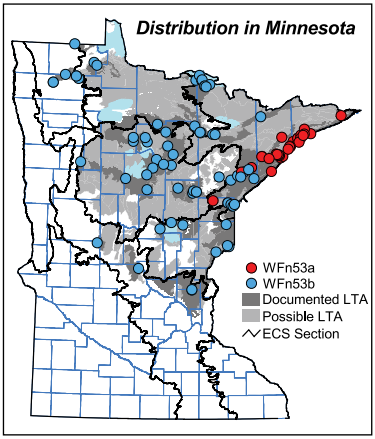
Northern Wet Cedar Forest

Wet conifer or conifer-hardwood forests on muck or peat soils. Typically present in settings where saturated soils are present through most of the growing season such as depressions; low, level terrain along lakes, rivers, or wetlands; and gently sloping upland drains.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 102 plots (relevés).



- **Ground layer** is patchy to continuous (25–100% cover), with upland forest herbs on hummocks and decaying logs and around tree bases, and wetland forest species in pools and mucky hollows. Common species include dwarf raspberry *(Rubus pubescens)*, starflower *(Trientalis borealis)*, naked miterwort *(Mitella nuda)*, bunchberry *(Cornus canadensis)*, and common oak fern *(Gymnocarpium dryopteris).* Brown mosses cover hummocks and logs and are also present in hollows.
- **Shrub layer** is sparse to patchy (5–50% cover). Mountain maple *(Acer spicatum)* and speckled alder *(Alnus incana)* occasionally are abundant. Fly honeysuckle *(Lonicera canadensis)* and seedlings of balsam fir, black ash, white cedar, and red maple are commonly present.
- **Subcanopy** is patchy (25–50% cover), with saplings of white cedar, balsam fir, and black ash.
- **Canopy** is patchy to interrupted (25–75% cover), dominated by white cedar, sometimes with abundant black ash. Balsam fir, paper birch, white spruce, yellow birch, and black spruce are occasionally present.

Landscape Setting & Soils

WFn53 occurs in many types of landforms, most often in small closed depressions and along the borders of large wetland basins with deep, actively growing *Sphagnum* peatlands at their centers. Less often, WFn53 occurs in gently sloping drains or at the toes of slopes in areas of groundwater discharge. The underlying parent material can be of almost any texture. Soils include both mucky mineral soils and in some places a thin layer of muck over as much as 10–40in (25–100cm) of sapric peat. The mineral soil is gray with bright mottles, indicating prolonged soil saturation with episodes of drying. In addition to muck and peat, saturated logs and mossy raised tree bases provide substrates for vascular plants. Soils are very poorly drained. Soil moisture-regime is wet to very wet. (MOP, NSU, MDL, WSU, SSU, LAP, Anoka Sand Plain and Hardwood Hills in MIM)

Natural History

In the past, catastrophic disturbances were infrequent in WFn53. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about 800 years, and the rotation of catastrophic windthrow was about 365 years. Events that result in partial loss of trees, such as patchy windthrow or light surface fires, were also rare, with a rotation of about 340 years. Based on the historic composition and age structure of these forests, WFn53 had three growth stages separated by two periods of transition.

- **0–55 years**—Young forests recovering from windthrow, strongly dominated by balsam fir mixed with some white cedar, paper birch, and black ash.
- **55–75 years**—A transition period marked by a dramatic decline in balsam fir, mirrored by an increase in white cedar. White spruce also increases significantly, while black ash

and paper birch persist as minor components.

- **75–105 years**—Mature forests dominated by white cedar mixed with some paper birch, white spruce, and old balsam fir.
- **105–155 years**—A transition period marked by substantial increases in balsam fir, tamarack, and white spruce at the expense of white cedar. Black ash and paper birch persist or decrease slightly.
- **> 155 years**—Old forests characterized by a mixture of white cedar, white spruce, and balsam fir with some tamarack. (Modern old forests rarely have much white spruce or tamarack. The apparent discrepancy between historic and modern forests may be due to difficulty in separating PLS survey records relevant for WFn53 from those that are most relevant for upland white cedar communities, where white spruce is often codominant in the canopy.)

