



Natural Heritage &
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Program

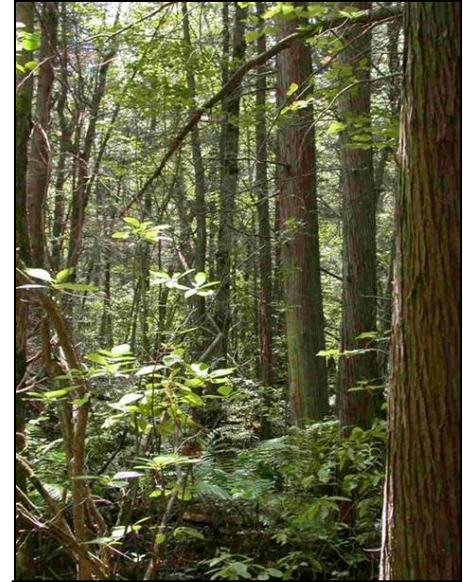
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**Natural Community Fact Sheet:
ATLANTIC WHITE CEDAR SWAMPS**

Community description

Atlantic White-Cedar (AWC) swamps are forested wetland communities with a dense, primarily evergreen canopy, a deciduous shrub layer, and a sparse herb layer dominated by mosses. AWC swamps are often found associated with red maple swamps and open bogs. Although all AWC swamp communities have Atlantic White-Cedar as the dominant tree, associated plant species vary depending on both the region in which the wetland occurs (e.g., coastal or inland, northern or southern) and on the wetland's physical setting (e.g. basin, seep or stream-/lakeside). Based on these differences in location and physical setting, four distinct AWC swamp community types are currently recognized in Massachusetts. Each of the four communities listed in Table 1 has Atlantic White-Cedar in the canopy with >25% cover and a distinct group of plant associates making the communities distinguishable; however, as with all natural communities, transitions and mixes do occur. Atlantic White-Cedar also occurs as an associate (canopy cover <25%) in other wetland community types, such as in Atlantic White Cedar Bogs; those communities are typically not classified as AWC swamps and are not described here.

NHESP considers all four AWC community types are considered to be Imperiled (ranked S2) and are Priority Natural Communities for protection due to their unique vegetation and limited distribution. High-quality examples of these wetland communities are tracked by NHESP.



Inland Atlantic White Cedar Swamp with dense shrub layer and Red Maple co-dominance. Photo: P. Swain, NHESP.

Atlantic White-Cedar Swamp Community Types in Massachusetts

Community Name	Counties	NHESP Sites	Examples
Coastal Atlantic White Cedar Swamp	Plymouth Bristol Barnstable	13	Acushnet Cedar Swamp (New Bedford) Hockomock Cedar Swamp
Inland Atlantic White Cedar Swamp	Worcester Middlesex Hampden Norfolk	11	Wolfe Hill Cedar Swamp (Northbridge) Leicester Cedar Swamp Douglas Cedar Swamp
Northern Atlantic White Cedar Swamp	Worcester (northern part)	1	Westminster Cedar Swamp
Alluvial Atlantic White Cedar Swamp	Bristol, Essex, Norfolk	7	Canoe River (Mansfield)
TOTAL		32	

Environment

In all AWC swamps, water-saturated peat overlies the mineral sediments, and standing water generally occurs for half of the growing season or longer. The water and soil are nutrient-poor, and particularly low in nitrogen and phosphorus. There is a high iron content in the soil; the iron (called "bog iron") was mined in the early days of manufacturing. Soil pH is acidic (3.1-5.5) and leaf litter decomposition is slow. **Coastal AWC swamps** typically occur at low elevations (less than 40 ft. above sea level), overlying sand and gravel deposits or glacial lake bottom sediments. **Inland AWC swamps** are found at a wide range of elevations and may be underlain by sand and gravel, clay or till deposits. The inland variants typically have

some surface water movement, and some of them receive groundwater seepage from nearby steep till deposits. **Northern AWC swamps** are restricted to high elevations; the Westminster Cedar Swamp occurs at an elevation of 1,110 feet and is the highest known elevation for Atlantic White-Cedar in Massachusetts. **Alluvial AWC swamps** are associated with river systems.

Characteristic plant species in Massachusetts



A young Atlantic White Cedar plant.
Photo: NHESP.

