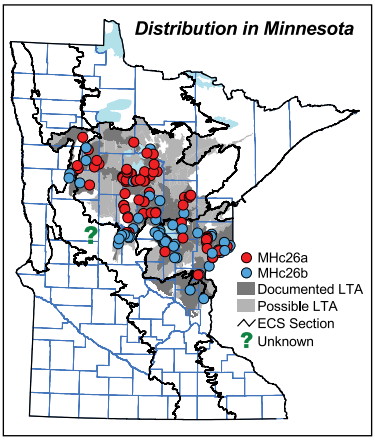
Central Dry-Mesic Oak-Aspen Forest

Dry-mesic hardwood or, rarely, hardwood-conifer forests, usually with northern red oak as a canopy dominant. Present on well-drained loamy or sandy soils, primarily on stagnation moraines and less frequently on till plains or glacial river terraces.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 157 plots (relevés).



- **Ground layer** has variable cover; the most frequent species are large-leaved aster *(Aster macrophyllus),* Pennsylvania sedge *(Carex pensylvanica)*, wild sarsaparilla *(Aralia nudicaulis),* bracken *(Pteridium aquilinum),* early meadow-rue *(Thalictrum dioicum),* hog peanut *(Amphicarpaea bracteata),* mountain rice grass *(Oryzopsis asperifolia),* pale bellwort *(Uvularia sessilifolia),* wood anemone *(Anemone quinquefolia),* Canada mayflower *(Maianthemum canadense),* large-flowered bellwort *(Uvularia grandiflora),* and Maryland black snakeroot *(Sanicula marilandica).*
- **Shrub-layer** cover ranges from patchy to continuous (25–100%). Beaked hazelnut *(Corylus cornuta)* is almost always abundant (> 25% average cover), with chokecherry *(Prunus virginiana),* downy arrowwood *(Viburnum rafinesquianum),* and juneberries *(Amelanchier* spp.) often present but not necessarily abundant. Tree seedlings are also common, especially northern red oak, red maple, and sugar maple.
- **Subcanopy** cover is variable, with sugar maple, ironwood, red maple, and basswood the most important species.
- **Canopy** is interrupted to continuous (50–100% cover). Northern red oak is usually dominant in the canopy, with paper birch, red maple, quaking aspen, basswood, sugar maple, bur oak, and big-toothed aspen sometimes important. White pine and red pine are occasionally present.

Landscape Setting & Soils

- **Stagnation moraines**—Common. Landscape is hummocky. Parent material is a discontinuous cap of partially sorted sand and gravel over a core of denser till and is either noncalcareous or has been leached of carbonates. Where this sandy and gravelly cap is thick, soils are somewhat excessively drained, and the soil-moisture regime is moderately dry. Where the cap is thinner than 60in (150cm), soils are well to moderately well drained. Soil-moisture regime is moderately fresh to fresh. (Chippewa Plains, Pine Moraines & Outwash Plains, and St. Louis Moraines in MDL; WSU; Hardwood Hills in MIM)
- **Till plains**—Common. Landscape is rolling to hummocky. Parent material is noncalcareous, coarse-textured, sandy loam drift. Soils have very slight accumulations of clay in the subsoil horizons and are weakly cemented, enabling them to perch some snowmelt and rainwater. Where subsoil horizons are well developed, soils are well drained, and the soil-moisture regime is fresh. Where subsoil horizons are poorly developed, soils are somewhat excessively drained, and the soil-moisture regime is moderately dry. (Chippewa Plains and Pine Moraines & Outwash Plains in MDL; WSU)
- **Outwash plains and sandy lake plains**—Occasional. Landscape is rolling to flat. Parent material is stratified loamy sand and gravel. The parent material is either noncalcareous or has been leached of carbonates. Some soils have very slight accumulations of clay in the subsoil horizons and are weakly cemented, enabling them to perch some snowmelt and rainwater. Other soils retain rainwater because of complex stratification. Soils are moderately well to somewhat excessively drained. Soil-moisture

regime is moderately dry to fresh. (MDL; WSU; Anoka Sand Plain in MIM)

- **Glacial river terraces**—Rare. Topography is flat. Parent material consists of deep deposits of sand and gravel over bedrock terraces eroded by torrential glacial streams during the formation of the St. Croix and Kettle River valleys. These terraces are well above modern river levels and do not flood. Soils are somewhat excessively drained. Soil-moisture regime is moderately dry. (WSU)

