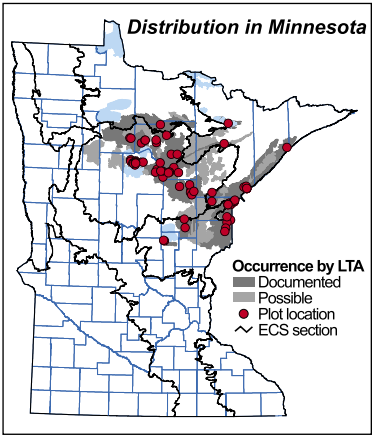
Northern Rich Mesic Hardwood Forest

Mesic hardwood forests on well-drained to somewhat poorly drained, rich loamy soils on glacial drift and till in areas of undulating to hummocky topography.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 83 plots (relevés).



● **Ground-layer** cover ranges from sparse (5-25%) to interrupted (50-75%). The most frequent species are lady fern *(Athyrium filix-femina),* wild sarsaparilla *(Aralia nudicaulis),* Clayton's sweet cicely *(Osmorhiza claytonii),* hairy Solomon's seal *(Polygonatum pubescens),* Canada mayflower *(Maianthemum canadense),* rose twistedstalk *(Streptopus roseus)*, mountain rice grass *(Oryzopsis asperifolia),* and Pennsylvania sedge *(Carex pensylvanica).*

● **Shrub** layer cover is variable, ranging from sparse to continuous (>75%). Sugar maple is usually abundant (>35% cover, on average), along with occasional beaked hazelnut *(Corylus cornuta),* basswood saplings, fly honeysuckle *(Lonicera canadensis),* mountain maple *(Acer spicatum),* chokecherry *(Prunus virginiana)*, and ironwood saplings.

● **Subcanopy** cover ranges from sparse to interrupted (5-75%), with sugar maple usually abundant and ironwood and basswood sometimes abundant.

● **Canopy** cover ranges from interrupted to continuous (50% - 100%) and is dominated by sugar maple, usually with lesser amounts of basswood and often some yellow birch. Paper birch, ironwood, northern red oak, black ash, balsam fir, and white spruce are occasionally present in the canopy.

Landscape Setting & Soils

● **Stagnation moraines**—Common. Present on relatively level areas in otherwise hummocky landscapes. Parent material is calcareous fine-textured till, usually with a stoneless cap of wind-deposited silt loam or loamy very fine sand. Free carbonates are usually present in the soil below 40in (100cm). Soils have firm, clayey subsoil horizons that perch snowmelt and rainfall, although there is no indication of prolonged saturation. Soils are well or moderately well drained. Soil-moisture regime is fresh. (Chippewa Plains and St. Louis Moraines in MDL; WSU; and North Shore Highlands in NSU)

● **Till plains**—Common. Landscape is level to rolling. Parent material is calcareous fine-textured till with a cap of very fine sandy loam. In some areas the cap consists of stoneless silt deposited by wind, while in other places the cap contains gravel and was deposited by water. Free carbonates are usually present in the soil below 40in (100cm). Soils have firm, clayey subsoil horizons that perch snowmelt and rainfall, although there is no indication of prolonged saturation. Soils are well or moderately well drained. Soil-moisture regime is fresh. (Chippewa Plains and St. Louis Moraines in MDL; WSU; and North Shore Highlands in NSU)

● **Dissected glacial lake sediments**—Occasional. Present on gentle to steep slopes in rugged terrain. Parent material is stratified silt and clay. The soil surface is silty and has free carbonates below about 30in (75cm). Soil drainage is dependent on slope; on steeper slopes soils are well drained, and on level areas soils are somewhat poorly drained. Soil-moisture regime is fresh, regardless of slope. (SSU)

● **Scoured bedrock terrain**— Occasional. Present on level sites in hummocky terrain. Parent material is a discontinuous mantle of mostly non-calcareous, cobbly till, about 20-50in (50-125cm) thick, over bedrock. Lower soil horizons are dense and capable of

perching snowmelt and rainfall. Soils are well drained. Soil-moisture regime is fresh. (North Shore Highlands Subsection in NSU)

Natural History

In the past, catastrophic disturbances were very rare in MHn47. An analysis of Public Land Survey records indicates that the rotations of catastrophic fires and windthrow both exceed 1,000 years. Events that result in partial loss of trees, such as light surface fires and patchy windthrow, were estimated to have a rotation of about 330 years. Based on the historic composition and age structure of these forests, MHn47 had three growth stages and a period of transition.

