



Natural Heritage & Endangered Species Program

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Description: This plant community is a coniferous swamp characterized by spruce and/or balsam fir as the dominant canopy trees. These swamps are typically found at stream headwaters or in poorly drained basins. Under the tree canopy, these swamps often have a patchy shrub component with mountain holly and other shrubs. The herbaceous layer is characterized by clumps of cinnamon fern with scattered bunchberry and three-seeded bog sedge. Sphagnum mosses tend to carpet the forest floor.

Environment: Boreal swamps occur in stream headwaters or in cold poorly drained areas, typically on acidic glacial till. They tend to be most common in the Berkshire Highlands and in north central portions of Massachusetts. Spruce-fir Boreal Swamps are most common at higher elevations and are often isolated from perennial streams. They typically have a small intermittent outlet channel and if there are any inlets they are usually not perennial. Organic muck or peat soils that are seasonally saturated in these swamps create acidic and nutrient poor conditions.

Characteristic Species: The tree canopy of these forested swamps is variable in cover and dominated by red spruce (*Picea rubens*) or balsam fir (*Abies balsamea*) or a mixture of red or black spruce (*P. mariana*) and balsam fir. There are three noticeable variants of Massachusetts boreal swamps that are described below.

RED SPRUCE VARIANT: These forested swamps tend to occur in north central Massachusetts at elevations between 800-1100 feet. The tree canopy is typically closed and dominated by red spruce. Occasional associates in the canopy are white pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), and yellow birch (*Betula alleghaniensis*), although these are much lower in abundance than spruce. The subcanopy is usually low in percent cover and may be comprised of one or more of the canopy species. The shrub component is often fairly sparse and grows primarily on the tops and sides of the hummocks. A diagnostic shrub of these swamps is mountain holly (*Nemopanthus mucronatus*). Other associates that may be present include highbush blueberry (*Vaccinium corymbosum*), wild raisin (*Viburnum nudum* var. *cassinoides*), winterberry (*Ilex*

Spruce-Fir Boreal Swamps

State Status: None
Federal Status: None

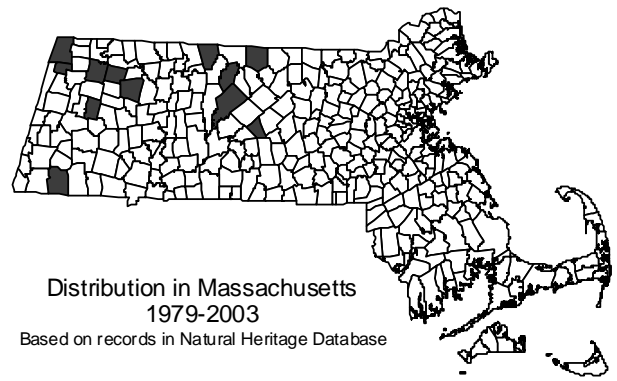


Illustration of spruce-fir swamp by Libby Davidson from *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* by Elizabeth H. Thompson and Eric R. Sorenson. Vermont Department of Fish & Wildlife and The Nature Conservancy. 2000.

verticillata), and an occasional azalea (*Rhododendron* spp.) or maleberry (*Lyonia ligustrina*). The herb layer is usually prominent and dominated by cinnamon fern (*Osmunda cinnamomea*). Other potential herbaceous associates are Massachusetts fern (*Thelypteris simulata*), goldthread (*Coptis trifolia*), bunchberry (*Cornus canadensis*), creeping snowberry (*Gaultheria hispidula*), and small amounts of three-seeded bog sedge (*Carex trisperma*). On the drier hummocks starflower (*Trientalis borealis*) and wild sarsaparilla (*Aralia nudicaulis*) may occur in small amounts. Saturated or flooded hollows between the hummocks are carpeted with mosses (primarily *Sphagnum* spp.) and are typical of Spruce-fir Boreal Swamps.

