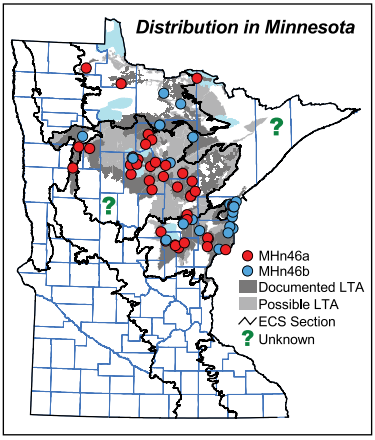
Northern Wet-Mesic Hardwood Forest

Wet-mesic lowland hardwood forests on level sites with clayey subsoils or high local water tables.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 72 plots (relevés).



- **Ground-layer** cover ranges from interrupted to continuous (50–100%). Common species include lady fern *(Athyrium filix-femina),* wild sarsaparilla *(Aralia nudicaulis),* Canada mayflower (*Maianthemum canadense),* dwarf raspberry *(Rubus pubescens),* large-leaved aster *(Aster macrophyllus),* and sweet-scented bedstraw *(Galium triflorum),* with Pennsylvania sedge *(Carex pensylvanica)* abundant in many sites.
- **Shrub layer** has variable cover; beaked hazelnut *(Corylus cornuta)*, chokecherry *(Prunus pensylvanica),* mountain maple *(Acer spicatum)*, and black ash, red maple, and basswood seedlings are the most important species.
- **Subcanopy** is often present, with black ash, basswood, sugar maple, and red maple the most frequent species.
- **Canopy** is patchy (25–50% cover) to continuous (> 75% cover) and typically dominated by black ash, basswood, or quaking aspen. Other important canopy trees include paper birch, bur oak, red maple, and sugar maple and occasionally northern red oak, green ash, balsam fir, or white cedar.

Landscape Setting & Soils

- **Till plains**—Common. Landscape is level to rolling. Parent material can be either calcareous or noncalcareous till. On calcareous till, heavy clay-loam subsoil horizons are present that hold water throughout much of the growing season. On noncalcareous till, very firm sandy-loam subsoil horizons are present that are capable of perching water throughout the growing season. In both cases, gray soil colors indicate that these horizons are saturated in spring because of high local water tables, which fall very slowly through the growing season. Soils are somewhat poorly to moderately well drained. Soil-moisture regime is very moist. (WSU; MDL; MOP; Hardwood Hills in MIM)
- **Stagnation moraines**—Occasional. Present on level areas within rolling to hummocky landscapes. Parent material is calcareous till with very few stones. Heavy clay-loam subsoil horizons are present that hold water throughout much of the growing season. Gray soil colors indicate that soils are saturated in spring because of high local water tables, which fall very slowly through the growing season. Soils are somewhat poorly drained. Soil-moisture regime is very moist. (MDL [except Tamarack Lowlands]; WSU; Hardwood Hills in MIM; Nashwauk Uplands in NSU)
- **Glacial lake plains**—Occasional. Landscape is level, with water perched over broad areas, and the local water table near the surface. Parent material is noncalcareous, stoneless clay. Gray soil colors indicating prolonged saturation are usually present in the upper 60in (150cm). Soils are somewhat poorly to moderately well drained. Soil-moisture regime is very moist. (SSU; MOP; Tamarack Lowlands and Chippewa Plains in MDL)

Natural History

In the past, catastrophic disturbances were rare in MHn46. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about 600 years, and the rotation of catastrophic windthrow was about 800 years. Events that result

in partial loss of trees, such as light surface fires and patchy windthrow, were much more common, with an estimated rotation of about 160 years. Based on the historic composition and age structure of these forests, MHn46 had two growth stages separated by a long period of transition.