- **0-55 years**—Young forests recovering from fire or wind, colonized immediately by sugar maple mixed with some earlier successional species including paper birch, basswood, and quaking aspen.
- **55-75 years**—A transition period marked by the gradual decline of paper birch, aspen, and basswood. Yellow birch, white pine, and white spruce seedlings become established during this period.
- **75-195 years**—Mature forests composed of sugar maple, yellow birch, paper birch, and basswood, with modest amounts of white pine and white spruce.
- **>195 years**—Very old forests dominated by sugar maple and white pine mixed with some yellow birch. (White pine was not present in samples from modern forests and probably was much more common in the community before white pine logging began in the 1800s.)

Similar Native Plant Community Classes

- **MHn35 Northern Mesic Hardwood Forest**

MHn35, when dominated by sugar maple, is similar to MHn47 but occurs on sites lower in nutrients.

▶ ***MHn35***—More likely to have red maple, juneberries *(Amelanchier* spp.), bush honeysuckle *(Diervilla lonicera),* and downy arrowwood *(Viburnum rafinesquianum)* in the shrub layer, and bracken *(Pteridium aquilinum)* and pale vetchling *(Lathyrus ochroleucus)* in the ground layer.

▶ ***MHn47***—More likely to have species characteristic of rich forests such as yellow birch (especially in the canopy), and jack-in-the-pulpit *(Arisaema triphyllum),* spinulose shield fern or glandular wood fern *(Dryopteris carthusiana/intermedia* group), blue cohosh *(Caulophyllum thalictroides),* common oak fern *(Gymnocarpium dryopteris),* alpine enchanter's nightshade *(Circaea alpina),* bloodroot *(Sanguinaria canadensis),* ostrich fern *(Matteuccia struthiopteris),* and wild leek *(Allium tricoccum)* in the ground layer.

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

MHn45, when dominated by sugar maple, can be similar to MHn47, although the two classes have little geographical overlap, with MHn45 mainly present in the northeastern two-thirds of the North Shore Highlands Subsection in NSU, and MHn47 generally limited to the southwestern third.

▶ ***MHn45***—More likely to have white spruce in the canopy, and Carolina spring beauty *(Claytonia caroliniana),* thimbleberry *(Rubus parviflorus),* and panicled bluebells *(Mertensia paniculata)* in the ground layer.

▶ ***MHn47***—More likely to have basswood and ironwood in the canopy and understory, and zigzag goldenrod *(Solidago flexicaulis)* in the ground layer.

- **MHc36 Central Mesic Hardwood Forests (Eastern)**

MHc36, when dominated by sugar maple, can be similar to MHn47 but occurs mainly to the south and west of MHn47 in WSU and MIM. The two classes overlap geographically in the central and northern parts of WSU.

▶ ***MHc36***—More likely to have northern red oak in the canopy, bitternut hickory and blue beech in the understory, downy arrowwood in the shrub layer, and early meadow-rue *(Thalictrum dioicum)*, hog peanut *(Amphicarpaea bracteata),* pointed-leaved tick trefoil *(Desmodium glutinosum),* large-flowered trillium *(Trillium grandiflorum),* common enchanter's nightshade *(Circaea lutetiana),* and wild geranium *(Geranium maculatum)* in the ground layer.

▶ ***MHn47***—More likely to have species with northern affinity, including yellow birch in the canopy, balsam fir in the understory, mountain maple in the shrub layer, and

bluebead lily *(Clintonia borealis),* nodding trillium *(Trillium cernuum),* common oak fern, and groundpines *(Lycopodium dendroideum/hickeyi)* in the ground layer.

Native Plant Community Types in Class

● **MHn47a Sugar Maple - Basswood - (Bluebead Lily) Forest**

Canopy is dominated by sugar maple with lesser amounts of basswood. Yellow birch, northern red oak, paper birch, and black ash are occasionally present. MHn47a is less nutrient rich and has a sparser canopy than MHn47b, the other type in this class. Species useful in distinguishing MHn47a from MHn47b include understory species with northern affinities such as bluebead lily, along with pale bellwort *(Uvularia sessilifolia),* swamp red currant *(Ribes triste),* northern red oak in the canopy, white baneberry *(Actaea pachypoda),* and long beach fern *(Phegopteris connectilis)*. MHn47a has been documented in the western and southern parts of NSU, southern MOP, the eastern half of MDL, the northern half of MDL, and SSU. Description is based on summary of vegetation data from 46 plots.

