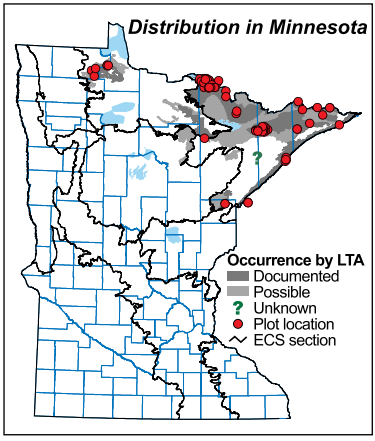
# *Northern Poor Dry-Mesic Mixed Woodland*

*Dry-mesic pine or black spruce woodlands, often mixed with paper birch and quaking aspen. Most common on relatively nutrient-poor, shallow, loamy soils over bedrock, but also present on sandy lacustrine plains. Crown and surface fires were common historically.*

## *Vegetation Structure & Composition*

Description is based on summary of vegetation data from 80 plots (relevés).

- **Ground-layer** cover ranges from sparse (5-25%) to continuous (>75%). The most important species are Canada mayflower *(Maianthemum canadense),* bunchberry *(Cornus canadensis),* twinflower *(Linnaea borealis),* and large-leaved aster *(Aster macrophyllus)*. Mosses and lichens are important on sites with shallow soils over bedrock.
- **Shrub layer** is variable in cover and typically contains both deciduous and coniferous species. The most frequent shrub species are juneberries *(Amelanchier* spp.), lowbush blueberry *(Vaccinium angustifolium),* and bush honeysuckle *(Diervilla lonicera)*. Balsam fir, paper birch, quaking aspen, and black spruce are present as saplings.
- **Subcanopy** is rarely present.
- **Canopy** is patchy to continuous (25%-100% cover) and dominated by jack pine, black spruce, red pine, or white pine, often mixed with hardwoods, especially paper birch and quaking aspen.




## *Landscape Setting & Soils*

- **Scoured bedrock terrain**—Common. Parent material is non-calcareous and ranges from very coarse bouldery till to silt loam washed into crevices in the rock. Typical soil depths are under 8in (20cm), with exposed bedrock and boulder-sized rocks usually evident. Where soils are deeper, distinctly gray upper horizons are typical and indicate a long history of conifer cover. Mosses, lichens, and organic litter are important as substrates for ground-layer plants. Soils are excessively drained. Soil-moisture regime is dry. (Border Lakes and North Shore Highlands in NSU)
- **Inter-beach deposits of Glacial Lake Agassiz**—Occasional. Parent material is very well-sorted fine sand with almost no gravel or stones. Originally the parent material was calcareous, but free carbonates have been leached or washed from the upper 60in (150cm). Distinctly gray upper horizons are typical and indicate a long history of conifer cover. Subsoil horizons that retain snowmelt or rainfall are absent, but the overall landscape is clayey beneath the sand, and soils can be wet during snowmelt. Gray and bright soil colors indicate that the local water table is near the soil surface in the spring but falls to about 60in early in the growing season. Soils are somewhat poorly drained. Soil-moisture regime is moderately moist. (MOP)
- **Lake-deposited sand**—The only occurrence of FDn32 on lake-deposited sand is on Minnesota Point, a long sand spit across the mouth of the St. Louis River. Parent material is beach sand modified by wind and waves. Currently there are no soils data available to describe soil development or soil-moisture regime. (North Shore Highlands in NSU)

## *Natural History*

In the past, fires were occasional throughout the range of FDn32. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about 170 years, and the rotation of severe surface fires about 210 years. The rotation of all fires

combined is estimated to be 100 years. Windthrow was not common, with an estimated rotation exceeding 1,000 years. Based on the historic composition and age structure of these woodlands, FDn32 had two growth stages separated by a long period of transition.

- **0-55 years**—Young woodlands recovering from fire, dominated by jack pine mixed with quaking aspen and paper birch.
- **55-95 years**—A transition period marked by a gradual decline in jack pine and quaking aspen. Red pine and paper birch are most abundant during this transition period. Spruce, balsam fir, and white pine invade and increase in abundance.
- **>95 years**—Mature woodlands characterized by mixed canopies dominated by spruce with some paper birch, balsam fir, white pine, and old jack pine. Black spruce is the spruce species most associated with this community, but white spruce is also present.