- **0–35 years**—Young forests recovering from fire or wind, strongly dominated by quaking aspen mixed with minor amounts of paper birch, black ash, basswood, and American elm.
- **35–95 years**—A transition period marked by a decline in quaking aspen and increases in paper birch, black ash, basswood, and American elm. White spruce and white pine become established in the understory. Bur oak, red maple, and balsam fir peak at this time, although they are not more than minor components.
- **> 95 years**—Mature forests dominated by quaking aspen and white spruce. Paper birch, black ash, basswood, and American elm are also present. (White spruce is occasionally present in samples from modern forests but is not nearly as abundant as it apparently was in the past. American elm is present in just a few of the modern samples; it is certain to have been more common in the community in the past before the spread of Dutch elm disease through Minnesota.)

Similar Native Plant Community Classes

- **MHn44 Northern Wet-Mesic Boreal Hardwood-Conifer Forest**

MHn44 when dominated by hardwoods (MHn44a, MHn44c, or MHn44d) can be similar to MHn46 when dominated by quaking aspen (MHn46a). MHn44 is more likely to have species indicative of poorer sites and with affinity for conifer-dominated WFn communities. MHn46 is more likely to have species indicative of richer sites and with affinity for black ash–dominated WFn communities.

MHn46 Indicator Species	(freq%) ***MHn46***	MHn44
Common enchanter's nightshade *(Circaea lutetiana)*	**17**	1
Sensitive fern *(Onoclea sensibilis)*	**34**	4
Ostrich fern *(Matteuccia struthiopteris)*	**20**	4
Winterberry *(Ilex verticillata)*	**27**	5
Erect, Smooth, or Illinois carrion-flower*	**29**	6
Virginia creeper *(Parthenocissus* spp.)	**37**	8
Nannyberry *(Viburnum lentago)*	**34**	11
Jack-in-the-pulpit *(Arisaema triphyllum)*	**54**	19

MHn44 Indicator Species	(freq%) MHn46	***MHn44***
False melic grass *(Schizachne purpurascens)*	-	**15**
Kidney-leaved violet *(Viola renifolia)*	-	**12**
Twinflower *(Linnaea borealis)*	-	**11**
Balsam fir (C)	5	**42**
Lowbush blueberry *(Vaccinium angustifolium)*	2	**16**
White spruce (C,U)	7	**26**
Balsam poplar (U)	7	**22**
Veiny pea *(Lathyrus venosus)*	7	**21**

*Erect, Smooth, or Illinois carrion-flower *(Smilax ecirrata, S. herbacea,* or *S. illinoensis)*

- **WFn55 Northern Wet Ash Swamp**

WFn55 can be similar to and grade into occurrences of MHn46 in low, level landscape settings. The canopy of WFn55 is usually strongly dominated by black ash, while black ash is likely to be mixed with other species such as basswood, bur oak, or quaking aspen in MHn46. WFn55 is more likely to have species characteristic of wet habitats such as vernal pools, while MHn46 is more likely to have species with affinity for well-drained soils.

MHn46 Indicator Species	(freq%) ***MHn46***	WFn55
Round-lobed hepatica *(Anemone americana)*	**39**	2
Pennsylvania sedge *(Carex pensylvanica)*	**67**	9
Bracken *(Pteridium aquilinum)*	**38**	6
Mountain rice grass *(Oryzopsis asperifolia)*	**47**	8
Sugar maple (C)	**25**	4
Bur oak (C)	**35**	8
Ironwood (U)	**36**	9
Downy arrowwood *(Viburnum rafinesquianum)*	**40**	10

WFn55 Indicator Species	(freq%) MHn46	***WFn55***
Rough bedstraw *(Galium asprellum)*	1	**28**
Red-stemmed aster *(Aster puniceus)*	3	**34**
Fowl manna grass *(Glyceria striata)*	6	**51**
Mad dog skullcap *(Scutellaria lateriflora)*	4	**32**
Swamp thistle *(Cirsium muticum)*	4	**27**
Northern bugleweed *(Lycopus uniflorus)*	7	**37**
Wild black currant *(Ribes americanum)*	6	**29**
Common marsh marigold *(Caltha palustris)*	10	**37**

- **MHc47 Central Wet-Mesic Hardwood Forest**

MHc47 is very similar to MHn46, but its range is mainly south of MHn46. The ranges of the two classes overlap in the northern half of the WSU and the extreme southern part of the MDL. MHc47 is more likely to have species with affinity for central and southern forests, while MHn46 is more likely to have species with affinity for northern forests.