● **MHn47b Sugar Maple - Basswood - (Horsetail) Forest**

Canopy is dominated by sugar maple and basswood, often with yellow birch. Sugar maple is fairly abundant in the subcanopy (>20% average cover) with lesser amounts of ironwood. Sugar maple is also abundant in the shrub layer. MHn47b can be distinguished from MHn47a by the presence of species indicative of rich habitats or with affinity to southern Minnesota, including American and red elm (usually in the understory), large-flowered bellwort *(Uvularia grandiflora)*, blue cohosh, leatherwood (*Dirca palustris*), lopseed *(Phryma leptostachya),* and several species of *Equisetum* including meadow horsetail *(Equisetum pratense),* dwarf scouring rush *(E. scirpoides),* tall scouring rush *(E. hyemale),* and smooth scouring rush *(E. laevigatum).* MHn47b has been documented in the northeastern half of MDL. Description is based on summary of vegetation data from 37 plots.

photo by W.R. Smith MN DNR

Bluebead lily *(Clintonia borealis)*

MHn47 Northern Rich Mesic Hardwood Forest – Species Frequency & Cover

	freq%	cover
Forbs, Ferns & Fern Allies		
Lady fern (*Athyrium filix-femina*)	91	●
Clayton's sweet cicely (*Osmorhiza claytonii*)	84	●
Hairy Solomon's seal (*Polygonatum pubescens*)	79	●
Wild sarsaparilla (*Aralia nudicaulis*)	78	●●
Rose twistedstalk (*Streptopus roseus*)	78	●
Canada mayflower (*Maianthemum canadense*)	74	●
Rattlesnake fern (*Botrychium virginianum*)	74	●
Jack-in-the-pulpit (*Arisaema triphyllum*)	73	●
Large-flowered bellwort (*Uvularia grandiflora*)	70	●●
Large-leaved aster (*Aster macrophyllus*)	69	●
Rugulose or Yellow violet (*Viola canadensis* or *V. pubescens*)	67	●
Wood anemone (*Anemone quinquefolia*)	65	●
Sweet-scented bedstraw (*Galium triflorum*)	61	●
American spikenard (*Aralia racemosa*)	60	●
Bluebead lily (*Clintonia borealis*)	56	●
Starflower (*Trientalis borealis*)	54	●
Wild ginger (*Asarum canadense*)	53	●
Spinulose shield fern or Glandular wood fern*	51	●
Red baneberry (*Actaea rubra*)	48	●
Zigzag goldenrod (*Solidago flexicaulis*)	44	●
Blue cohosh (*Caulophyllum thalictroides*)	44	●
Common oak fern (*Gymnocarpium dryopteris*)	43	●
Round-lobed hepatica (*Anemone americana*)	43	●
Dwarf raspberry (*Rubus pubescens*)	40	●
Nodding trillium (*Trillium cernuum*)	39	●
Common false Solomon's seal (*Smilacina racemosa*)	38	●
Groundpine (*Lycopodium dendroideum* or *L. hickeyi*)	31	●
Pale bellwort (*Uvularia sessilifolia*)	30	●
Bloodroot (*Sanguinaria canadensis*)	29	●
Early meadow-rue (*Thalictrum dioicum*)	27	●
Alpine enchanter's nightshade (*Circaea alpina*)	26	●
Ostrich fern (*Matteuccia struthiopteris*)	24	●
Wild leek (*Allium tricoccum*)	23	●
Maryland black snakeroot (*Sanicula marilandica*)	23	●
Meadow horsetail (*Equisetum pratense*)	21	●
Grasses & Sedges		
Pennsylvania sedge (*Carex pensylvanica*)	76	●●●
Mountain rice grass (*Oryzopsis asperifolia*)	74	●
Long-stalked sedge (*Carex pedunculata*)	64	●●
Dewey's sedge (*Carex deweyana*)	33	●
Drooping wood sedge (*Carex arctata*)	32	●
Bearded shorthusk (*Brachyelytrum erectum*)	27	●
Bladder sedge (*Carex intumescens*)	21	●
Shrubs		
Beaked hazelnut (*Corylus cornuta*)	69	●●
Fly honeysuckle (*Lonicera canadensis*)	69	●
Chokecherry (*Prunus virginiana*)	67	●
Mountain maple (*Acer spicatum*)	63	●●
Prickly gooseberry (*Ribes cynosbati*)	51	●
Pagoda dogwood (*Cornus alternifolia*)	49	●
Leatherwood (*Dirca palustris*)	42	●
Swamp red currant (*Ribes triste*)	21	●

Trees	Canopy		Subcanopy		Shrub Layer	
	freq%	cover	freq%	cover	freq%	cover
Sugar maple	98	●●●●	96	●●●●	97	●●●●
Basswood	93	●●●	54	●●	78	●
Yellow birch	43	●●●	15	●●	13	●
Paper birch	24	●●	6	●	3	●
Northern red oak	19	●●	8	●	48	●
Black ash	19	●●	12	●	41	●
Ironwood	18	●●	54	●●●	67	●●
White cedar	10	●●	4	●	-	-
Red maple	9	●●	11	●	19	●
Green ash	9	●●	4	●	13	●
Balsam fir	6	●	10	●	47	●
Quaking aspen	5	●●	-	-	16	●
White pine	4	●●●	-	-	4	●
American elm	4	●	9	●●	38	●●

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