

## HUDSONIA HARLEM VALLEY BIODIVERSITY MANUAL SUPPLEMENT

### Conifer swamp

Swamps dominated by coniferous trees are far less common in the Harlem Valley region than those dominated by deciduous trees. Coniferous swamps tend to be found in locations with cooler microclimates, especially in the northern part of the study area (e.g. Rensselaer Plateau). This habitat type includes non-calcareous conifer swamps with hemlock or spruce and calcareous conifer swamps with tamarack or northern white cedar. Eastern red cedar may occur in swamps, but is rarely dominant or co-dominant. Calcareous swamps are more frequent north of the Hudson Highlands. South of the Hudson Highlands the dominant conifer in swamps is usually eastern hemlock. NHP communities subsumed under this category include hemlock-northern hardwood swamp, rich hemlock-northern hardwood peat swamp, black spruce-tamarack bog, spruce-fir swamp, and northern white cedar swamp (Edinger et al. 2002).

### Vegetation

A number of vegetational associations are subsumed under this habitat designation. Hemlock-dominant swamps are widespread in the region, declining in frequency from the northern end of the region (Rensselaer Plateau) to the southern end (Westchester County). Common hardwood associates of hemlock in swamps include red maple, yellow birch and black ash, along with shrubs such as highbush blueberry and winterberry. White pine (*Pinus strobus*) may occur occasionally in swamps, but is rarely dominant.

Northern coniferous swamps tend to have black spruce (*Picea mariana*) or balsam fir (*Abies balsamea*), with red maple and yellow birch sometimes forming an open canopy community with shrubs such as poison sumac (*Toxicodendron vernix*), alder-leaf buckthorn (*Rhamnus alnifolia*), alders (*Alnus* spp.) and highbush blueberry. Herbaceous species with an affinity for northern coniferous swamps include Virginia chain fern (*Woodwardia virginica*) and three-fruited sedge (*Carex trisperma*). An example from the Rensselaer Plateau had northern herbs such as mountain holly (*Nemopanthus mucronatus*), bunchberry (*Cornus canadensis*) and goldthread (*Coptis trifolia*) (McVaugh 1958).

A conifer swamp community with tamarack (*Larix laricina*), red maple and slippery elm occurs at low elevations on calcareous soils or peaty soils underlain by calcareous rock. (See also calcareous swamp). Northern white cedar swamps may occur on calcareous soils in the northern part of the region, but this swamp type is poorly documented in the study area. The dominant tree is northern white cedar (*Thuja occidentalis*). Common associates include red maple, hemlock, balsam fir, yellow birch and black ash (*Fraxinus nigra*) (Edinger et al. 2002, Reschke 1990). Atlantic white cedar swamp, a state-rare conifer swamp community, is discussed in a separate habitat profile.

### Fauna

Golden-crowned kinglet and saw-whet owl have been found to breed in hemlocks swamps (Andrle & Carroll 1988). Long-eared owl uses conifer swamps, forests and plantations for winter roosting sites. Red-backed vole may be a resident species in any northern type of coniferous swamp (Doutt et al. 1977; Connor 1960). Southern bog lemming may forage in open-canopy coniferous swamps with sedges and rushes. Bog turtle may utilize calcareous conifer swamps (e.g. red cedar-elm, or tamarack swamp) as summer refugia or foraging habitat in wetland

complexes that include substantial areas of open wetland, primarily fens. In the northern part of the study area, regionally-rare bog elfin (*Callophrys lanoraieensis*) may occur in cool, open-canopy conifer swamps with its larval host black spruce (*Picea mariana*).

### **Indicators and Identification**

A significant percent cover or number and density of individuals of one or more coniferous tree species marks this type of swamp. There is no accepted standard percent cover of conifers for this general habitat type, but 30% or more is probably an acceptable figure. Reschke (1990) gives a figure of 30% as the minimum cover for northern white cedar swamp. However, an occasional conifer or small stand of conifers in a predominantly deciduous swamp is not necessarily an indicator for conifer swamp. Spruce-fir swamp, hemlock-hardwood swamp, northern white cedar swamp and red maple-tamarack peat swamp are types recognized by NYNHP (Edinger et al 2002, Reschke 1990). Other associations have been recognized in New England (Lundgren 2000). Many combinations of conifer and hardwood species occur in the region, and do not necessarily conform to standard types reported in the literature.

