Black Spruce-Tamarack Bog

Black spruce-tamarack bog at Raquette Boreal Forest

Photo credits: *Shane Gebauer*

System Palustrine

Subsystem Forested Peatlands

Did you know?
The common name for the tamarack comes from the Algonquian Native American name that means "wood used for snowshoes." Other Algonquian names that are used in English are mainly animals such as caribou, moose, chipmunk, raccoon, muskrat, opossum, woodchuck, and skunk and plants such as hickory and pecan.

Summary

Protection Not listed in New York State, not listed federally.

Rarity G4G5, S3

A global rarity rank of G4G5 means: Apparently or Demonstrably Secure globally - Uncommon to common in the world, but not rare; usually widespread, but may be rare in some parts of its range; possibly some cause for long-term concern due to declines or other factors. More information is needed to assign a single conservation status.
A state rarity rank of S3 means: Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

Conservation Status in New York

There are several hundred occurrences statewide. Some documented occurrences have good viability and are protected on public land or private conservation land. This community has a limited distribution to the northern half of the state, and includes several very large, high quality examples. The current trend of this community is probably stable for occurences on public land, or declining slightly elsewhere due to moderate threats related to development pressure or alteration to the natural hydrology. This community has declined moderately to substantially from historical numbers likely correlated with peat mining and logging and development of the surrounding landscape.

Short-term Trends

The numbers and acreage of black spruce-tamarack bogs in New York have probably remained stable in recent decades as a result of wetland protection regulations. There may be a few cases of slight decline due to alteration of hydrology from impoundments (conversion to other palustrine community types).

Long-term Trends

The numbers and acreage of black spruce-tamarack bogs in New York have probably declined moderately to substantially from historical numbers likely correlated with initial peat mining and logging of the surrounding landscape (increasing nutrient run-off into bogs).

Larger occurrences of this natural community (>12.5 acres) are protected under NY State wetland laws.

Conservation and Management

Threats

Black spruce-tamarack bogs are threatened by development and its associated run-off (e.g., agricultural, roads, railroads), recreational overuse (e.g., hiking trails causing peat compaction), and habitat alteration in the adjacent landscape (e.g., mining, excessive logging, pollution, nutrient loading). Alteration to the natural hydrology is also a threat to this community (e.g., impoundments, blocked culverts, beaver). Several examples of black spruce-tamarack bog are threatened by invasive species, such as reedgrass (Phragmites australis).

Conservation Strategies and Management Practices

Because black spruce-tamarack bogs are naturally acidic and low in nutients, they are particularly susceptible to alteration by elevated nutrient inputs. Bogs may require larger buffers than other wetland types because of their high susceptibility to changes in nutrient concentrations. Direct impacts are typically most serious within 300 feet (90 m) of wetland areas (Sperduto et al. 2000).

Where practical, establish and maintain a natural wetland buffer to reduce storm-water, pollution, and nutrient run-off, while simultaneously capturing sediments before they reach the wetland. Buffer width should take into account the erodibility of the surrounding soils, slope steepness, and current land use. Wetlands protected under Article 24 are known as New York State "regulated" wetlands. The regulated area includes the wetlands themselves, as well as a protective buffer or "adjacent area" extending 100 feet landward of the wetland boundary (NYS DEC 1995). If possible, minimize the number and size of impervious surfaces in the surrounding landscape. Avoid habitat alteration within the wetland and surrounding landscape. For example, roads and trails should be routed around wetlands, and ideally not pass through the buffer area. If the wetland must be crossed, then bridges and boardwalks are preferred over filling. Restore past impacts, such as removing obsolete impoundments and ditches in order to restore the natural hydrology. Prevent the spread of invasive exotic species into the wetland through appropriate direct management, and by minimizing potential dispersal corridors, such as roads.

Development and Mitigation Considerations

When considering road construction and other development activities minimize actions that will change what water carries and how water travels to this community, both on the surface and underground. Water traveling over-the-ground as run-off usually carries an abundance of silt, clay, and other particulates during (and often after) a construction project. While still suspended in the water, these particulates make it difficult for aquatic animals to find food; after settling to the bottom of the wetland, these particulates bury small plants and animals and alter the natural functions of the community in many other ways. Thus, road construction and development activities near this community type should strive to minimize particulate-laden run-off into this community. Water traveling on the ground or seeping through the ground also carries dissolved minerals and chemicals. Road salt, for example, is becoming an increasing problem both to natural communities and as a contaminant in household wells. Fertilizers, detergents, and other chemicals that increase the nutrient levels in wetlands cause algae blooms and eventually an oxygen-depleted environment where few animals can live. Herbicides and pesticides often travel far from where they are applied and have lasting effects on the quality of the natural community. So, road construction and other development activities should strive to consider: 1. how water moves through the ground, 2. the types of dissolved substances these development activities may release, and 3. how to minimize the potential for these dissolved substances to reach this natural community.