MHn46 Indicator Species	(freq%) *MHn46*	MHc47
Common oak fern *(Gymnocarpium dryopteris)*	**28**	-
Bunchberry *(Cornus canadensis)*	**24**	-
Mountain maple *(Acer spicatum)*	**67**	4
Palmate sweet coltsfoot *(Petasites frigidus)*	**26**	4
Balsam fir (C,U)	**38**	9
Woodland horsetail *(Equisetum sylvaticum)*	**35**	9
Starflower *(Trientalis borealis)*	**49**	13
Swamp red currant *(Ribes triste)*	**42**	13

MHc47 Indicator Species	(freq%) MHn46	*MHc47*
Wild geranium *(Geranium maculatum)*	3	**61**
Honewort *(Cryptotaenia canadensis)*	3	**52**
Pointed-leaved tick trefoil *(Desmodium glutinosum)*	4	**70**
Prickly ash *(Zanthoxylum americanum)*	3	**43**
Lopseed *(Phryma leptostachya)*	4	**52**
Maidenhair fern *(Adiantum pedatum)*	3	**35**
Hawthorn *(Crataegus* spp.)	8	**57**
Blue beech (U)	13	**70**

Native Plant Community Types in Class

- **MHn46a Aspen - Ash Forest**

Canopy is dominated most commonly by basswood, bur oak, quaking aspen, black ash, or red maple, with smaller amounts of paper birch. Other species such as northern red oak, green ash, and sugar maple occasionally are abundant in the canopy. Basswood, black ash, red maple, American elm, and bur oak are the most common species in the subcanopy. MHn46a differs from MHn46b by having greater frequency of quaking aspen in the canopy and understory, and greater frequency of juneberries *(Amelanchier* spp.), highbush cranberry *(Viburnum trilobum),* winterberry *(Ilex verticillata)*, downy arrowwood *(Viburnum rafinesquianum),* prickly or smooth wild rose *(Rosa acicularis* or *R. blanda)*, and other shrubs uncommon in densely shaded forests. Poison ivy *(Toxicodendron rydbergii)* and bracken *(Pteridium aquilinum),* are also more common in MHn46a. MHn46a has been documented primarily in the WSU and MDL but also occurs in the MOP, SSU, the western edge of NSU, and in northern MIM. Description is based on summary of vegetation data from 41 plots.

- **MHn46b Black Ash - Basswood Forest**

Rich forests, typically dominated by black ash, usually with basswood and occasionally with sugar maple, white cedar, or green ash. Other occasional canopy species include paper birch, red maple, balsam fir, yellow birch, quaking aspen, and white spruce. Black ash and sugar maple are important in the subcanopy. MHn46b differs from MHn46a by having a denser tree canopy, greater abundance of late-successional tree species such as black ash, sugar maple, and white cedar, and lower abundance of early-successional species such as quaking aspen. Other species that help to distinguish MHn46b from MHn46a include common oak fern *(Gymnocarpium dryopteris)*, alpine enchanter's nightshade *(Circaea alpina)*, dandelions *(Taraxacum* spp.), hooked crowfoot *(Ranunculus recurvatus)*, blue cohosh *(Caulophyllum thalictroides)*, wood nettle *(Laportea canadensis)*, long beech fern *(Phegopteris connectilis)*, white avens *(Geum canadense)*, and wild leek *(Allium tricoccum).* MHn46b is common in the SSU and WSU, extending north to the northern part of the Hardwood Hills Subsection in the MIM, the Chippewa Plains Subsection in the MDL, the Little Fork Vermilion Uplands Subsection in the MOP, and the extreme western edge of the NSU. Description is based on summary of vegetation data from 31 plots.