Natural History

In the past, catastrophic disturbances were rare in MHc26. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about 370 years, and the rotation of catastrophic windthrow was about 910 years. Events that result in partial loss of trees, especially light surface fires, were much more common, with an estimated rotation of about 75 years. Based on the historic composition and age structure of these forests, MHc26 had three growth stages and one 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 and northern red oak.
- **35–55 years**—A transition period marked by a rapid decline in quaking aspen mirrored by increases in paper birch, northern red oak, and red maple. Bur oak, white pine, and white spruce become established in the understory during this period.
- **55–135 years**—Mature forests characterized by mixed canopies of paper birch, quaking aspen, and some northern red oak, with minor amounts of red maple, bur oak, white pine, and white spruce.
- **> 135 years**—Old forests characterized by mixed canopies of quaking aspen, paper birch, northern red oak, white pine, and white spruce. (The persistence of quaking aspen and paper birch in the mature and old stages suggests that they were capable of regenerating in the community after fine-scale disturbances, perhaps light surface fires. White spruce is not present in samples from modern mature or old forests.)

Similar Native Plant Community Classes

- **MHn35 Northern Mesic Hardwood Forest**

MHn35 can have tree canopy composition similar to that of MHc26 (although MHn35 is more likely to be strongly dominated by sugar maple, while MHc26 is more likely to be dominated by northern red oak), and the two communities have broadly overlapping ranges in the WSU, MDL, and northern MIM. MHn35 is more likely to have species with affinity for WFn communities, while MHc26 is more likely to have species indicative of occasional burning or soil disturbance.

MHc26 Indicator Species	(freq%) *MHc26*	MHn35
Gray dogwood *(Cornus racemosa)*	**21**	2
Black cherry (U)	**54**	6
Pointed-leaved tick trefoil *(Desmodium glutinosum)*	**48**	7
Blue beech (U)	**20**	4
Poison ivy *(Toxicodendron rydbergii)*	**46**	11
Lowbush blueberry *(Vaccinium angustifolium)*	**43**	12
Wild honeysuckle *(Lonicera dioica)*	**24**	7
Large-flowered trillium *(Trillium grandiflorum)*	**29**	8

MHn35 Indicator Species	(freq%) MHc26	*MHn35*
Groundpine*	4	**36**
White spruce (U)	2	**18**
Balsam fir (C,U)	8	**51**
Wild ginger *(Asarum canadense)*	4	**23**
Drooping wood sedge *(Carex arctata)*	5	**17**
Long-stalked sedge *(Carex pedunculata)*	12	**38**
Bunchberry *(Cornus canadensis)*	5	**15**
Bluebead lily *(Clintonia borealis)*	27	**71**

*Groundpine *(Lycopodium dendroideum* or *L. hickeyi)*

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

MHc36 is similar to MHc26 but occurs on moister sites, often downslope of MHc26 when both communities are present on the same landform. MHc36 is more likely to have species with affinity for terrace forests in the FF System, while MHc26 is more likely to have species indicative of occasional fire.

MHc26 Indicator Species	(freq%) *MHc26*	MHc36
Lowbush blueberry *(Vaccinium angustifolium)*	**43**	2
Prickly or Smooth wild rose*	**17**	2
Round-leaved dogwood *(Cornus rugosa)*	**41**	5
Hairy honeysuckle *(Lonicera hirsuta)*	**24**	5
Bush honeysuckle *(Diervilla lonicera)*	**65**	16
Veiny pea *(Lathyrus venosus)*	**29**	9
Tall blackberries**	**27**	9
Spreading dogbane *(Apocynum androsaemifolium)*	**31**	10

MHc36 Indicator Species	(freq%) MHc26	*MHc36*
Blue cohosh *(Caulophyllum thalictroides)*	3	**39**
Maidenhair fern *(Adiantum pedatum)*	3	**26**
Wild ginger *(Asarum canadense)*	4	**36**
Bloodroot *(Sanguinaria canadensis)*	7	**58**
Jack-in-the-pulpit *(Arisaema triphyllum)*	8	**50**
Lopseed *(Phryma leptostachya)*	9	**50**
Common enchanter's nightshade *(Circaea lutetiana)*	13	**57**
Wild geranium *(Geranium maculatum)*	13	**52**

* Prickly or Smooth wild rose *(Rosa acicularis* or *R. blanda)* ** Tall blackberries *(Rubus allegheniensis* and similar *Rubus* spp.)