Inventory Needs

Survey for occurrences statewide to advance documentation and classification of peatlands. A statewide review of the acidic peatlands is desirable, similar to the studies done in New Hampshire (Sperduto et al. 2000), Massachusetts (Kearsley 1999), and similar to what New York Natural Heritage did for rich fens (Olivero 2001).

Research Needs

Research is needed to fill information gaps about black spruce-tamarack bogs, especially to advance our understanding of their classification, ecological processes (e.g., fire), hydrology, floristic variation, characteristic fauna, and bog development and succession. This research will provide the basic facts necessary to assess how human alterations in the landscape affect peatlands, and supply a framework for evaluating the relative value of peat bogs (Damman and French 1987).

Rare Species

Swamp Birch (*Betula pumila*)
Subarctic Darner (*Aeshna subarctica*)
Bog Turtle (*Glyptemys muhlenbergii*)
Southern Twayblade (*Listera australis*)
Bald Eagle (*Haliaeetus leucocephalus*)
Balsam Willow (*Salix pyrifolia*)
Wiegand's Sedge (*Carex wiegandii*)
Pink Wintergreen (*Pyrola asarifolia ssp. asarifolia*)
Pod Grass (*Scheuchzeria palustris*)
Calypso (*Calypso bulbosa var. americana*)

Rusty Blackbird (*Euphagus carolinus*)
Forcipate Emerald (*Somatochlora forcipata*)

Identification Comments

A conifer forest that occurs on acidic peatlands in cool, poorly drained depressions. The characteristic trees are black spruce (Picea mariana) and tamarack (Larix laricina); in any one stand, either tree may be dominant, or codominant. Canopy cover is quite variable, ranging from open canopy woodlands with as little as 20% cover of evenly spaced canopy trees to closed canopy forests with 80 to 90% cover.

In the more open canopy stands there is usually a well-developed shrub layer characterized by several shrubs typical of bogs including sheep laurel (Kalmia angustifolia), Labrador tea (Rhododendron groenlandicum), mountain holly (Nemopathus mucronatus) and highbush blueberry (Vaccinium corymbosum). In closed canopy stands the shrub layer is usually sparse; however the species composition is similar. The dominant groundcover consists of several species of Sphagnum moss with scattered sedges and forbs. Vascular plant diversity is usually low in these forested peatlands; however the bryophyte and epiphytic lichen flora may be relatively diverse. Characteristic herbs are three-seeded sedge (Carex trisperma), cotton grass (Eriophorum spp.), pitcher plant (Sarracenia purpurea), cinnamon fern (Osmunda cinnamomea), and in shady areas where the canopy is dense, gold thread (Coptis trifolia) and creeping snowberry (Gaultheria hispidula).

A black spruce-tamarack bog may imperceptibly grade into and form a mosaic with a dwarf shrub bog. As the peat substrate thins and the wetland transitions to terrestrial communities, the black spruce-tamarack bog may grade into spruce flats.

The Best Time to See

Open canopy stands with a well-developed bog shrub layer are particularly lovely beginning in late May and continuing through June, when the characteristic shrubs are in full bloom.

Characteristics Most Useful for Identification

A conifer dominated, peatland swamp forest dominated by black spruce and/or tamarack. Typically the dominant species have >50% combined cover in the canopy, sub-canopy and tall shrub layers.

Elevation Range

Known examples of this community have been found at elevations between 318 feet and 2034 feet.

Similar Ecological Communities

Spruce-fir swamp: Black spruce-tamarack bogs are distinguished from spruce-fir swamps by having a peat substrate >20cm deep (instead of mineral soil or shallow peat) and a combined tree and tall shrub cover of tamarack and black spruce that exceeds that of balsam fir and red spruce.

Red maple-tamarack peat swamp: Red maple-tamarack peat swamps are distinguished from black spruce-tamarack bogs by having soils generally rich in calcium, in combination with the presence of red maple as a dominant or co-dominant, while black spruce is absent or present only as a minor associate.

Dwarf shrub bog: The dominance of low growing shrubs, most commonly leatherleaf, which are typically less than one meter tall, distinguishes dwarf shrub bogs from black spruce-tamarack bogs.

