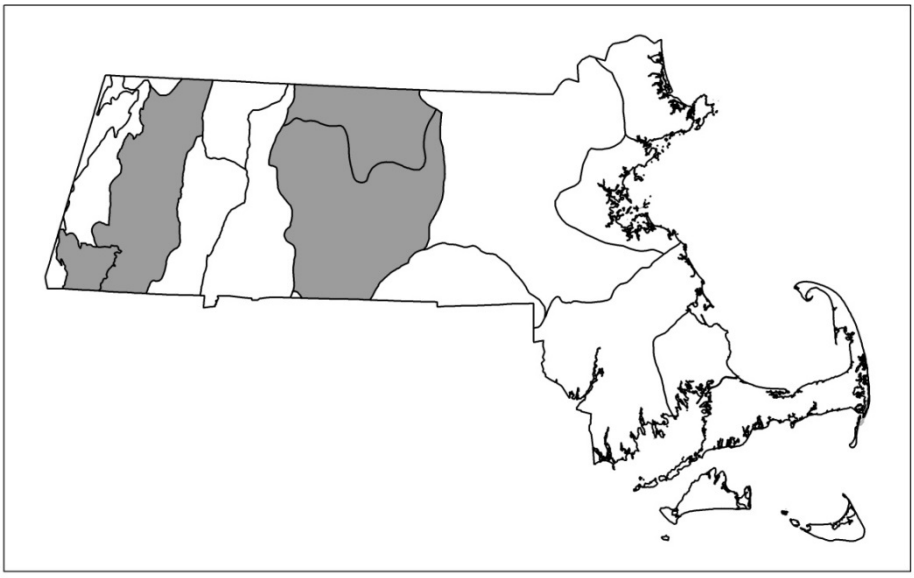
Hemlock Swamp

Community Code: CP1A12A000

State Rank: S4



Concept: Acidic forested swamps where eastern hemlock is dominant or co-dominant in the canopy.

Environmental Setting: Hemlock Swamps are characterized by a dense tree canopy dominated by mature eastern hemlock, allowing little light to reach the forest floor. Due to the nearly closed and mostly coniferous canopy, the understory is usually low in overall plant diversity, with patches of ferns and extensive areas of sphagnum mosses. Hemlock Swamps tend to occur in large or long depressions and often contain standing water and small intermittent streams; there is a hummock-hollow topography with trees growing on the hummocks. The hollows have wetter, organic peaty soils and are saturated throughout the year.

Vegetation Description: Eastern hemlock (*Tsuga canadensis*) is the dominant tree species in Hemlock Swamps. Hemlock forms stands with dense canopies alone or mixed with lower amounts of white pine (*Pinus strobus*), red maple (*Acer rubrum*), or yellow birch (*Betula alleghaniensis*). The hemlock-dominated canopy allows little light through to support plants in lower strata, resulting in a patchy subcanopy that is usually comprised of the overstory species growing in occasional canopy gaps created by windthrows. The poorly developed shrub layer has sparse and patchy cover with hemlock most characteristic: the saplings may persist in the understory for many decades, to be released to grow into maturity when canopy gaps occur. Typical shrubs include winterberry (*Ilex verticillata*), mountain laurel (*Kalmia latifolia*), highbush blueberry (*Vaccinium corymbosum*), currents (*Ribes* spp.), mountain holly (*Nemopanthus mucronatus*), alders (*Alnus* spp.), witch hazel (*Hamamelis virginiana*), and maleberry (*Lyonia ligustrina*). Ferns are common, especially

cinnamon fern (*Osmundastrum cinnamomeum*), along with goldthread (*Coptis trifolia*), partridgeberry (*Mitchella repens*), and wild sarsaparilla (*Aralia nudicaulis*). The hummocky ground layer is covered with sphagnum moss and the liverwort *Bazzania trilobata*; the moss *Thuidium delicatulum* is often present.

Differentiating Occurrences: Many swamps have eastern hemlock (*Tsuga canadensis*) as a component of the canopy, but Hemlock Swamps are differentiated by having eastern hemlock as the dominant canopy species throughout the community. Red Maple Swamps and named variants such as Red Maple-Black Gum Swamps often have pockets of hemlock or scattered hemlocks, but overall those community types are dominated by deciduous trees, particularly red maple, and hemlocks are present in low overall percentages as part of the normal variation within the community. Red Maple Swamps have more species diversity in all the layers, as well as denser shrubs and herbaceous layers, than do Hemlock Swamps. In northern and western portions of the state at higher elevations, Hemlock Swamps grade into Red Spruce Swamps, differentiated by the dominance of red spruce and the addition of species typical of colder or northern areas. In the western portion of the state in areas with calcium-enriched seepage waters, Hemlock Swamps grade into Rich Conifer Swamps which are characterized by less abundance of hemlock and a much more diverse floral assemblage, including elm (*Ulmus* sp.), spicebush (*Lindera benzoin*), poison ivy and poison sumac (*Toxicodendron radicans* and *vernix*), marsh marigold (*Caltha palustris*), spotted touch-me-not (*Impatiens capensis*), jack-in-the-pulpit (*Arisaema triphyllum*), Pennsylvania bittercress (*Cardamine pensylvanica*), water avens (*Geum rivale*), wood-sorrel (*Oxalis montana*), green wood orchid (*Platanthera clavellata*), blue marsh violet (*Viola cucullata*), and hemlock parsley (*Conioselinum chinense*).In the southeast part of the state, hemlock mixes with Atlantic white cedar (*Chamaecyparis calyculata*) and other species typical of the coastal plain or more southern areas, grading into Atlantic white cedar swamps, with type determined by the overall dominant tree species.

Associated Fauna: Hemlock Swamps are part of habitat of large mobile animals. Ground-level browsers, including white-tailed deer (*Odocoileus virginianus*), snowshoe hare (*Lepus americanus*), and New England cottontail (*Sylvilagus transitionalis*), use shrubby areas in the community. Conifer swamps tend to have dense shade and are relatively cool in the summer, making them preferred areas for moose (*Alces alces*), animals that get too hot and have trouble controlling their body temperature. Birds that nest or forage in canopies or mid-sections of conifers don't differentiate on whether the site is wet or not: many birds of upland conifer forest also use Hemlock Swamps. Areas of Hemlock Swamps where water remains standing for 2-3 months and that lack fish can function as vernal pool habitat for amphibian breeding.

Public Access: Three Mile Pond WMA, Sheffield; Appalachian Trail Corridor, Tyringham; Otis State Forest, Otis; Ware River Watershed, Rutland; Wolf Swamp WMA, Brookfield.

Threats: Invasive exotic insect pests (e.g., hemlock woolly adelgid (*Adelges tsugae*) and elongate hemlock scale (*Fiorinia externa*)); altered hydrology.

Management Needs: More information is needed to assess the management needs for Hemlock Swamps. The use of undisturbed natural buffers around the best occurrences of the community reduces the potential for impacts from changes in the surrounding environment.

USNVC/NatureServe: *Tsuga canadensis* Saturated Forest Alliance - *Tsuga canadensis Betula alleghaniensis*/*Ilex verticillata*/*Sphagnum* spp. Forest [CEGL006226].