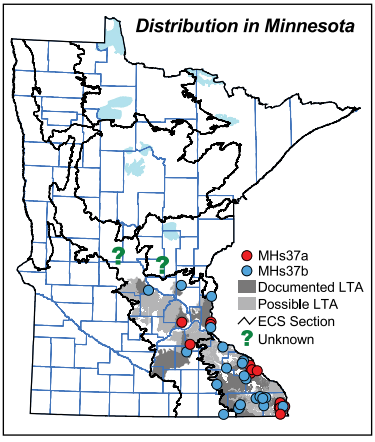
Southern Dry-Mesic Oak Forest

Dry-mesic hardwood forests occurring most often on thin, wind-deposited silt on crests and upper slopes of bedrock bluffs and less often on hummocky stagnation moraines in calcareous, partially sorted drift.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 43 plots (relevés).



- **Ground-layer** cover varies from patchy to continuous (25–100%); important species include lady fern *(Athyrium filix-femina)*, pointed-leaved tick trefoil *(Desmodium glutinosum)*, Clayton's sweet cicely *(Osmorhiza claytonii),* common enchanter's nightshade *(Circaea lutetiana)*, wild geranium *(Geranium maculatum)*, hog peanut *(Amphicarpaea bracteata)*, and white snakeroot *(Eupatorium rugosum)*.
- **Shrub-layer** cover is patchy to interrupted (25–75%); common species include northern red oak and black cherry saplings, chokecherry *(Prunus virginiana)*, American hazelnut *(Corylus americana)*, Missouri gooseberry *(Ribes missouriense)*, and pagoda dogwood *(Cornus alternifolia)*.
- **Subcanopy** cover is patchy to interrupted (25–75%); important species include basswood, black cherry, northern red oak, white oak, and shagbark hickory.
- **Canopy** cover is interrupted to continuous (50–100%); the most common species are northern red oak, white oak, and basswood. Shagbark hickory is occasionally present in the PPL.

Landscape Setting & Soils

- **Loess-covered bedrock hills**—Common. Present mainly on crests and upper slopes of bedrock bluffs. Most common on north-facing aspects on steeper slopes but also present on west- or east-facing crests and middle to upper slopes. Parent material is a mantle of wind-deposited silt deeper than 30in (75cm) over older soils, with texture that reflects the composition of the underlying sedimentary bedrock. Depths to bedrock generally exceed 60in (150cm). The silt is typically stoneless, but the soil becomes very stony just above the bedrock. Soils have dark surface horizons, indicating former occupation of these sites by oak or aspen woodland. Soils are well drained, and the soil moisture regime is fresh. (Blufflands in PPL)
- **Stagnation moraines & till plains**—Rare. Present on hummocky stagnation moraines and rolling parts of till plains. Parent material is calcareous, partially sorted drift. The surface is generally loamy but soils become sandy and gravelly at depth. Soil surface horizons are dark, indicating former occupation of these sites by oak woodland or prairie. Soils are well drained, and the soil moisture regime is fresh. (Big Woods, St. Paul-Baldwin Plains and Moraines, and Oak Savanna in MIM; Rochester Plateau in PPL)

Natural History

In the past, catastrophic disturbances were rare in MHs37. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was in excess of 1,000 years, and the rotation of catastrophic windthrow was about 390 years. Events that resulted in partial loss of trees, especially light surface fires, were much more common, with an estimated rotation of about 20 years. Based on the historic composition and age structure of these forests, MHs37 had two growth stages separated by a long period of transition.

- **0–55 years**—Young forests recovering from fire or wind, dominated by northern red oak mixed with some white oak, basswood, and American elm.
- **55–95 years**—A transition period marked by a gradual decline in northern red oak and increases in basswood, white oak, American elm, and ironwood.
- **> 95 years**—Mature forests consisting of mixed stands of white oak, basswood, northern red oak, and American elm.

Similar Native Plant Community Classes

• MHs38 Southern Mesic Oak-Basswood Forest

MHs37 and MHs38 share many species and can be very similar. The ranges of the two classes overlap in east-central and southeastern Minnesota; MHs38 usually occurs on more mesic sites and is more likely to have abundant sugar maple in the canopy.