Characteristic Species

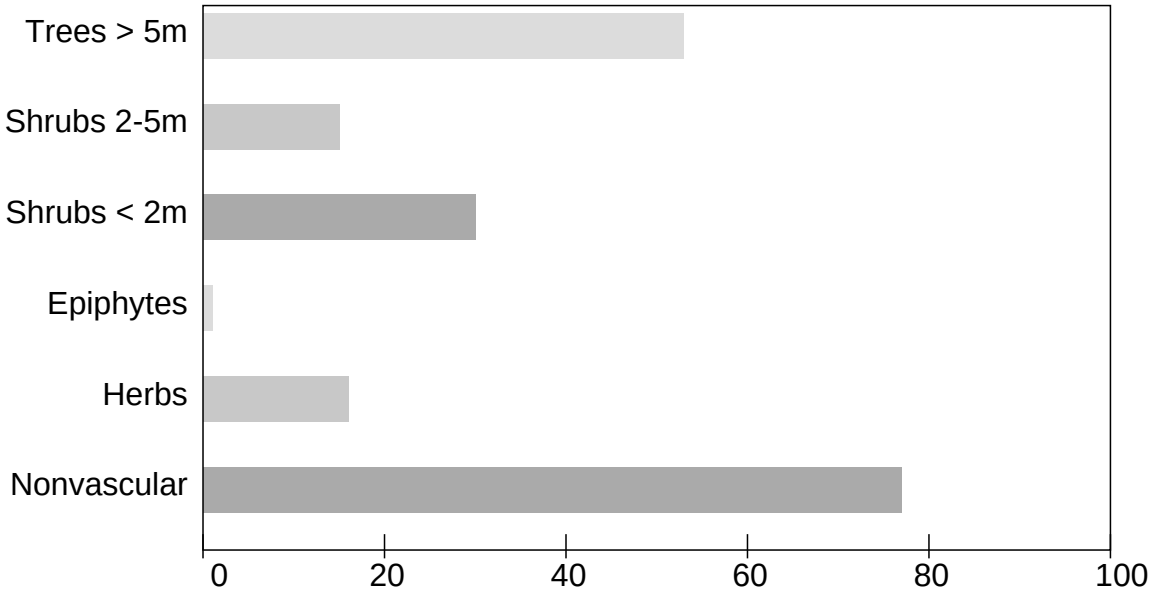
Trees > 5m
Balsam Fir (*Abies balsamea*)
Tamarack (*Larix laricina*)
Black Spruce (*Picea mariana*)
Red Spruce (*Picea rubens*)
Eastern White Pine (*Pinus strobus*)

Shrubs 2-5m
Mountain Holly (*Nemopanthus mucronatus*)
Possumhaw (*Viburnum nudum*)

Shrubs < 2m
Red Maple (*Acer rubrum*)
Leatherleaf (*Chamaedaphne calyculata*)
Sheep-laurel (*Kalmia angustifolia*)
Bog Labrador Tea (*Rhododendron groenlandicum*)
Lowbush Blueberry (*Vaccinium angustifolium*)
Velvetleaf Huckleberry (*Vaccinium myrtilloides*)

Herbs
Billings' Sedge (*Carex trisperma*)
Bunchberry (*Cornus canadensis*)
Cinnamon Fern (*Osmunda cinnamomea*)
Pitcher-plant (*Sarracenia purpurea*)

Nonvascular
Bazzania trilobata
Pleurozium schreberi
Sphagnum girgensohnii
Sphagnum magellanicum



This figure helps visualize the structure and "look" or "feel" of a typical black spruce-tamarack bog. Each bar represents the amount of "coverage" for all the species growing at that height. Because layers overlap (shrubs may grow under trees, for example), the shaded regions can add up to more than 100%.

International Vegetation Classification System Associations

This New York natural community encompasses all or part of the concept of the following International Vegetation Classification (IVC) natural community associations. These are often described at finer resolution than New York's natural communities. The IVC is developed and maintained by NatureServe.

Black Spruce Bog (CEGL002485)

Black Spruce - Tamarack / Labrador-tea Poor Swamp (CEGL005271)

Black Spruce Woodland Bog (CEGL006098)

NatureServe Ecological System Associations

This New York natural community falls into the following ecological system(s). Ecological systems are often described at a coarser resolution than New York's natural communities and tend to represent clusters of associations found in similar environments. The ecological systems project is developed and maintained by NatureServe.

Boreal/Laurentian Acid Swamp (CES201.574)

North-Central Interior and Appalachian Acid Peatland (CES202.606)

Additional Resources

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