- **FDc34 Central Dry-Mesic Pine-Hardwood Forest**

FDc34 when dominated by hardwoods (FDc34b) can be similar to MHc26 when dominated by northern red oak, paper birch, or quaking aspen (MHc26a). FDc34 and MHc26 are often present in fine-scale mosaics on landforms such as stagnation moraines where soil properties vary substantially across short distances. In general, FDc34 is more likely to have some species with affinity for poorer soils, while MHc26 is more likely to have species with affinity for relatively rich soils.

MHc26 Indicator Species	(freq%) ***MHc26***	FDc34
Starflower *(Trientalis borealis)*	**45**	-
Fly honeysuckle *(Lonicera canadensis)*	**32**	-
Erect, Smooth, or Illinois carrion-flower*	**17**	-
Pointed-leaved tick trefoil *(Desmodium glutinosum)*	**33**	5
Sugar maple (C,U)	**57**	11
Bearded shorthusk *(Brachyelytrum erectum)*	**25**	5
Virginia creeper *(Parthenocissus* spp.)	**23**	5
Ironwood (U)	**57**	16

FDc34 Indicator Species	(freq%) MHc26	***FDc34***
Jack pine (C)	-	**11**
Tall thimbleweed *(Anemone virginiana)*	-	**11**
Canada goldenrod *(Solidago canadensis)*	2	**32**
Prairie willow *(Salix humilis)*	1	**16**
Red pine (U)	1	**11**
Red-osier dogwood *(Cornus sericea)*	2	**16**
Bunchberry *(Cornus canadensis)*	8	**26**
Prickly or Smooth wild rose**	24	**74**

*Erect, Smooth, or Illinois carrion-flower *(Smilax ecirrata, S. herbacea,* or *S. illinoensis)* **Prickly or Smooth wild rose *(Rosa acicularis* or *R. blanda)*

Native Plant Community Types in Class

- **MHc26a Oak - Aspen - Red Maple Forest**

Canopy is typically dominated by northern red oak, paper birch, quaking aspen, or red maple. Bur oak and big-toothed aspen may also be important. In rare instances, white pine or red pine are dominant in the canopy. Red maple, ironwood, and sugar maple are the most common subcanopy trees, although sugar maple is much less frequent in the subcanopy in MHc26a than in MHc26b (see below). There are few species in MHc26 that are restricted to MHc26a, although quaking aspen, prickly or smooth wild rose *(Rosa acicularis* or *R. blanda)*, and species characteristic of northern forests such as starflower *(Trientalis borealis),* bluebead lily *(Clintonia borealis),* mountain maple *(Acer spicatum),* and one-sided pyrola *(Pyrola secunda)* are either more abundant or more likely to occur in MHc26a than MHc26b. MHc26a has been documented throughout the WSU and most of the MDL and is also present in the northern MIM. Description is based on summary of vegetation data from 87 plots.

- **MHc26b Red Oak - Sugar Maple - Basswood - (Large-flowered Trillium) Forest**

Canopy is dominated by northern red oak, often with basswood and less frequently with sugar maple as codominants. Paper birch, red maple, big-toothed aspen, quaking aspen, green ash, bur oak, and white oak may also be present in the canopy. Sugar maple, ironwood, or red maple can be abundant in the subcanopy. Species that help to differentiate MHc26b from MHc26a include basswood and sugar maple in the canopy, large-flowered trillium *(Trillium grandiflorum),* blue beech, zigzag goldenrod *(Solidago flexicaulis)*, rattlesnake fern *(Botrychium virginianum)*, American spikenard *(Aralia racemosa)*, common enchanter's nightshade *(Circaea lutetiana),* wild geranium *(Geranium maculatum)*, poke milkweed *(Asclepias exaltata)*, and bitternut hickory, all of which are more common in MHc26b. MHc26b is most common in the WSU but has also been documented in the MDL and in the Anoka Sand Plain and Hardwood Hills Subsections in the MIM. Description is based on summary of vegetation data from 70 plots.