Atlantic White-Cedar (*Chamaecyparis thyoides*) is the defining species of AWC swamps. Atlantic White-Cedar is an evergreen conifer tree in the Cypress family (Cupressaceae) with short branches and scale-like leaves that form a soft, flat spray. The trees grow up to 80 ft. (25 m) tall, and they have straight trunks, cinnamon-brown to gray peeling bark, and a twisting grain. Although each of the four AWC swamp community types has a characteristic vegetation structure and composition, some plant species co-occur with Atlantic white-cedar in each of the types; these common associates are red maple (*Acer rubrum*), high-bush blueberry (*Vaccinium corymbosum*), swamp azalea (*Rhododendron viscosum*) and *Sphagnum* spp. moss.

In **Coastal AWC swamps**, Atlantic white-cedar is the dominant tree mixed with red maple. Pitch pine, white pine and hemlock are infrequent associates. These swamps can have a very dense shrub layer, including high-bush blueberry, swamp azalea, sweet pepperbush (*Clethra alnifolia*) and fetterbush (*Leucothoe racemosa*). In Cape Cod sites, inkberry (*Ilex glabra*) frequently occurs. The herb layer is sparse and patchy with cinnamon fern (*Osmunda cinnamomea*), Virginia chain fern (*Woodwardia virginica*), starflower (*Trientalis borealis*) and wild sarsaparilla (*Aralia nudicaulis*). The ground layer is dominated by *Sphagnum* spp. mosses.

Canopy trees in **Inland AWC swamps** differ depending on elevation. In sites lower than 700 ft. elevation, Atlantic White-Cedar is mixed with hemlock (*Tsuga canadensis*), red maple, and yellow birch (*Betula alleghaniensis*).

At elevations above 700 ft., Atlantic white-cedar is mixed with hemlock and spruce. The low elevation sites have a mixture of sweet pepperbush and winterberry (*Ilex verticillata*) in the shrub layer, and high elevation sites have abundant mountain holly (*Nemopanthus mucronata*). The herb layer of both low- and higher-elevation sites is similar with cinnamon fern, starflower and Canada mayflower (*Maianthemum canadense*) common. High-elevation sites also have northern species such as creeping snowberry (*Gaultheria hispidula*) and bunchberry (*Cornus canadensis*).

Northern AWC swamps are dominated by northern conifers such as black and red spruce (*Picea mariana* and *P. rubens*) and balsam fir (*Abies balsamea*); Atlantic White-Cedar can occur as an associate. There is a single known occurrence of this type in Massachusetts. Shrubs and herbs are similar to those found in high-elevation Inland AWC swamps. Labrador tea (*Ledum groenlandicum*) and rhodora (*Rhododendron canadense*) are also common.

Alluvial AWC swamps are highly variable. Atlantic white-cedar and red maple dominate the tree layer, and high-bush blueberry and sweet pepperbush occur in the shrub layer along with silky dogwood (*Cornus amomum*). The herb layer is comprised of species common to very wet, open or enriched sites, including sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), bugleweed (*Lycopus* spp.) and marsh St. John's-wort (*Hypericum virginicum*).

Rare plant species in Massachusetts

Heartleaf twayblade (*Listera cordata*) (E) (an orchid with one location in Massachusetts), Great Laurel (*Rhododendron maximum*) (T) and dwarf mistletoe (*Arceuthobium pusillum*) (SC) are rare plant species that occur in Atlantic White-Cedar Swamps.

E=State Endangered, T=State Threatened, SC=State Special Concern

Characteristic animal species in Massachusetts

Information on animals associated with AWC swamps is limited. Young AWC thickets provide excellent cover for deer, rabbits and birds. Atlantic white-cedar foliage and twigs is a preferred winter browse for white-tailed deer, while rabbits and mice can feed on cedar seedlings. Although no bird species appear to be restricted to AWC communities, studies have shown these wetlands to be important bird habitat. Birds that have been observed nesting in AWC swamps include Red-breasted Nuthatch, Brown Creeper, Yellow-throated Warbler, Black-and-white Warbler and Black-capped Chickadee.

