stands with a lot of ash has been a relatively recent consideration. Sometimes these forests can be valuable for timber products, but, more commonly, their greater value lies in ecological services and wildlife habitat.

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. The various types of wetlands also can be distinguished by hydrological factors and pH.

### The Trees

About 55 tree species make up swamp hardwood forests across Michigan. Red maple, green ash and silver maple account for over half the volume. Black ash, northern white-cedar, quaking aspen,



*Black ash swamp with cinnamon fern understory.*



*Green ash (top)  
Black ash (bottom)*

balsam poplar, American elm, balsam fir and cotton-wood each make up 2 to 4 percent of the volume. Growth is often slow because of site limitations. Red maple, black ash and cedar are more dominant in the Upper Peninsula than in the Lower Peninsula.<sup>1</sup>

Ash-dominated stands are among the first to lose their leaves in the fall and among the last to leaf out in the spring. Red maple-

dominated stands can be very colorful in the fall. Black ash tend to occupy the wettest sites, with green ash on sites intermediate between upland and lowland soils, and along waterways (riparian areas). White ash is not usually a component of swamp hardwood forests but rather a component of upland mixed hardwoods and northern hardwoods (see other bulletins in this series).

Small-diameter red maple has smooth bark. Leaves have toothed margins; sugar maple leaves have smooth margins. Buds on red maple are reddish-purple. In the springtime, red flower clusters can appear in great numbers. Both maples and ashes are oppositely branched, where leaves and twigs attach to branches directly across from each other. Silver

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

maple also has smooth bark at smaller diameters. Large trees often have long strips of bark peeling from the silvery-gray trunks. Leaves have deep sinuses between elongated lobes.

Green ash has rough bark broken into somewhat rectangular furrows. Leaves have six to nine stalked leaflets. Unlike black ash, the first set of side buds on green ash is close to the terminal bud. The tops of the leaf scars are straight across with no notch. Black ash bark sheds a lot of debris when rubbed and often has corky ridges. The leaves have seven to 11 leaflets without stalks. The first set of side buds is at least ¼ inch below the terminal bud. Leaf scars are slightly notched.

## Distribution

Swamp hardwoods cover about 2.4 million acres of forestland — about 15 percent of the Michigan forest. Distribution is fairly uniform across the state, but swamp hardwoods occupy a disproportionately high percentage of the southern Lower Peninsula forest. There, most of the upland forest has been replaced by agricultural land uses. Swamp hardwoods may occur along rivers and bottomlands as well as in swamplands.

## Ecology

Varying hydrological characteristics are critical to differences among swamp hardwood stands. The river bottomlands and floodplains of southern Michigan don't resemble the black ash swamps of the western Upper Peninsula. Stands dominated by balsam poplar and quaking aspen mixes are another common variant across northern Michigan. Peats and mucks will be less productive than better drained mineral soils. Some of the poorest sites, mostly in the Upper Peninsula, are commonly near-pure stands of black ash.

Stand volumes statewide are below average, though some stands can be quite productive and well-stocked. Stocking and productivity are low on wetter sites. Many of these stands provide important hydrological functions typical of wetlands.

Stands dominated by ash species are threatened by the emerald ash borer. Loss of ash in these swamps may result in conversion to a non-forested

condition. Lowered transpiration rates may cause moisture levels to be greater than they would otherwise be. The loss of vertical structure will strongly affect wildlife habitat conditions.

Good quality sites with well-stocked stands can be managed for high quality timber. Many of these stands have been high-graded over time, however, resulting in stands of low timber quality.

Reproduction commonly occurs on raised microtopography — hummocks, old stumps, large logs, etc. Areas of high deer pressure will push tree species composition toward less palatable species. Stress during drought years can leave some of these tree species vulnerable to insects and/or diseases.

Depending on site conditions and forest overstory, rich understories can develop in swamp hardwood stands. Understories can include attractive species such as certain wildflowers (e.g., cardinal flower) and many ferns (e.g., cinnamon and ostrich fern). Marsh marigolds are among the earliest of spring blooms.