MN DNR

Morrison County, MN

MHc26 Central Dry-Mesic Oak-Aspen Forest – Species Frequency & Cover

	freq%	cover
Forbs, Ferns & Fern Allies		
Large-leaved aster *(Aster macrophyllus)*	97	●●●
Bracken *(Pteridium aquilinum)*	90	●●
Wild sarsaparilla *(Aralia nudicaulis)*	89	●●
Early meadow-rue *(Thalictrum dioicum)*	82	●
Hog peanut *(Amphicarpaea bracteata)*	76	●●
Canada mayflower *(Maianthemum canadense)*	71	●
Large-flowered bellwort *(Uvularia grandiflora)*	71	●
Wood anemone *(Anemone quinquefolia)*	70	●
Pale bellwort *(Uvularia sessilifolia)*	69	●
Maryland black snakeroot *(Sanicula marilandica)*	67	●
Clayton's sweet cicely *(Osmorhiza claytonii)*	59	●
Hairy Solomon's seal *(Polygonatum pubescens)*	57	●
Common false Solomon's seal *(Smilacina racemosa)*	55	●
Rose twistedstalk *(Streptopus roseus)*	54	●
Sweet-scented bedstraw *(Galium triflorum)*	52	●
Common strawberry *(Fragaria virginiana)*	50	●
Pale vetchling *(Lathyrus ochroleucus)*	49	●
Pointed-leaved tick trefoil *(Desmodium glutinosum)*	48	●
Round-lobed hepatica *(Anemone americana)*	47	●
Rugulose or Yellow violet *(Viola canadensis* or *V. pubescens)*	46	●
Dwarf raspberry *(Rubus pubescens)*	38	●
Lady fern *(Athyrium filix-femina)*	38	●
Starflower *(Trientalis borealis)*	34	●
Spreading dogbane *(Apocynum androsaemifolium)*	31	●
Lindley's aster *(Aster ciliolatus)*	30	●
Large-flowered trillium *(Trillium grandiflorum)*	29	●
Veiny pea *(Lathyrus venosus)*	29	●
Grasses & Sedges		
Pennsylvania sedge *(Carex pensylvanica)*	91	●●●
Mountain rice grass *(Oryzopsis asperifolia)*	73	●●
Bearded shorthusk *(Brachyelytrum erectum)*	24	●
Climbing Plants		
Virginia creeper *(Parthenocissus* spp.)	26	●
Wild honeysuckle *(Lonicera dioica)*	24	●

	freq%	cover
Low Shrubs		
Lowbush blueberry *(Vaccinium angustifolium)*	43	●
Tall blackberries *(Rubus allegheniensis* and similar *Rubus* spp.)	24	●
Shrubs		
Beaked hazelnut *(Corylus cornuta)*	92	●●●●
Downy arrowwood *(Viburnum rafinesquianum)*	78	●●
Chokecherry *(Prunus virginiana)*	78	●
Juneberries *(Amelanchier* spp.)	75	●
Bush honeysuckle *(Diervilla lonicera)*	65	●
Pagoda dogwood *(Cornus alternifolia)*	61	●
Poison ivy *(Toxicodendron rydbergii)*	46	●
Round-leaved dogwood *(Cornus rugosa)*	41	●●●
Prickly gooseberry *(Ribes cynosbati)*	38	●
Fly honeysuckle *(Lonicera canadensis)*	32	●
Hairy honeysuckle *(Lonicera hirsuta)*	24	●
Gray dogwood *(Cornus racemosa)*	21	●
American hazelnut *(Corylus americana)*	18	●●●

Trees	Canopy		Subcanopy		Shrub Layer	
	freq%	cover	freq%	cover	freq%	cover
Northern red oak	82	●●●●	36	●●	82	●
Paper birch	59	●●●	25	●●	11	●
Basswood	45	●●●	46	●●	52	●
Red maple	43	●●●	59	●●●	78	●
Quaking aspen	41	●●●	20	●	46	●
Sugar maple	29	●●●	62	●●●	61	●●
Bur oak	28	●●●	18	●	20	●
Big-toothed aspen	25	●●●	8	●●	18	●
Green ash	11	●●	22	●	41	●
White pine	10	●●●	-	-	15	●
Red pine	10	●●●	-	-	-	-
Ironwood	10	●●	62	●●●	56	●●
White oak	9	●●●	-	-	8	●
Blue beech	-	-	13	●	15	●●
Black cherry	-	-	12	●	53	●