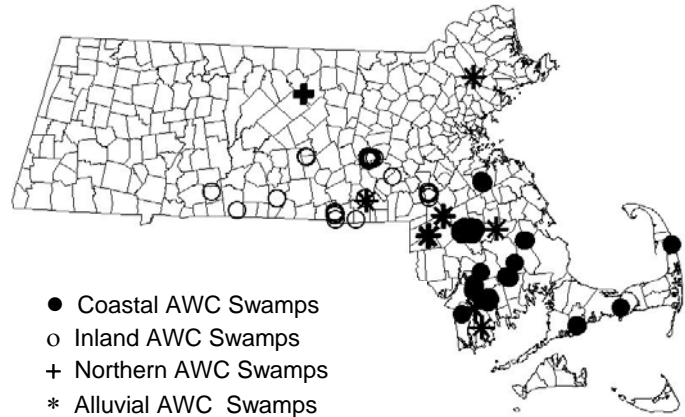
Rare animal species

The larvae of one rare butterfly, Hessel's Hairstreak (*Callophrys hesseli*) (SC), feed exclusively on Atlantic White-Cedar. The federally endangered Ringed Boghaunter Dragonfly (*Williamsonia lintneri*) (E) is found in open fens and bogs that are often associated with AWC Swamps. Ringed Boghaunters can use AWC Swamps as resting and mating habitat. Spotted turtles (*Clemmys guttata*) (delisted in 2006, but protected on state lands) can also be found in associated open wet areas. Sharp-shinned Hawks (*Accipiter striatus*) (SC) and Northern Parula warbler (*Parula americana*) (T) are two state-protected bird species that can be found in AWC Swamps but are not restricted to them.

Range of Atlantic White-Cedar Wetlands & Distribution in Massachusetts

AWC swamps are found mostly on the Atlantic Coastal Plain from Maine to North Carolina and along the Gulf Coast in western Florida, Alabama and Mississippi. Local occurrences are found in north-central Florida, Georgia and South Carolina. AWC swamps are considered rare throughout their range.

There are 4300 acres of wetlands with >25% cover of Atlantic White-Cedar in Massachusetts, and an additional 2600 acres with between 5-25% cover of Atlantic White-Cedar. Most AWC wetlands occur in Bristol and Plymouth Counties, but numerous smaller AWC wetlands occur throughout the eastern and central portions of the state. Cedar wetlands can be found as far west as Springfield in the Connecticut River Valley, and as far north as Westminster in Worcester County. Massachusetts has more extensive AWC than any other state in the Northeast and one third of the entire acreage of cedar wetlands. From a regional perspective, efforts to protect AWC wetlands in Massachusetts are warranted.



Distribution in Massachusetts

Threats and Management Recommendations

The two greatest threats to Atlantic White-Cedar wetlands are land clearing for agricultural, commercial and residential development, and interference of normal hydrological functioning as a result of development. The Massachusetts Wetland Protection Act regulates activities within AWC communities, and all project proposals are required to go through the Notice of Intent process with the local conservation commission. Due to the limited distribution of these unique communities, it is recommended that no clearing or filling of these wetlands be allowed.

Atlantic white-cedar has been cut extensively for posts and shingles for over three centuries. In an extensive statewide vegetation inventory funded by MNHESP in 1990, no “virgin” or uncut stands were found, but several sites contained cedars that were 100-200 years old. Selective cutting is detrimental to the persistence of AWC swamps, because hardwoods, such as red maple, outcompete and replace AWC.

Atlantic white-cedar will regenerate best following catastrophic disturbance events such as hurricanes and fires. Data suggest that in the absence of disturbance, red maple and shrubs increase in abundance at the expense of Atlantic White-Cedar. Fire suppression negatively threatens the long-term persistence of AWC swamps, and controlled burning practices may be an appropriate restoration tool in many areas. Small-patch clearcuts are another recommended restoration tool. By clear-cutting small patches (generally 20 m x 20 m) and removing the slash and competing vegetation, pure, even-aged stands of Atlantic White-Cedar are able to regenerate.

AWC swamps require a natural cycle of wet and dry periods for their survival and reproduction. Any alterations to the natural hydroperiod of the community threatens its persistence. Standing water for much of the year is unfavorable for both seed germination and seedling survival, and young seedlings are killed by both drowning and drought. It is recommended that any alterations in water levels be avoided, this includes development and road construction in uplands surrounding AWC swamps which can alter water levels. Where cedar wetlands are associated with river systems, it is important to maintain normal hydrologic regime of the river.

Sources

Most of the information contained in this fact sheet was derived from a report to NHESP by Glen Motzkin entitled “Atlantic White Cedar Wetlands of Massachusetts” which was then published by the Massachusetts Agricultural Experiment Station.

For more information refer to:

Motzkin, G. 1991. *Atlantic white cedar wetlands of Massachusetts*. Massachusetts Agricultural Experiment Station Research Bulletin Number 731, Amherst.

Laderman, A.D. 1989. *The ecology of Atlantic white cedar wetlands; a community profile*. United States Fish and Wildlife Service Biological Report 85 (7.21), Washington, D.C.

Originated: 1998
Reformatted and ranks updated: 2007

NHESP Natual Community fact sheet: Atlantic White Cedar Swamps
Partially Funded by a grant from the U.S. Environmental Protection Agency