



Northern Mesic Mixed Forest

Mesic pine, aspen, white cedar, or birch forests on loamy soils over bedrock in scoured bedrock uplands and on loamy, rocky, or sandy soils on glacial moraines, till plains, and outwash plains. Crown and severe surface fires were common historically.

Vegetation Structure & Composition

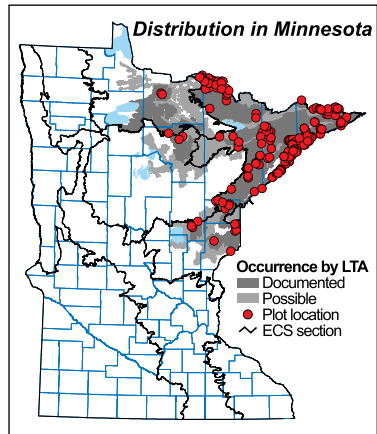
Description is based on summary of vegetation data from 203 plots (relevés).

- **Ground layer** ranges from patchy to continuous (25-100% cover). Common species include wild sarsaparilla (*Aralia nudicaulis*), large-leaved aster (*Aster macrophyllus*), bluebead lily (*Clintonia borealis*), bunchberry (*Cornus canadensis*), and Canada mayflower (*Maianthemum canadense*).

- **Shrub layer** is variable in cover and dominated by deciduous species. Beaked hazelnut (*Corylus cornuta*), fly honeysuckle (*Lonicera canadensis*), and mountain maple (*Acer spicatum*) are the most frequent shrubs.

- **Subcanopy** is usually poorly defined and sparse, although nearly three-quarters of all sites have at least some balsam fir.

- **Canopy** composition is often mixed but ranges from solely deciduous to solely coniferous, with variable cover. Important canopy species include paper birch, quaking aspen, white pine, balsam fir, white spruce, red pine, and white cedar.



Landscape Setting & Soils

- **Scoured bedrock terrain**—Common. Present on deep glacial till deposits in landscapes characterized by shallow soils over bedrock. Parent material is loamy, non-calcareous till. Exposed bedrock and boulder-sized rocks are rarely evident. Soils show some deposition of organic material and iron compounds in lower horizons due to a long history of conifer cover. The till is stony at depth and densely packed, making it capable of perching snowmelt in flat or concave spots. Soils are well drained and droughty by late summer. Soil-moisture regime is moderately fresh. (Border Lakes and North Shore Highlands in NSU)

- **Stagnation moraines and till plains**—Common. Present on flat, local deposits of sand and gravel in otherwise hummocky or rolling landscapes. Parent material is non-calcareous, loamy or fine-sandy drift that is often gravelly and occasionally stony. Soils show some deposition of organic material and iron compounds in lower horizons due to a long history of conifer forest cover. The drift is stony at depth and densely packed, making it capable of perching snowmelt in locally flat or concave spots. Soils are well drained and are droughty by late summer. Soil-moisture regime is moderately fresh. (North Shore Highlands, Toimi Uplands, and Laurentian Uplands in NSU; WSU)

- **Outwash plains**—Occasional. Parent material is non-calcareous loamy sand often with gravelly lenses and generally lacking large stones. Distinctly gray surface soil horizons and deposits of iron compounds deeper in the soil indicate a long history of conifer cover. Subsoil horizons that can cause retention of snowmelt or rainfall are absent. Soils are somewhat excessively drained and are droughty by late summer. Soil-moisture regime is moderately dry to moderately fresh. (WSU, North Shore Highlands in NSU)

Natural History

In the past, fires were occasional throughout the range of FDn43. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about 220 years, and the rotation of severe surface fires about 260 years. The rotation of all fires



combined is estimated to be 115 years. Windthrow was not common, with an estimated rotation exceeding 1,000 years. Based on the historic composition and age structure of these forests, FDn43 had three growth stages separated by two periods of transition.

- **0-35 years**—Young forests recovering from fire, dominated by quaking aspen with less jack pine and paper birch.
- **35-55 years**—A transition period where aspen and jack pine decline and are replaced by paper birch, white pine, red pine, and balsam fir. White spruce seedlings become established during this period.
- **55-95 years**—Mature forests with a mixed canopy of paper birch and white pine with less balsam fir and red pine and some old aspen. White spruce saplings are present in the understory.
- **95-115 years**—A transition period marked by a significant increase in white spruce and the decline of paper birch, red pine, and quaking aspen.
- **>115 years**—Old forests dominated by white pine and white spruce with modest amounts of balsam fir and paper birch.