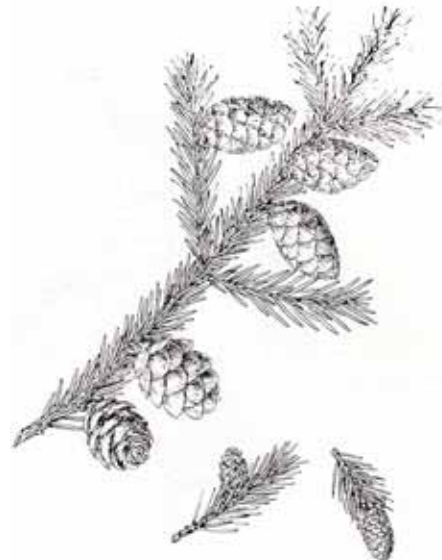
MIXED CANOPY VARIANT: These swamps are most commonly found in the hill towns west of the Connecticut River valley, within the Berkshire Highlands region of the state. The mixed canopy swamps tend to form headwaters for small streams and are located at the base of hillsides. There appears to be groundwater seepage influencing the floristic composition. These swamps usually have an open canopy with a diverse assemblage of trees and shrubs. The trees usually include black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), eastern hemlock (*Tsuga canadensis*), red maple, (*Acer rubrum*), yellow birch (*Betula alleghaniensis*) and occasionally black ash (*Fraxinus nigra*). The subcanopy is often prominent and diverse, including many of the canopy species. Shrubs are often abundant in these swamps and include mountain holly (*Nemopanthus mucronatus*), mountain laurel (*Kalmia latifolia*), wild raisin (*Viburnum nudum* var. *cassinoides*), hobblebush (*Viburnum lantanoides*), and winterberry (*Ilex verticillata*). Occasional poison sumac (*Toxicodendron vernix*), azaleas (*Rhododendron spp.*) or alders (*Alnus spp.*) occur as well. The herbaceous layer is low to moderate in cover and usually includes patches of cinnamon fern (*Osmunda cinnamomea*) or royal fern (*Osmunda regalis* var. *spectabilis*). Other herbaceous associates include blue-bead lily (*Clintonia borealis*), goldthread (*Coptis trifolia*), bunchberry (*Cornus canadensis*), swamp dewberry (*Rubus hispidus*) and three-seeded bog sedge (*Carex trisperma*). Sometimes other sedges are present as well. On the drier hummocks starflower (*Trientalis borealis*) and wild sarsaparilla (*Aralia nudicaulis*) are often found in small amounts. Saturated or flooded hollows occur between the hummocks that are usually carpeted with mosses (primarily *Sphagnum spp.*)

BALSAM FIR VARIANT: These swamps are often quite small and function as headwaters for small streams in the higher elevations close to the mountain tops. The open canopy is usually dominated by balsam fir (*Abies balsamea*), although sometimes it is shared with lesser amounts of red spruce (*Picea rubens*) and yellow birch (*Betula alleghaniensis*). The subcanopy is usually comprised of smaller balsam fir trees with occasional red spruce and American mountain-ash (*Sorbus americana*). Shrubs are not abundant and include mountain holly (*Nemopanthus mucronatus*) and hobblebush (*Viburnum lantanoides*). The herbaceous component is low in cover and is characterized by three-seeded bog sedge (*Carex trisperma*). Other associates include northern awned sedge (*Carex gynandra*), bunchberry (*Cornus canadensis*), goldthread (*Coptis trifolia*), and whorled wood-aster (*Aster acuminatus*). *Sphagnum* mosses carpet the ground.



Management Considerations: Logging, changes in hydrology, development, pollution, and exotic species are the greatest threats to Spruce-Fir Boreal Swamps. Logging within these swamps or even in close proximity in the surrounding uplands may affect the hydrologic patterns, nutrient status, habitat integrity or species composition of these forested wetlands. Swamps that are adjacent to developed areas may be degraded by changes in hydrology, stormwater or wastewater discharges, elevated nutrient inputs, or exotic flora. Sedimentation from nearby logging or construction activities is a significant threat to the ecological integrity and composition of these swamps. In addition to human impacts, beavers (*Castor canadensis*) can cause significant flooding and subsequent changes in community type from forested wetland to open water, marsh or shrub swamp.

The use of undisturbed natural buffers around the best occurrences of Massachusetts Spruce-fir Boreal Swamps is encouraged. Natural wooded buffers reduce the potential for impacts to the swamps from surrounding changes in the environment and will help protect habitats for wildlife that are dependent upon these swamps for food, cover, breeding, or nesting sites.



Black Spruce

Illustration by C.E. Faxon from *Native and Naturalized Trees of Massachusetts*, Cooperative Extension Service, University of Massachusetts, Amherst, MA, 1978.