### **Biodiversity Values**

Coniferous swamps provide habitat for specialized animal species (as indicated above), probably including many invertebrates not yet recognized as associated with this habitat. Besides the coniferous tree species that identify this habitat type, there are many more herbaceous species, mosses and lichens that occur exclusively or primarily in coniferous swamps. Regionally-rare Columbia silk moth occurs in tamarack swamps in the Adirondacks, but has not been reported from the study area. Birds that breed in conifer swamps include Canada warbler (*Wilsonia canadensis*), magnolia warbler (*Dendroica magnolia*), ovenbird (*Seiurus aurocapillus*) and saw-whet owl (*Aegolius acadicus*).

### **Substrates**

Peat, derived from dead sphagnum moss or other plant remains, or fibrous muck, are typical of northern conifer swamps with tamarack or northern white cedar. In these swamps, deeper substrates (bedrock or mineral soils) are typically at least somewhat calcareous (see Calcareous swamp profile). Less fibrous muck or silt typically underlie spruce-fir and hemlock-dominant swamps in most of the region. Calcareous clay soils tend to support deciduous or mixed deciduous-coniferous swamps with tamarack or eastern red cedar. Perched conifer swamps on high ridges tend to have thin peat or muck over metamorphic bedrock; red spruce, pitch pine or hemlock are typical, and these trees are often dwarfed.

### **Surface Waters**

Water levels in many swamps fluctuate widely, with surface water present only during times of flooding. Chemistry (including pH) is usually acidic but may vary considerably, depending upon the chemistry of substrates, runoff, and leachates from organic materials in the water.

### **Extent**

Conifer swamps in the study area are not as extensive as hardwood swamps, and often occur within mosaics of upland and wetland habitats or as patches within large hardwood swamps. A

great deal of former swampland was cleared for farming, and, especially in the southern portion of the study area, for development. Certainly some conifer swamps are still undocumented, hidden within large tracts of forested land.

### **Distribution in study area**

Calcareous conifer swamps are more frequent north of the Hudson Highlands, where a greater variety of coniferous species occur. South of the Hudson Highlands the dominant conifer in swamps is usually eastern hemlock. Swamps with black spruce or red spruce, northern trees, occur primarily in Rensselaer County. Hemlock and tamarack probably occur in swamps throughout the study area, including northern Westchester (e.g. Lake Oscaleta, North Salem).

### **Quality**

Many conifer swamps have retained their natural character and quality due to their remoteness and to extreme conditions of hydrology and water and soil chemistry that discourage invasive plants, perhaps the most serious biological agents of degradation in upland forests in the study area and elsewhere. The difficulties of traversing conifer swamps makes these habitats poor choices for the location of hiking trails, except along their edges.

### **Human Uses**

Many smaller, deep water swamps, especially those remote from population centers and roads, have escaped logging and clearing because of the difficulty of draining these areas. More accessible ones, however, were subject to timber harvesting during the winter months when soils and surface waters were deeply frozen

### **Sensitivities, Impacts**

Historically, swamps of all types were drained to reduce mosquito numbers or to be cleared for agriculture. In the southern part of the region in recent decades, stands of eastern hemlock have been decimated by hemlock wooly adelgid (*Adelges tsugae*) and associated scale insects. It is uncertain whether or to what extent these forest pests will extend their ranges northward in the region.

### **Conservation and Management**

#### **Examples on Public Access lands**

Dyken Pond Environmental Education Center, Rensselaer County, contains an example of spruce fir swamp with creeping snowberry (*Gaultheria hispidula*), a regionally-rare trailing shrub. This preserve also has examples of spruce-hemlock and hemlock-hardwood swamps (Miller ed. 1998).

Grafton Lakes State Park has small patches of conifer swamp in a larger matrix of spruce-hemlock coniferous forest.

Peddler's Pond in the Town of Grafton, Rensselaer County, has a black spruce-tamarack swamp at the margin of a large fen (Schmidt et al 1994).

Rippowam Preserve (Lake Oscaleta), South Salem, Westchester County, has two large swamps (west and southeast of lake) with patches of hemlock-tamarack conifer swamp.

## References

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Photo: Leelanau County Board