Similar Native Plant Community Classes

- **FPn63 Northern Cedar Swamp**

FPn63 is usually dominated by white cedar and can appear similar to WFn53. FPn63, however, typically occurs on relatively deep peat rather than on mucky mineral soil or shallow peat over mineral soil. FPn63 also has a continuous or nearly continuous ground layer of *Sphagnum* or feathermoss, while *Sphagnum* generally is not abundant in WFn53, and mosses, when present, are restricted to hummocks and logs.

WFn53 Indicator Species	(freq%) ***WFn53***	FPn63
Jack-in-the-pulpit *(Arisaema triphyllum)*	**25**	-
Nodding trillium *(Trillium cernuum)*	**40**	4
Long beech fern *(Phegopteris connectilis)*	**43**	5
Black ash (C)	**42**	5
White spruce (C,U)	**35**	5
Long-stalked sedge *(Carex pedunculata)*	**48**	9
Alpine enchanter's nightshade *(Circaea alpina)*	**72**	15
Rose twistedstalk *(Streptopus roseus)*	**46**	14

FPn63 Indicator Species	(freq%) WFn53	***FPn63***
Poor sedge *(Carex paupercula)*	1	**47**
Small cranberry *(Vaccinium oxycoccos)*	3	**49**
Pussy willow *(Salix discolor)*	3	**23**
Labrador bedstraw *(Galium labradoricum)*	4	**25**
Heart-leaved twayblade *(Listera cordata)*	5	**26**
Tamarack (U)	5	**22**
Pink shinleaf *(Pyrola asarifolia)*	7	**31**
Mountain fly honeysuckle *(Lonicera villosa)*	8	**28**

- **WFn64 Northern Very Wet Ash Swamp**

WFn64 is similar to WFn53 mainly when WFn64 has significant cover of white cedar in the canopy (WFn64a). In WFn64, black ash tends to have greater cover in the canopy than white cedar, while in WFn53 white cedar has much greater cover in the canopy than black ash.

WFn53 Indicator Species	(freq%) ***WFn53***	WFn64
Creeping snowberry *(Gaultheria hispidula)*	**36**	-
Labrador tea *(Ledum groenlandicum)*	**33**	-
Twinflower *(Linnaea borealis)*	**58**	4
Velvet-leaved blueberry *(Vaccinium myrtilloides)*	**23**	2
Shining firmoss *(Huperzia lucidula)*	**34**	4
Lowbush blueberry *(Vaccinium angustifolium)*	**23**	4
Kidney-leaved violet *(Viola renifolia)*	**39**	11
Palmate sweet coltsfoot *(Petasites frigidus)*	**43**	13

WFn64 Indicator Species	(freq%) WFn53	***WFn64***
Giant goldenrod *(Solidago gigantea)*	1	**26**
Fowl bluegrass *(Poa palustris)*	4	**28**
Common mint *(Mentha arvensis)*	3	**19**
Spotted water hemlock *(Cicuta maculata)*	6	**23**
Sensitive fern *(Onoclea sensibilis)*	18	**68**
Awl-fruited sedge *(Carex stipata)*	13	**49**
Mad dog skullcap *(Scutellaria lateriflora)*	20	**64**
Winterberry *(Ilex verticillata)*	9	**28**

- **MHn45 Northern Mesic Hardwood (Cedar) Forest**

MHn45 and WFn53 are most similar when MHn45 is dominated by white cedar (MHn45b) and when WFn53 is present in gently sloping upland drains or seepage areas in the North Shore Highlands Subsection in the NSU (WFn53a). MHn45 usually occurs on moderately well-drained loamy soil and often has abundant yellow birch and heart-leaved birch in the canopy with white cedar. WFn53 tends to occur on mucky mineral soil or peat and is more likely to be strongly dominated by white cedar with other canopy species only of minor significance.

