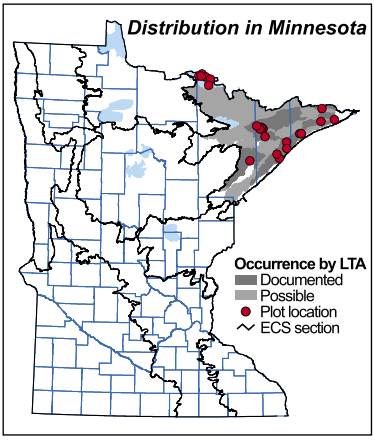
Northern Rich Spruce Swamp (Basin)

Black spruce–dominated swamps on deep peat in small basins on scoured-bedrock terrain or on till plains. Peat surface is influenced by mineral-rich groundwater or surface runoff.

Vegetation Structure & Composition

Description is based on summary of vascular plant data from 21 plots (relevés).

- **Moss layer** usually with >50% cover. Characterized by hummocks, often interspersed with water-filled hollows. Typically dominated by *Sphagnum* in association with brown mosses and feathermosses.
- **Graminoid layer** with three-fruited bog sedge (*Carex trisperma)* usually present.
- **Forb layer** with bunchberry *(Cornus canadensis)* and starflower *(Trientalis borealis)* usually present.
- **Low-shrub** cover is variable but typically contains the ericaceous species Labrador tea (*Ledum groenlandicum)* and creeping snowberry *(Gaultheria hispidula)*.
- **Tall-shrub** cover is variable but commonly dominated by speckled alder *(Alnus incana).*



- **Understory trees** include black spruce, paper birch, and red maple.
- **Canopy** is interrupted to continuous (50-100%) and dominated by black spruce, commonly with some tamarack, paper birch, and balsam fir.

Landscape Setting & Soils

FPn62 occurs most often in small, poorly drained basins (usually less than 100 acres [40ha] in size) but can also occur in larger peatlands along linear drainage features. Most common on bedrock-controlled topography and on non-calcareous till in northeastern Minnesota. Soils are saturated, well-decomposed deep (>15in [40cm]) peat overlain by poorly decomposed *Sphagnum* peat. Surface water pH is >5.5. FPn62 can occupy entire basins, often fringed by Northern Alder Swamps (FPn73) or Northern Cedar Swamps (FPn63), or it may occur along the margins of peatland basins, between Northern Poor Conifer Swamps (APn81) and adjacent uplands.

Natural History

Plants in FPn62 root in peat, which is low in available nutrients. In contrast to acid peatland communities, however, the upper peat surface in rich peatlands remains in contact with mineral-influenced groundwater or surface runoff from adjacent uplands. This flow of mineral-rich water keeps the pH of surface water relatively high and prevents development of bog conditions. Because FPn62 occurs in proximity to uplands in small or narrow basins, it is exposed to a continuous seed “rain” from upland plant communities. As a result, upland species are much more common in FPn62 than in rich black spruce swamps in large peatlands (see Northern Rich Spruce Swamp [Water Track] [FPn71]). The water table in FPn62 is subject to oscillations throughout the year but typically is high in spring and drops during the summer. Well-developed hummocks that rise above the water table create conditions favorable for growth of woody plants (in particular, black spruce). FPn62 may succeed from Rich Tamarack Swamps following accumulation of peat or changes in peatland hydrology that lead to slightly drier conditions. In interiors of larger basins, accumulation of peat and isolation of the peat surface from mineral-rich water often results in succession of FPn62 to Northern Poor Conifer Swamp (APn81). In small or narrow basins, FPn62 usually does not succeed to APn81 because the small size or width of the basin physically prevents sufficient elevation of the peat surface to isolate it from mineral-rich water.

Catastrophic disturbances appear to have been relatively uncommon in FPn62 in the past, although, surprisingly, the community did burn on occasion. An analysis of Public Land Survey (PLS) records indicates that the rotation of catastrophic fires in FPn62 was 220 years, while the rotation of moderate surface fires (which burn just a thin layer of dried peat above the water table) was about 210 years. These rotations match the rotations for Northern Mesic Mixed Forest (FDn43), which is the predominant vegetation on the uplands surrounding FPn62. This strongly suggests that large fires in northeastern Minnesota could simply burn across the whole landscape, uplands and peatlands alike. Given that uplands are far more extensive in this region than peatlands, the fire regime of peatlands was probably passively determined by their setting in the landscape more than any internal properties of the peatlands themselves. Catastrophic windthrow seems to have a minor effect on FPn62. Although the dominant tree species are adapted to layering from fallen parent trees, large areas of windthrow were not commonly reported in the community in the past, with the PLS records suggesting rotations in excess of 1,000 years.

Similar Native Plant Community Classes

- **FPn71 Northern Rich Spruce Swamp (Water Track)**

FPn71, like FPn62, occurs on peat and has a canopy dominated by black spruce; FPn71, however, is confined to large glacial lake peatlands in the northwestern part of the state.

▶ ***FPn71***—Affected by lateral groundwater flow, which results in the formation of water tracks (these are usually visible on aerial photographs). More likely to have dwarf alder *(Rhamnus alnifolia)*, lingonberry *(Vaccinium vitis-idaea),* northern marsh fern *(Thelypteris palustris),* pitcher plant *(Sarracenia purpurea),* and bog aster *(Aster borealis).*

▶ ***FPn62***—Lacks significant lateral groundwater flow. More likely to have bluebead lily *(Clintonia borealis),* woodland horsetail *(Equisetum sylvaticum),* bristly clubmoss *(Lycopodium annotinum),* and bluejoint *(Calamagrostis canadensis).*

- **APn81 Northern Poor Conifer Swamp**

APn81 is similar to FPn62 but is poorer in species (usually <23 species/400m^2) and has a sparser tree canopy.

▶ ***APn81***—Canopy cover is typically 25-50%. Surface water pH is 4.2 - 5.5. More likely to have shade-intolerant species such as bog rosemary *(Andromeda glaucophylla),* pitcher plant, round-leaved sundew *(Drosera rotundifolia),* and tussock cottongrass *(Eriophorum vaginatum).*

▶ ***FPn62***—Canopy cover is typically >50%. Surface water pH is >5.5. More likely to have rich forest indicators such as balsam fir (>6 ft [3m] tall), white cedar, starflower, twinflower *(Linnaea borealis),* bluebead lily, dwarf raspberry *(Rubus pubescens),* and woodland horsetail.

Native Plant Community Types in Class

- **FPn62a Rich Black Spruce Swamp (Basin)**

FPn62a is the only community type recognized in this class at present. Collection of additional data may provide justification for further splitting. Sites closer to Lake Superior, particularly those in the North Shore Highlands Subsection in NSU, appear wetter, shadier, and richer based on synecological coordinates (i.e., plant indicators) than those farther west in Voyageurs National Park. In addition, other classifications in Ontario and Minnesota recognize tall-shrub and herb-rich types of rich black spruce swamps, which were not apparent in analysis of relevé data used in this classification.