Similar Native Plant Community Classes

● FDn32 Northern Poor Dry-Mesic Mixed Woodland

FDn32 and FDn43 are most similar when dominated by red pine or white pine. In northeastern Minnesota, the two communities can be present on the same bedrock ridge complexes, but FDn32 occurs on ridgetops or hillsides while FDn43 occurs on moister, more nutrient-rich sites in concave drainageways.

▶ **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 tessellated rattlesnake plantain (*Goodyera tessellata*) in the ground layer.

▶ **FDn43**—More likely to have mountain maple in the shrub layer and sweet-scented bedstraw (*Galium triflorum*), rose twistedstalk (*Streptopus roseus*), and one-sided pyrola (*Pyrola secunda*) in the ground layer. Balsam fir, and to some extent paper birch, are also more common and abundant in FDn43, especially in the canopy.

● FDn33 Northern Dry-Mesic Mixed Woodland

FDn33 and FDn43 are most similar when dominated by red pine and white pine or by quaking aspen and paper birch. The ranges of the two classes appear to overlap only in the western and southern parts of NSU.

▶ **FDn33**—When red pine and white pine are dominant in the canopy, FDn33 is more likely to have northern red oak in the understory and wintergreen (*Gaultheria procumbens*), round-leaved pyrola (*Pyrola rotundifolia*), hairy Solomon's seal (*Polygonatum pubescens*), pale bellwort (*Uvularia sessilifolia*), and northern bedstraw (*Galium boreale*) in the ground layer.

▶ **FDn43**—When red pine and white pine are dominant in the canopy, FDn43 is more likely to have mountain ash, white cedar, and black spruce in the canopy or understory. When quaking aspen and paper birch are dominant in the canopy, FDn43 can be distinguished from FDn33 by the presence of balsam fir in the canopy, white spruce and mountain ash in the understory, and twinflower (*Linnaea borealis*), running clubmoss (*Lycopodium clavatum*), naked miterwort (*Mitella nuda*), and common oak fern (*Gymnocarpium dryopteris*) in the ground layer.

Native Plant Community Types in Class

● FDn43a White Pine - Red Pine Forest

Canopy is dominated by white pine and red pine with occasional paper birch, balsam fir, white spruce, quaking aspen, or white cedar. Balsam fir is also common in the sub-canopy and shrub layer. FDn43a is best distinguished from other community types in the class by the presence of white pine and red pine in the canopy, and pipsissewa (*Chimaphila umbellata*) in the ground layer. FDn43a is common in NSU; it has also been documented but is uncommon in MOP, MDL, and WSU. Description is based on summary of vegetation data from 67 plots.

**● FDn43b Aspen-Birch Forest**

Canopy is dominated by quaking aspen, paper birch, balsam fir, or white spruce. FDn43b is divided into two subtypes:

○ FDn43b1 Balsam Fir Subtype

Canopy is dominated by quaking aspen or paper birch, less frequently by balsam fir or white spruce. Balsam fir, quaking aspen, and paper birch are common in the understory. Blueberries (*Vaccinium myrtilloides* and *V. angustifolium*), ground pines, ground cedars, or clubmosses (*Lycopodium* spp.), red maple (especially in the canopy), and balsam fir are much more important in FDn43b1 than FDn43b2 and help to distinguish the two subtypes. FDn43b1 can have an understory that is floristically similar to White Pine - Red Pine Forests (see FDn43a above); however, FDn43b1 is less likely to have abundant red pine or white pine in the canopy and also generally lacks pipsissewa in the ground layer. Documented throughout NSU and the northern part of MDL; occasional in the eastern part of MOP and MDL. Description is based on summary of vegetation data from 69 plots.

○ FDn43b2 Hardwood Subtype

Relatively rich aspen- and birch-dominated forests, usually lacking conifers in the canopy although white spruce is sometimes important. Quaking aspen and paper birch are common in the understory; balsam fir and other conifer species are present at most as scattered seedlings or saplings. Species that help distinguish FDn43b2 from FDn43b1 include lady fern (*Athyrium filix-femina*), common oak fern, bluejoint (*Calamagrostis canadensis*), and black ash. Documented in NSU; includes most quaking aspen and paper birch sites along the North Shore, especially those lacking conifers in the canopy. Description is based on summary of vegetation data from 31 plots.

● FDn43c Upland White Cedar Forest

Canopy is usually dominated by white cedar. Includes sites dominated by quaking aspen, paper birch, and balsam fir that have (or had) white cedar as a component. White cedar and balsam fir are common in the understory. Starflower (*Trientalis borealis*), bluebead lily, and wild sarsaparilla are the most common species in the ground layer. Species useful in distinguishing FDn43c from other types in the class include Canada yew (*Taxus canadensis*), shining firmoss (*Huperzia lucidula*), and yellow birch seedlings or saplings. Documented across NSU but concentrated in the North Shore Highlands Subsection. Description is based on summary of vegetation data from 36 plots.