WFn53 Indicator Species	(freq%) ***WFn53***	MHn45
Three-fruited bog sedge *(Carex trisperma)*	**64**	-
Black spruce (C,U)	**58**	-
Bristle-stalked sedge *(Carex leptalea)*	**58**	-
Woodland horsetail *(Equisetum sylvaticum)*	**73**	6
Twinflower *(Linnaea borealis)*	**73**	6
Palmate sweet coltsfoot *(Petasites frigidus)*	**64**	6
Creeping snowberry *(Gaultheria hispidula)*	**58**	6
Goldthread *(Coptis trifolia)*	**85**	13

MHn45 Indicator Species	(freq%) WFn53	***MHn45***
Thimbleberry *(Rubus parviflorus)*	-	**75**
Sugar maple (C)	-	**50**
Rugulose or Yellow violet*	-	**25**
Groundpine**	6	**56**
Mountain rice grass *(Oryzopsis asperifolia)*	6	**56**
White pine (U)	3	**25**
Wild ginger *(Asarum canadense)*	3	**25**
Red baneberry *(Actaea rubra)*	12	**63**

*Rugulose or Yellow violet *(Viola canadensis* or *V. pubescens)* **Groundpine *(Lycopodium dendroideum* or *L. hickeyi)*

Native Plant Community Types in Class

- **WFn53a Lowland White Cedar Forest (North Shore)**

Canopy is typically dominated by white cedar, although at some sites black ash is more abundant in the canopy than white cedar. Other occasional canopy species include balsam fir, paper birch, heart-leaved birch, black spruce, white spruce, and yellow birch. Mountain maple and speckled alder are often abundant in the shrub layer. When present, long beech fern *(Phegopteris connectilis)*, shining firmoss *(Huperzia lucidula)*, panicled bluebells *(Mertensia paniculata)*, Canada yew *(Taxus canadensis)*, clasping leaved twistedstalk *(Streptopus amplexifolius)*, mountain ash, black spruce, and sugar maple in the understory help to differentiate WFn53a from WFn53b (see below). WFn53a is largely restricted to the North Shore Highlands Subsection in the NSU, where it is the wettest cedar-dominated forest community on mineral soils. Description is based on summary of vegetation data from 33 plots.

- **WFn53b Lowland White Cedar Forest (Northern)**

Canopy is dominated by white cedar, sometimes with abundant black ash. Balsam fir and paper birch are occasionally present in the canopy. White cedar, balsam fir, and black ash are sometimes abundant in the subcanopy, but most often the community is relatively open below the canopy. WFn53b generally occurs to the west of WFn53a, but where the ranges of the two types overlap in the NSU, WFn53b can often be distinguished by the absence of the indicator species listed above for WFn53a and the presence of rattlesnake fern *(Botrychium virginianum)*, common strawberry *(Fragaria virginiana)*, touch-me-nots *(Impatiens* spp.), or red baneberry *(Actaea rubra)*. Other species that help to differentiate WFn53b from WFn53a, when present, include American elm in the understory, lowbush blueberry *(Vaccinium angustifolium)*, northern bugleweed *(Lycopus uniflorus)*, and northern marsh fern *(Thelypteris palustris)*. WFn53b is widespread, occurring in the MDL, WSU, MOP, the central and western portions of the NSU, and very locally in the LAP and in the Hardwood Hills and Anoka Sand Plain Subsections in the MIM. Description is based on summary of vegetation data from 69 plots.