## *Similar Native Plant Community Classes*

- **FDn43 Northern Mesic Mixed Forest**

FDn43 and FDn32 are most similar when dominated by red pine or white pine. Both communities are commonly associated with bedrock outcrops and ridge complexes, but FDn43 typically occurs on moister sites such as valleys, lower slopes, and large depressions in the bedrock, while FDn32 is more likely on ridgetops and hillsides.

▶ ***FDn43***—More likely to have balsam fir and paper birch in the tree canopy and sweet-scented bedstraw *(Galium triflorum),* mountain maple *(Acer spicatum),* rose twisted-stalk *(Streptopus roseus),* and one-sided pyrola *(Pyrola secunda)* in the understory.

▶ ***FDn32***—More likely to have red pine and northern red oak in the understory and creeping snowberry *(Gaultheria hispidula),* stemless lady's slipper *(Cypripedium acaule),* and tesselated rattlesnake plantain *(Goodyera tesselata)* in the ground layer.

- **FDn12 Northern Dry-Sand Pine Woodland**

The similarity of FDn12 and FDn32 is greatest between jack pine–dominated stands of FDn12 and jack pine–dominated stands of FDn32 on sand.

▶ ***FDn12***—Canopy is dominated by jack pine or red pine. More likely to have bur oak in the understory, chokecherry in the shrub layer, and wintergreen *(Gaultheria procumbens)* in the ground layer.

▶ ***FDn32***—Canopy is diverse, with black spruce, balsam fir, white pine, paper birch, or quaking aspen often present in addition to jack pine or red pine. More likely to have black spruce in the subcanopy and groundpines *(Lycopodium dendroideum/hickeyi* group) in the ground layer.

- **FDn22 Northern Dry-Bedrock Pine-(Oak) Woodland**

FDn22 and FDn32 are most similar when dominated by jack pine, red pine, or white pine. Both communities are commonly associated with bedrock outcrops and ridge complexes, but FDn22 occurs mainly on the driest ridgetops.

▶ ***FDn22***—When jack pine is dominant in the canopy, FDn22 is more likely to have northern pin oak in the canopy and understory, bush juniper *(Juniperus communis)* and sand cherry *(Prunus pumila)* in the shrub layer, and poverty grass *(Danthonia spicata)* in the ground layer. When red pine and white pine are dominant in the canopy, FDn22 is more likely to have bush juniper, prairie willow *(Salix humilis*), and sand cherry in the shrub layer, and pussytoes *(Antennaria* spp.) and bastard toadflax *(Comandra umbellata)* in the ground layer.

▶ ***FDn32***—When jack pine is dominant in the canopy, FDn32 is more likely to have mountain ash in the understory, and twinflower, bluebead lily *(Clintonia borealis),* and dwarf raspberry *(Rubus pubescens)* in the ground layer. When red pine and white pine are dominant in the canopy, FDn32 is more likely to have white spruce, white cedar, and mountain ash in the understory; beaked hazelnut *(Corylus cornuta)* in the shrub layer; and common polypody *(Polypodium virginianum)* in the ground layer.

- **FDn33 Northern Dry-Mesic Mixed Woodland**

FDn33 and FDn32 are most similar when dominated by red pine and white pine. FDn33 generally occurs to the west and south of FDn32, on somewhat richer soils.

▶ ***FDn33***—More likely to have chokecherry in the shrub layer and wood anemone *(Anemone quinquefolia),* dwarf raspberry, and sweet-scented bedstraw in the ground

layer.

▶ ***FDn32***—Much more likely to have common polypody in the ground layer.

## *Native Plant Community Types in Class*

● **FDn32a Red Pine - White Pine Woodland (Canadian Shield)**

Pine woodlands on excessively drained upper slopes and broad ridgetops. Canopy is strongly dominated by red pine and white pine with occasional black spruce or white spruce. FDn32a appears to be limited to NSU, where it has been documented mainly in the western and central portions of the Border Lakes Subsection. Description is based on summary of vegetation data from 17 plots.

● **FDn32b Red Pine - White Pine Woodland (Minnesota Point)**

Uneven-aged pine forests on stabilized sand dunes. Canopy is dominated by red pine and white pine, often with scattered paper birch. Prickly or smooth wild rose *(Rosa acicularis/blanda* group), poison ivy *(Toxicodendron rydbergii),* pin cherry *(Prunus pensylvanica),* bush honeysuckle, and red raspberry *(Rubus idaeus)* can be abundant in the shrub layer. In Minnesota, FDn32b is limited to Minnesota Point, which separates the estuary of the St. Louis River from Lake Superior. The community is likely to be more widespread on sandy soils in northern Wisconsin and northern Michigan. Description is based on field observations and summary of vegetation data from 3 plots.

