



Black Ash Swamp with Cinnamon Fern Understory

Swamp hardwoods is a collection of 8 U.S. Forest Service forest types characterized by forested wetlands dominated by hardwood tree species. Site wetness and related access is an important management factor. 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. Different wetlands also can be distinguished by hydrological factors and pH.

The Trees

There are about 55 tree species that make-up different swamp hardwood forests across Michigan. Red maple, green ash, and silver maple represent over half the volume. Black ash, northern white-cedar, quaking aspen, balsam poplar, American elm, balsam fir, and cottonwood each comprise two to four percent of



*Green Ash (above)
Black Ash (below)*

the volume. Growth is often, but not always, slow due to site limitations. Red maple, black ash, and cedar are more dominant in the Upper Peninsula than the Lower Peninsula.¹

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 more intermediate sites 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).

Red maple has smooth bark at smaller diameters. Leaves have toothed margins, where sugar maple has smooth margins. Buds are reddish-purplish. In the springtime, red flower clusters can appear in great numbers. Both maples and ashes are oppositely branched. **Silver maple** also has smooth bark at smaller diameter. Leaves have deep sinuses between elongated lobes. Larger trees often have long strips of bark peeling from the trunk.

Green ash has rough bark broken into somewhat rectangular furrows. Leaves have 6-9 stalked leaflets. The first set of side buds are close to the terminal bud, unlike black ash. The top 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 7-11 leaflets without stalks. The first set of side buds are at least a quarter-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

Hydrological characteristics vary among different swamp hardwood stands and are critical to those differences. The river bottomlands and floodplains of southern Michigan won'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. However, 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 the conversion to a non-forested condition. Lowered transpiration rates may cause moisture levels to be greater than what 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. However, many of these stands have been high-graded over time 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 to less palatable species. During drought years, some of these tree species are prone to stress and vulnerability to insects and/or diseases.

Depending upon 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 & Silviculture

Equipment access to wetland systems can be limited due to equipment weight, soil conditions, access technology, and length of winter cold periods. Caution to avoid site damage is warranted. On more productive sites with shade tolerant or mid-range tolerant species, the forest can be managed using the selection system or shelterwood system, including black ash swamps. Some of these more shade tolerant swamp hardwood species are basswood, American elm, black ash, yellow birch, and red maple. On good

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".

black ash sites, thinning should be in stands under an age of 110 years with stocking levels at least 100 square feet of basal area.²

On poor sites, timber management may not be financially possible. 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.

Stands dominated by quaking aspen and balm-of-Gilead will be best reproduced through clearcutting, 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. However, 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) stands as the greatest threat to swamp hardwood types with significant element of ash species. EAB is not uniformly spread around the state and knowing how far EAB is located from a managed ash woodland is important to know. 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 altering 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 species³, 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 from emerald ash borer.



Viburnum Fruit

Landowner Tips

- Develop a management plan
- Determine ash species component
- How close is the emerald ash borer?
- How accessible is the forest?
- 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 <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 Erdman, G.E., T.R. Crow, R.M. Peterson, Jr, and C.D. Wilson. 1987. **Managing Black Ash in the Lake States**. USDA Forest Service, GTR Report NC-115. 10 pp.

³ Michigan DNR. 2000. Unpublished spreadsheet data.