photo by Tim Whitfeld MN DNR

Clearwater County, MN

WFn53 Northern Wet Cedar Forest — Species Frequency & Cover

	freq%	cover
Forbs, Ferns & Fern Allies		
Dwarf raspberry *(Rubus pubescens)*	95	●●●
Starflower *(Trientalis borealis)*	93	●
Bunchberry *(Cornus canadensis)*	91	●
Naked miterwort *(Mitella nuda)*	91	●●
Common oak fern *(Gymnocarpium dryopteris)*	84	●
Wild sarsaparilla *(Aralia nudicaulis)*	82	●●
Sweet-scented bedstraw *(Galium triflorum)*	82	●
Goldthread *(Coptis trifolia)*	82	●●
Bluebead lily *(Clintonia borealis)*	80	●
Canada mayflower *(Maianthemum canadense)*	78	●
Lady fern *(Athyrium filix-femina)*	77	●●
Alpine enchanter's nightshade *(Circaea alpina)*	72	●
Spinulose shield fern or Glandular wood fern*	61	●
Twinflower *(Linnaea borealis)*	58	●
Common strawberry *(Fragaria virginiana)*	53	●
Large-leaved aster *(Aster macrophyllus)*	52	●
Common marsh marigold *(Caltha palustris)*	49	●
Woodland horsetail *(Equisetum sylvaticum)*	48	●●
Crested fern *(Dryopteris cristata)*	48	●
Rose twistedstalk *(Streptopus roseus)*	46	●
Touch-me-not *(Impatiens* spp.)	45	●
Rattlesnake fern *(Botrychium virginianum)*	44	●
Palmate sweet coltsfoot *(Petasites frigidus)*	43	●
Long beech fern *(Phegopteris connectilis)*	43	●
Nodding trillium *(Trillium cernuum)*	40	●
Red-stemmed aster *(Aster puniceus)*	39	●
Kidney-leaved violet *(Viola renifolia)*	39	●
Red baneberry *(Actaea rubra)*	36	●
Three-leaved false Solomon's seal *(Smilacina trifolia)*	35	●
Shining firmoss *(Huperzia lucidula)*	34	●
Wood anemone *(Anemone quinquefolia)*	32	●
Interrupted fern *(Osmunda claytoniana)*	28	●
Northern bugleweed *(Lycopus uniflorus)*	28	●
Cinnamon fern *(Osmunda cinnamomea)*	23	●
One-flowered pyrola *(Moneses uniflora)*	23	●

	freq%	cover
Grasses & Sedges		
Bristle-stalked sedge *(Carex leptalea)*	54	●●
Bladder sedge *(Carex intumescens)*	52	●
Long-stalked sedge *(Carex pedunculata)*	48	●●
Soft-leaved sedge *(Carex disperma)*	46	●
Three-fruited bog sedge *(Carex trisperma)*	45	●●
Fowl manna grass *(Glyceria striata)*	44	●
Drooping woodreed *(Cinna latifolia)*	33	●
Drooping wood sedge *(Carex arctata)*	30	●
Graceful sedge *(Carex gracillima)*	29	●
Low Shrubs		
Creeping snowberry *(Gaultheria hispidula)*	36	●
Labrador tea *(Ledum groenlandicum)*	33	●
Red raspberry *(Rubus idaeus)*	31	●
Tall Shrubs		
Fly honeysuckle *(Lonicera canadensis)*	71	●
Speckled alder *(Alnus incana)*	67	●●●
Beaked hazelnut *(Corylus cornuta)*	63	●
Mountain maple *(Acer spicatum)*	62	●●●
Swamp red currant *(Ribes triste)*	51	●
Red-osier dogwood *(Cornus sericea)*	47	●
Juneberries *(Amelanchier* spp.)	43	●
Dwarf alder *(Rhamnus alnifolia)*	29	●

Trees	Canopy		Subcanopy		Shrub Layer	
	freq%	cover	freq%	cover	freq%	cover
White cedar	83	●●●●	70	●●●	70	●
Balsam fir	46	●●	59	●●●	80	●●
Black ash	42	●●●	57	●●●	75	●●
Paper birch	40	●●	36	●	39	●
Black spruce	24	●●	17	●●	19	●
White spruce	18	●●	17	●	29	●
Yellow birch	17	●	25	●●	28	●
Red maple	-	-	13	●	50	●
Mountain ash	-	-	11	●	39	●
American elm	-	-	9	●	23	●

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