● **FDn32c Black Spruce - Jack Pine Woodland**

Conifer and conifer-hardwood woodlands, usually dominated by black spruce or jack pine. FDn32c is divided into three subtypes:

- *FDn32c1 Jack Pine - Balsam Fir Subtype*

  Occurs on shallow soils over bedrock or occasionally on sandy soils. Canopy is dominated by jack pine, sometimes with lesser amounts of balsam fir and white spruce. FDn32c1 includes very open woodlands or shrublands on bedrock with short, scrubby tree canopies dominated by quaking aspen, paper birch, and balsam fir. FDn32c1 has been documented in NSU and adjacent parts of MOP. Description is based on summary of vegetation data from 15 plots.

- *FDn32c2 Black Spruce - Feathermoss Subtype*

  Occurs on shallow soils over bedrock. Canopy is usually dominated by black spruce, often with lesser amounts of balsam fir, jack pine, quaking aspen, or paper birch. Ground layer is dominated by feathermosses, typically with 50% to nearly 100% cover. Documented in the northern part of NSU and in the northwestern part of MOP. Description is based on summary of vegetation data from 19 plots.

- *FDn32c3 Jack Pine - Black Spruce - Aspen Subtype*

  Occurs on shallow soils over bedrock. Canopy is dominated by jack pine, black spruce, and quaking aspen. Quaking aspen, paper birch, black spruce, and jack pine are all commonly present in the understory. Flat-topped aster *(Aster umbellatus)* and pearly everlasting *(Anaphalis margaritacea)*, when present, help to differentiate FDn32c3 from the other types and subtypes in FDn32. Documented in the Border Lakes Subsection of NSU. Description is based on summary of vegetation data from 16 plots.

● **FDn32d Jack Pine - Black Spruce Woodland (Sand)**

Conifer or conifer-hardwood woodlands on sandy soils on beach ridge and outwash deposits. Canopy is dominated by black spruce or jack pine, sometimes mixed with quaking aspen. Trailing arbutus *(Epigaea repens)*, when present in the ground layer, is useful for differentiating FDn32d from the other types in FDn32. Documented mainly in the northwestern part of MOP and occasionally in NSU. Description is based on summary of vegetation data from 10 plots.

● **FDn32e Spruce - Fir Woodland (North Shore)**

Conifer woodlands on sites with thin soils over bedrock along Lake Superior. Canopy is dominated by balsam fir, white spruce, and black spruce. Ground layer is characterized by a rich assemblage of terrestrial mosses and lichens. FDn32e occurs at scattered sites along the shore of Lake Superior and on nearby islands. Description is based on field observations.

