



## General Description

Lowland conifer forest habitats are found in shallow basins, along lakes and streams, and as part of large peatland complexes. Although large peatlands are concentrated in the Agassiz Lowlands and Tamarack Lowlands subsections, the habitat is found throughout the Laurentian Mixed Forest Province. The soils are peat or mucky mineral soil that is usually saturated with water deficient in oxygen and low in nutrients. This habitat includes conifer swamp forests and wet cedar forests, some of which may be relatively nutrient rich, and forested bogs, which grow on more acid, nutrient-poor substrates.

Lowland conifer forests are dominated by black spruce, tamarack, or white cedar. Tree height and density vary from nearly closed canopies of white cedar or black spruce of moderate height on richer sites to scattered, stunted black spruce in the most nutrient-poor black spruce bogs. The understory of this habitat is characterized by a mossy ground layer with an abundance of forbs, sedges, and broad-leaved evergreen shrubs. Brown mosses predominate in the richer environments, whereas the more acid-loving species of *Sphagnum* dominate the bogs. Typical shrubs include Labrador tea (*Ledum groenlandicum*), leatherleaf (*Chamaedaphne calyculata*), and bog rosemary (*Andromeda glaucophylla*). Richer examples of this habitat (that is, nonbogs) also support species characteristic of surrounding upland forests, but these species are limited to tree bases and moss hummocks elevated above the water table.

Plant adaptations to the harsh growing conditions in lowland conifer forests include evergreen leaves (conifers and ericaceous shrubs), reliance on ectomycorrhizal fungi to facilitate nutrient uptake, capture of insects to provide additional nutrients (pitcher plants [*Sarracenia purpurea*] and sundews [*Drosera* spp.]), and secondary compounds in leaves to reduce herbivory.

The important natural disturbance prior to settlement by people of European descent in lowland conifer forests was small-scale blowdown, which occurred every 40 to 80 years on many sites. Catastrophic blowdown was much rarer, occurring every 365 to 1,000 years. Likewise, catastrophic wildfire was rare in lowland conifer forests, generally occurring every 360 to 1,000 years, except for sites in small basins surrounded by more fire-prone upland conifer forests, where return intervals were as low as 220 years.

In spite of numerous attempts at drainage in the early 20th century, lowland conifer forests still cover vast areas, primarily in large peatlands in the northern part of the Laurentian Mixed Forest Province. Drainage efforts continue today, albeit at a smaller scale. Peat mining and mineral development occur in some existing lowland conifer forests. Roads and access routes for timber and decorative tree harvests may alter the hydrology of these wetlands, potentially altering the vegetation. These forests are particularly sensitive to off-road vehicle use, and even a single incident of vehicle use can change the hydrology and hamper the recovery of the slow-growing species for many years afterward.

## Examples of Features Important for Species in Greatest Conservation Need

**Connecticut warblers** nest in tamarack and spruce bogs with varying amounts of shrubby understory. **Boreal chickadees** prefer young and mature wet spruce forests, where they require cavities for nesting. **Rusty blackbirds** use lowland conifer forests as breeding habitat, often nesting at the edge of beaver ponds. **Olive-sided flycatchers** breed in lowland conifers, generally requiring a fairly open canopy with tall prominent trees and snags. Two butterflies, the **disa alpine** and the **bog copper**, require lowland conifers with cranberries (*Vaccinium macrocarpon* or *V. oxycoccos*) and lowland black spruce forests, respectively. **Northern bog lemmings** are limited to lowland conifer forests and open peatlands in extreme northern Minnesota; they have been shown to disappear from peatlands altered by human activities.

## Management Options to Support Species in Greatest Conservation Need

Explore opportunities to implement forest management practices that:

- Use natural disturbance return intervals to guide rotation periods.
- Mimic landscape disturbance patterns with timber harvest (for example, small patches).
- Regulate and monitor harvest of nontimber forest products such as spruce tops to avoid rutting and damage to sensitive peat substrates.
- Manage stands to retain biological legacies (at site level) such as large snags and stumps.