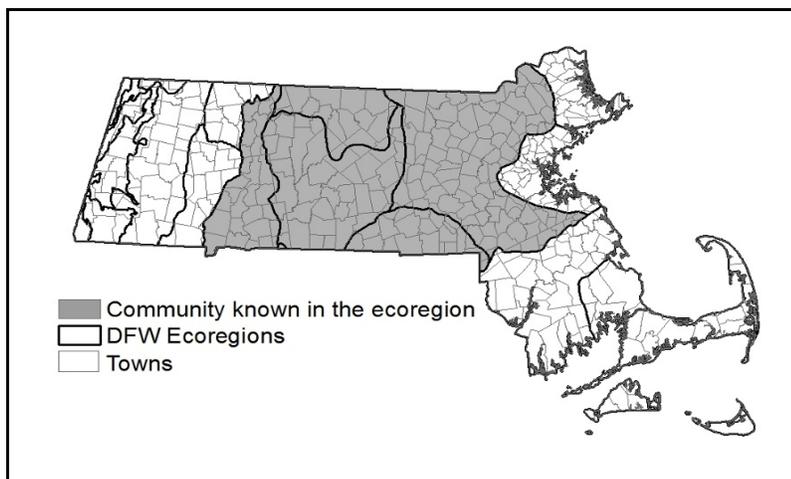


## Inland Atlantic White Cedar Swamp

**Community Code:** CP1B1A2000

**State Rank:** S2



**Concept:** Inland basin or seepage swamps dominated by Atlantic white cedar in the overstory. Hemlock, spruce, red maple, and yellow birch co-occur, and coastal indicator species are lacking.

**Environmental Setting:** Inland AWC swamps generally occur in the central part of the state in basins or seepage wetlands at a wide range of elevations. As in all AWC swamps, water-saturated peat overlies the mineral sediments (sand and gravel, glacial lake sediments, or till deposits), and standing water generally occurs for half of the growing season or longer. There is typically some surface water movement, and some sites receive groundwater seepage from nearby steep till deposits. The water and soil are nutrient-poor, and particularly low in nitrogen and phosphorus. Soil pH is acidic (3.1-5.5) and leaf litter decomposition is slow. When conifers dominate the canopy, occurrences may be dark and have limited understory growth. Fallen and tipped trees are common and the resultant openings become tangles with dense shrub and sapling growth around downed trunks.

**Vegetation Description:** White Cedar (AWC) Swamps are defined as having >25% cover of AWC in the canopy. Associated canopy trees in Inland AWC swamps differ depending on elevation. In sites lower than 700 ft. elevation, AWC (*Chamaecyparis thyoides*) is mixed with hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*). At elevations above 700 ft., AWC is mixed with hemlock and spruce (*Picea* spp.). The low elevation sites typically have sweet pepper-bush (*Clethra alnifolia*) and winterberry (*Ilex verticillata*) in the shrub layer, and high elevation sites have abundant mountain holly (*Ilex mucronata*). The herb layer of both low- and higher-elevation sites is similar with cinnamon fern (*Osmundastrum cinnamomeum*), starflower (*Lysimachia borealis*), and Canada mayflower (*Maianthemum canadense*) common. High-elevation sites also have northern species such as creeping snowberry (*Gaultheria hispidula*) and bunchberry (*Chamaepericlymenum canadense*).



## Inland Atlantic White Cedar Swamp

### Differentiating Occurrences:

Although each of the AWC swamp community types has a characteristic vegetation structure and composition, as with all natural communities, transitions and mixes do occur. Coastal AWCSs generally occur below 60 ft elevation and in SE Massachusetts (the Cape and Islands, Plymouth, and Bristol Counties). In Coastal AWCS, pitch pine (*Pinus rigida*) is an occasional canopy associate seldom found in other AWCS types. Other species that are found in greater abundance in coastal than elsewhere include greenbrier (*Smilax rotundifolia*), the shrubs inkberry (*Ilex glabra*), dangleberry (*Gaylussacia frondosa*), sheep laurel (*Kalmia angustifolia*), and swamp sweetbells (*Eubotrys* (= *Leucothoe*) *racemosa*), and the ferns Virginia chain-fern and netted chain-fern (*Woodwardia virginica* and *W. areolata*). Inland AWCS typically occur at elevations > 60 ft. above sea level and not in southeast MA. Yellow Birch (*Betula alleghaniensis*) is more common than in Coastal AWCS. Inland AWCS have lower abundance of coastal indicators than CAWCS. High-elevation Inland AWCS also have northern species such as creeping snowberry (*Gaultheria hispidula*) and bunchberry (*Chamaepericlymenum canadense*). Northern AWC swamps are codominated by northern conifers such as black and red spruce (*Picea mariana* and *P. rubens*) and balsam fir (*Abies balsamea*). Shrubs and herbs are similar to those found in high-elevation Inland AWCS along with Labrador tea (*Rhododendron groenlandicum*) and Rhodora (*Rhododendron canadense*). Northern AWC swamps are restricted to basins at high elevations with the known example >1100 ft. AWC also occurs in AWC Bogs, relatively open peatland communities with canopy cover <25%. Alluvial AWCS are along streams. The vegetation is highly variable. AWC and red maple dominate the tree layer, and high-bush blueberry and sweet pepperbush occur in the shrub layer along with silky dogwood (*Swida* (= *Cornus*) *amomum*). The herb layer includes sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), bugleweed (*Lycopus* spp.) and marsh St. John's-wort (*Hypericum virginicum*). In Alluvial Red Maple Swamps, silver maple is often a codominant with red maple. If AWC is present, it is well under 25% cover. Red Maple Swamps in basins in SE Massachusetts are often former AWCS that were cut in the past. Many have small patches of AWC; however, AWC needs to be dominant in the overstory for the community to be classified as an AWCS. Mapping of relatively large dense patches of AWC as AWCS communities may be useful within a Red Maple Swamp to indicate a mosaic of wetland communities.

### Habitat Values for Associated Fauna:

Inland AWC swamps can function as vernal pool habitat if water remains standing for 2-3 months and they lack fish; these areas provide important amphibian breeding habitat.

### Threats:

The two greatest threats to AWC swamps are land clearing for agricultural, commercial and residential development, and interference of normal hydrological functioning as a result of development. 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 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. Any alterations to the natural hydroperiod of AWC swamps threatens their persistence.

### Management Needs:

Due to the limited distribution of AWC swamps, it is recommended that no clearing or filling of these wetlands be allowed. 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. Controlled burning should be accompanied by small-patch clearcuts to be most effective. 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. 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.

### USNVC/NatureServe:

*Chamaecyparis thyoides* Saturated Forest Alliance - *Chamaecyparis thyoides* - (*Tsuga canadensis*, *Betula alleghaniensis*) / *Clethra alnifolia* Forest (CEGL006189); includes much of *Chamaecyparis thyoides* / *Rhododendron maximum* Forest (CEGL006355) except for lacking dominant *Rhododendron maximum*.