MHn46 Northern Wet-Mesic Hardwood Forest – Species Frequency & Cover

	freq%	cover
Forbs, Ferns & Fern Allies		
Wild sarsaparilla *(Aralia nudicaulis)*	86	●●
Lady fern *(Athyrium filix-femina)*	85	●●●
Canada mayflower *(Maianthemum canadense)*	83	●
Dwarf raspberry *(Rubus pubescens)*	83	●●
Large-leaved aster *(Aster macrophyllus)*	81	●●
Sweet-scented bedstraw *(Galium triflorum)*	79	●
Wild ginger *(Asarum canadense)*	71	●
Common strawberry *(Fragaria virginiana)*	69	●
Clayton's sweet cicely *(Osmorhiza claytonii)*	65	●
Wood anemone *(Anemone quinquefolia)*	65	●
Rose twistedstalk *(Streptopus roseus)*	64	●
Jack-in-the-pulpit *(Arisaema triphyllum)*	64	●
Maryland black snakeroot *(Sanicula marilandica)*	64	●
Red baneberry *(Actaea rubra)*	63	●
Early meadow-rue *(Thalictrum dioicum)*	57	●
Rugulose or Yellow violet *(Viola canadensis* or *V. pubescens)*	54	●
Rattlesnake fern *(Botrychium virginianum)*	53	●
Large-flowered bellwort *(Uvularia grandiflora)*	50	●
Bluebead lily *(Clintonia borealis)*	49	●
Starflower *(Trientalis borealis)*	49	●
Spinulose shield fern or Glandular wood fern*	49	●
Nodding trillium *(Trillium cernuum)*	43	●
Naked miterwort *(Mitella nuda)*	42	●
Side-flowering aster *(Aster lateriflorus)*	38	●
Woodland horsetail *(Equisetum sylvaticum)*	35	●●
Ostrich fern *(Matteuccia struthiopteris)*	33	●●●
Touch-me-not *(Impatiens* spp.)	29	●
Sensitive fern *(Onoclea sensibilis)*	28	●
Palmate sweet coltsfoot *(Petasites frigidus)*	26	●
Hooked crowfoot *(Ranunculus recurvatus)*	24	●
Wood nettle *(Laportea canadensis)*	17	●●●
Grasses & Sedges		
Pennsylvania sedge *(Carex pensylvanica)*	67	●●●
Long-stalked sedge *(Carex pedunculata)*	56	●●
Bearded shorthusk *(Brachyelytrum erectum)*	50	●
Graceful sedge *(Carex gracillima)*	49	●
Mountain rice grass *(Oryzopsis asperifolia)*	47	●●
Dewey's sedge *(Carex deweyana)*	36	●
Bladder sedge *(Carex intumescens)*	36	●
Pointed woodrush *(Luzula acuminata)*	36	●
Shrubs		
Beaked hazelnut *(Corylus cornuta)*	92	●●●
Chokecherry *(Prunus virginiana)*	71	●
Mountain maple *(Acer spicatum)*	67	●●●
Juneberries *(Amelanchier* spp.)	44	●
Swamp red currant *(Ribes triste)*	42	●
Pagoda dogwood *(Cornus alternifolia)*	36	●
Highbush cranberry *(Viburnum trilobum)*	25	●
Nannyberry *(Viburnum lentago)*	25	●
American hazelnut *(Corylus americana)*	24	●●●

Trees	Canopy		Subcanopy		Shrub Layer	
	freq%	cover	freq%	cover	freq%	cover
Black ash	65	●●●●	58	●●●	71	●●
Basswood	60	●●	56	●●	63	●
Quaking aspen	38	●●●	17	●●●	38	●
Paper birch	36	●●	21	●●	11	●
Bur oak	35	●●●	26	●	43	●
Red maple	32	●●●	40	●●●	60	●
Sugar maple	25	●●●	46	●●●	53	●●●
Northern red oak	15	●●●	15	●	46	●
Yellow birch	14	●●	8	●	-	-
American elm	14	●	40	●●	44	●
Green ash	14	●●●	22	●●	31	●●
White spruce	11	●●	13	●	14	●
Balsam fir	11	●●●	17	●	35	●
White cedar	8	●●●	-	-	-	-
Big-toothed aspen	-	-	8	●●	-	-
Balsam poplar	-	-	-	-	8	●

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