## Management and Silviculture

Equipment weight, soil conditions, access technology and length of winter cold periods can limit access to wetland systems. Caution to avoid site damage is warranted. On more productive sites with shade-tolerant or midrange-tolerant species, the forest, including black ash swamps, can be managed using the selection system or shelterwood system. Some of these more shade-tolerant swamp hardwood species are basswood, American elm, black ash, yellow birch and red maple. On good black ash sites, thinning should occur in stands under 100 years old with stocking levels at least 100 square feet of basal area (before thinning).<sup>2</sup>

On poor sites, timber management may not be financially feasible. Wildlife habitat and watershed quality objectives may dominate. Poor sites dominated by black ash and threatened by emerald ash borer may convert to lowland brush and/or wetland grasses and sedges.

<sup>2</sup> Erdman, G.E., T.R. Crow, R.M. Peterson, Jr., and C.D. Wilson. 1987. Managing Black Ash in the Lake States. GTR Report NC-115. USDA Forest Service.

### Basal Area

Stand density (the combination of tree size and number of trees) determines the amount of light available within and below the canopy. Stand density is measured using the number of square feet of tree trunks per acre; a measure of the trunk cross-sectional area at a height 4.5 feet from the ground. This is called “basal area”.

Stands dominated by quaking aspen and balm-of-Gilead will be best reproduced through clear-cutting, although balm can tolerate higher amounts of shade than aspen, even though they are in the same genus. Forest owners may consider natural succession to other tree species where the opportunity exists, though quaking aspen, even on less than optimal sites, may be desirable for game species habitat. Clearcutting can also be used in stands of red maple, silver maple and green ash to stimulate stump sprouts.

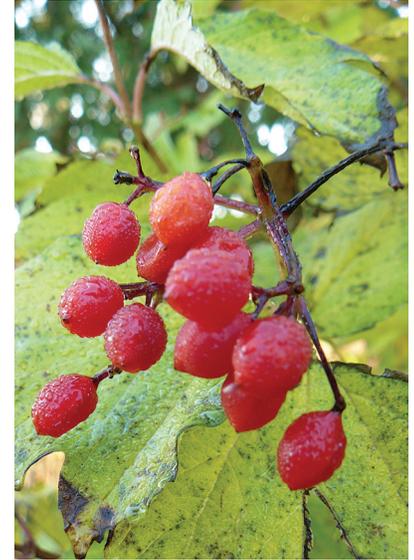
### Tree Health Issues

The emerald ash borer (EAB) is the greatest threat to swamp hardwood types with significant proportions of ash species. EAB is not uniformly spread around the state, so it’s important to know how far EAB is located from a managed ash woodland. Dutch elm disease continues to affect all native elm species. Beaver can cause significant direct damage to ash and aspen. Beaver dams can flood and kill swamp hardwood stands. Placement of roads and alterations to drainage should be carefully considered — changes in water levels can cause growth loss and mortality among trees.

### Wildlife Habitat

Swamp hardwoods will often support a wide range of wildlife — at least 89 vertebrate species<sup>3</sup>, including game species. Seasonally flooded sites with temporary ponds (vernal pools) support many amphibian species and attract many terrestrial species. Swamp hardwoods with berry-producing

species such as winterberry, spicebush and viburnums will attract wildlife. Stands with greater structural diversity will likely have a greater number of wildlife species. Some swamp hardwood sites, especially those dominated by black ash, may lose their forested condition because of emerald ash borer.



*Virburnum fruit*

### Landowner Tips

- Develop a management plan.
- Determine ash species component.
- Find out how close the emerald ash borer is.
- Determine how accessible the forest is.
- Productive bottomlands can be managed with the selection or shelterwood system
- Clearcutting may raise water levels high enough to reduce regeneration.
- Consider stand density, species composition and water conditions.
- Poor quality sites may be too difficult to work.

See the Michigan Society of American Foresters’ publication, *Forest Management Guidelines for Michigan*, on their website: <http://michigansaf.org>.

<sup>3</sup> Michigan Department of Natural Resources. 2000. Unpublished spreadsheet data.