photo by C.K. Converse MNDNR

Susie Islands, Lake Superior, Cook County, MN

# *FDn32 Northern Poor Dry-Mesic Mixed Woodland* – Species Frequency & Cover

| | freq% | cover |
|---|---|---|
| ***Forbs, Ferns & Fern Allies*** | | |
| Canada mayflower (*Maianthemum canadense*) | 96 | ●● |
| Bunchberry (*Cornus canadensis*) | 89 | ●●● |
| Wild sarsaparilla (*Aralia nudicaulis*) | 89 | ●● |
| Twinflower (*Linnaea borealis*) | 81 | ● |
| Large-leaved aster (*Aster macrophyllus*) | 75 | ●●● |
| Bluebead lily (*Clintonia borealis*) | 70 | ● |
| Starflower (*Trientalis borealis*) | 63 | ● |
| Groundpine (*Lycopodium dendroideum* or *L. hickeyi*) | 56 | ● |
| Bracken (*Pteridium aquilinum*) | 49 | ●●● |
| Running clubmoss (*Lycopodium clavatum*) | 45 | ● |
| Dwarf raspberry (*Rubus pubescens*) | 43 | ● |
| Cow wheat (*Melampyrum lineare*) | 41 | ● |
| Common strawberry (*Fragaria virginiana*) | 39 | ●● |
| Wood anemone (*Anemone quinquefolia*) | 34 | ● |
| Spreading dogbane (*Apocynum androsaemifolium*) | 31 | ● |
| Sweet-scented bedstraw (*Galium triflorum*) | 28 | ● |
| Common polypody (*Polypodium virginianum*) | 26 | ● |
| Bristly clubmoss (*Lycopodium annotinum*) | 24 | ● |
| Spinulose shield fern or Glandular wood fern* | 24 | ● |
| Rose twistedstalk (*Streptopus roseus*) | 21 | ● |
| Goldthread (*Coptis trifolia*) | 21 | ● |
| Fireweed (*Epilobium angustifolium*) | 21 | ● |
| Northern or Wirey groundcedar (*Diphasiastrum complanatum* or *D. digitatum*) | 15 | ● |
| Woodland horsetail (*Equisetum sylvaticum*) | 15 | ● |
| Lindley's aster (*Aster ciliolatus*) | 15 | ● |
| Green-flowered pyrola (*Pyrola chlorantha*) | 15 | ● |
| Lady fern (*Athyrium filix-femina*) | 14 | ● |
| Wood strawberry (*Fragaria vesca*) | 13 | ●● |
| ***Grasses & Sedges*** | | |
| Mountain rice grass (*Oryzopsis asperifolia*) | 53 | ●● |
| Poverty grass (*Danthonia spicata*) | 23 | ● |
| False melic grass (*Schizachne purpurascens*) | 21 | ● |
| Bluejoint (*Calamagrostis canadensis*) | 16 | ●● |
| Sharp-pointed rice grass (*Oryzopsis pungens*) | 16 | ● |

| | freq% | cover |
|---|---|---|
| ***Low Shrubs*** | | |
| Pennsylvania sedge (*Carex pensylvanica*) | 10 | ●●● |
| Lowbush blueberry (*Vaccinium angustifolium*) | 88 | ●●● |
| Velvet-leaved blueberry (*Vaccinium myrtilloides*) | 61 | ●● |
| Red raspberry (*Rubus idaeus*) | 59 | ●● |
| Wintergreen (*Gaultheria procumbens*) | 35 | ● |
| Pipsissewa (*Chimaphila umbellata*) | 29 | ● |
| Labrador tea (*Ledum groenlandicum*) | 23 | ●● |
| Sweet fern (*Comptonia peregrina*) | 23 | ●● |
| Creeping snowberry (*Gaultheria hispidula*) | 16 | ● |
| ***Shrubs*** | | |
| Juneberries (*Amelanchier* spp.) | 88 | ●● |
| Bush honeysuckle (*Diervilla lonicera*) | 86 | ●● |
| Beaked hazelnut (*Corylus cornuta*) | 69 | ●●● |
| Prickly or Smooth wild rose (*Rosa acicularis* or *R. blanda*) | 61 | ●● |
| Fly honeysuckle (*Lonicera canadensis*) | 40 | ● |
| Green alder (*Alnus viridis*) | 35 | ●●● |
| Bebb's willow (*Salix bebbiana*) | 23 | ●● |
| Chokecherry (*Prunus virginiana*) | 20 | ● |
| Mountain maple (*Acer spicatum*) | 18 | ●● |
| Prairie willow (*Salix humilis*) | 11 | ● |

| ***Trees*** | Canopy | | Subcanopy | | Shrub Layer | |
|---|---|---|---|---|---|---|
| | freq% | cover | freq% | cover | freq% | cover |
| Jack pine | 55 | ●●●● | 26 | ●●● | 11 | ●● |
| Black spruce | 53 | ●●● | 61 | ●●● | 48 | ●● |
| Quaking aspen | 35 | ●●● | 41 | ●●● | 51 | ●● |
| Paper birch | 34 | ●● | 61 | ●● | 53 | ●● |
| Red pine | 28 | ●●●● | 15 | ●● | 11 | ● |
| White pine | 26 | ●●● | 30 | ● | 41 | ● |
| Balsam fir | 26 | ●● | 58 | ●● | 69 | ●● |
| White spruce | 10 | ● | 26 | ● | 29 | ● |
| Red maple | 6 | ● | 16 | ●● | 43 | ● |
| Mountain ashes | – | – | 13 | ● | 56 | ● |
| White cedar | – | – | 8 | ●● | 10 | ●● |

*Spinulose shield fern or Glandular wood fern (*Dryopteris carthusiana* or *D. intermedia*)