Lake County, MN



FDn43 Northern Mesic Mixed Forest – Species Frequency & Cover

	freq%	cover		freq%	cover		freq%	cover
Forbs, Ferns & Fern Allies								
Wild Sarsaparilla (<i>Aralia nudicaulis</i>)	91	••	Bluejoint (<i>Calamagrostis canadensis</i>)	19	•••			
Large-leaved aster (<i>Aster macrophyllus</i>)	89	••••	Long-stalked sedge (<i>Carex pedunculata</i>)	18	••			
Bluehead lily (<i>Clintonia borealis</i>)	88	••	False melic grass (<i>Schizachne purpurascens</i>)	17	•			
Bunchberry (<i>Cornus canadensis</i>)	87	••	Drooping wood sedge (<i>Carex arcuata</i>)	16	•			
Canada mayflower (<i>Maianthemum canadense</i>)	87	•						
Starflower (<i>Theridialis borealis</i>)	80	••	Low Shrubs					
Sweet-scented bedstraw (<i>Galium triflorum</i>)	71	•	Red raspberry (<i>Rubus idaeus</i>)	38	••			
Rose twistedstalk (<i>Streptopus roseus</i>)	69	•	Velder-leaved blueberry (<i>Vaccinium myrtilloides</i>)	36	••			
Dwarf raspberry (<i>Rubus pubescens</i>)	67	••	Lowbush blueberry (<i>Vaccinium angustifolium</i>)	36	••			
Twinklifer (<i>Ulmnaea borealis</i>)	60	••	Thimbleberry (<i>Rubus parviflorus</i>)	30	••			
Groundpine (<i>Lycopodium dendroideum</i> or <i>L. hickeyi</i>)	54	••						
Bracken (<i>Pteridium aquilinum</i>)	47	••••	Shrubs					
Common strawberry (<i>Fragaria virginiana</i>)	46	••	Beaked hazelnut (<i>Corylus cornuta</i>)	93	•••			
Wood anemone (<i>Anemone quinquefolia</i>)	44	••	Fly honeysuckle (<i>Lonicera canadensis</i>)	83	••			
Spinnulose shield fern or Glandular wood fern*	39	••	Mountain maple (<i>Acer spicatum</i>)	77	•••			
Red baneberry (<i>Actaea rubra</i>)	34	••	Bush honeysuckle (<i>DierVilla lonicera</i>)	67	••			
One-sided pyrola (<i>Pyrola secunda</i>)	30	••	Juneberry (<i>Amelanchier</i> spp.)	64	••			
Running clubmoss (<i>Lycopodium clavatum</i>)	29	••	Prickly or Smooth wild rose (<i>Rosa acicularis</i> or <i>R. blanda</i>)	33	••			
Naked milkwort (<i>Mitella nuda</i>)	26	••	Round-leaved dogwood (<i>Cornus rugosa</i>)	25	••			
Common oak fern (<i>Gymnocephalum dryopteris</i>)	26	••	Chokecherry (<i>Prunus virginiana</i>)	24	••			
Lady fern (<i>Athyrium filix-femina</i>)	22	••	Hairy honeysuckle (<i>Lonicera hirsuta</i>)	22	••			
Bristly clubmoss (<i>Lycopodium annotinum</i>)	21	••	Downy arrowwood (<i>Viburnum rafinesquianum</i>)	15	••			
Goldthread (<i>Coptis trifolia</i>)	20	••	Prairie willow (<i>Salix humilis</i>)	7	••			
Spreading dogbane (<i>Apocynum androsaemifolium</i>)	17	••						
Palmette sweet coltsfoot (<i>Petasites frigidus</i>)	17	••	Trees					
Pale veitchling (<i>Lathyrus ochroleucus</i>)	17	••						
Common polypody (<i>Polypodium virginianum</i>)	15	••	Paper birch	69	•••	62	••	37
Kidney-leaved violet (<i>Viola renifolia</i>)	15	••	Quaking aspen	46	•••	37	•••	50
Shining firmoss (<i>Huperzia lucidula</i>)	14	••	Balsam fir	46	•••	74	•••	90
<i>Veiny pee</i> (<i>Lathyrus venosus</i>)	14	••	White pine	39	••••	18	••	38
Alpine anchorer's nightshade (<i>Circoea alpina</i>)	12	••	White spruce	36	••	40	••	46
Cow wheat (<i>Melampyrum lineare</i>)	12	••	Red pine	22	••••	2	•	2
			White cedar	20	••••	24	•••	18
			Red maple	16	•••	25	•••	40
			Black spruce	11	••	14	••	13
			Jack pine	5	••	2	••	1
			Mountain ashes	1	•	10	•	58

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