MHs37 Indicator Species	(freq%) ***MHs37***	MHs38
Shagbark hickory (C,U)	**33**	1
Clearweed *(Pilea* spp.)	**28**	3
Spinulose shield fern or Glandular wood fern*	**26**	3
Tall blackberries**	**28**	4
Black raspberry *(Rubus occidentalis)*	**30**	5
Bracken *(Pteridium aquilinum)*	**40**	9
Woodland sunflower *(Helianthus strumosus)*	**26**	6
White snakeroot *(Eupatorium rugosum)*	**65**	19

MHs38 Indicator Species	(freq%) MHs37	***MHs38***
Bladdernut *(Staphylea trifolia)*	-	**16**
Wild leek *(Allium tricoccum)*	2	**27**
Long-stalked sedge *(Carex pedunculata)*	2	**27**
Blue beech (U)	2	**23**
Canada moonseed *(Menispermum canadense)*	2	**21**
Nodding trillium *(Trillium cernuum)*	2	**19**
Sharp-lobed hepatica *(Anemone acutiloba)*	7	**38**
Wild ginger *(Asarum canadense)*	14	**43**

* Spinulose shield fern or Glandular wood fern *(Dryopteris carthusiana* or *D. intermedia)* ** Tall blackberries *(Rubus allegheniensis* and similar *Rubus* spp.)

• FDs38 Southern Dry-Mesic Oak-Hickory Woodland

The range of FDs38 overlaps with MHs37 in the far southeastern part of Minnesota. FDs38 occurs on steep fire-prone slopes and is much more likely than MHs37 to contain species commonly found in prairies.

MHs37 Indicator Species	(freq%) ***MHs37***	FDs38
Spreading Jacob's ladder *(Polemonium reptans)*	**47**	-
Bloodroot *(Sanguinaria canadensis)*	**40**	-
Early meadow-rue *(Thalictrum dioicum)*	**35**	-
Round-leaved dogwood *(Cornus rugosa)*	**30**	-
American spikenard *(Aralia racemosa)*	**30**	-
Virginia waterleaf *(Hydrophyllum virginianum)*	**30**	-
Maidenhair fern *(Adiantum pedatum)*	**56**	6
Blue cohosh *(Caulophyllum thalictroides)*	**47**	6

FDs38 Indicator Species	(freq%) MHs37	***FDs38***
Eastern red cedar (U)	-	**29**
Canadian black snakeroot *(Sanicula canadensis)*	-	**29**
Wild bergamot *(Monarda fistulosa)*	-	**24**
Heart-leaved alexanders *(Zizia aptera)*	-	**24**
Northern pin oak (U)	7	**53**
Greenbrier *(Smilax tamnoides)*	9	**59**
Quaking aspen (C,U)	5	**35**
Elm-leaved goldenrod *(Solidago ulmifolia)*	14	**53**

• MHc36 Central Mesic Hardwood Forest (Eastern)

MHc36 generally occurs north of MHs37, although the ranges of the two classes overlap in east-central Minnesota. MHc36 is more likely than MHs37 to occur on loamy rather than sandy or gravelly soils.

MHs37 Indicator Species	(freq%) ***MHs37***	MHc36
Spreading Jacob's ladder *(Polemonium reptans)*	**47**	-
Box elder (U)	**79**	1
White snakeroot *(Eupatorium rugosum)*	**65**	1
Missouri gooseberry *(Ribes missouriense)*	**63**	2
Hackberry (C,U)	**60**	2
Cleavers *(Galium aparine)*	**40**	5
Wild grape *(Vitis riparia)*	**79**	10
White oak (C,U)	**67**	11

MHc36 Indicator Species	(freq%) MHs37	***MHc36***
Mountain rice grass *(Oryzopsis asperifolia)*	-	**60**
Large-flowered trillium *(Trillium grandiflorum)*	-	**52**
Leatherwood *(Dirca palustris)*	-	**38**
Large-leaved aster *(Aster macrophyllus)*	2	**77**
Rose twistedstalk *(Streptopus roseus)*	2	**56**
Long-stalked sedge *(Carex pedunculata)*	2	**56**
Blue beech (U)	2	**40**
Pale bellwort *(Uvularia sessilifolia)*	7	**54**

• FDs37 Southern Dry-Mesic Oak (Maple) Woodland

FDs37 can be similar to MHs37 but is more likely to occur on fine sand or sand-gravel soils than on loamy soils. FDs37 occurs on sites more affected by fire in the recent past and therefore is more likely than MHs37 to have open-grown trees in the canopy.

MHs37 Indicator Species	(freq%) ***MHs37***	FDs37
Maidenhair fern *(Adiantum pedatum)*	**56**	-
Spreading Jacob's ladder *(Polemonium reptans)*	**47**	-
Gregarious black snakeroot *(Sanicula gregaria)*	**58**	4
Bitternut hickory (C,U)	**56**	4
Sugar maple (C,U)	**51**	4
White snakeroot *(Eupatorium rugosum)*	**65**	7
Hackberry (C,U)	**60**	9
Honewort *(Cryptotaenia canadensis)*	**72**	13

FDs37 Indicator Species	(freq%) MHs37	***FDs37***
Mountain rice grass *(Oryzopsis asperifolia)*	-	**42**
Large-leaved aster *(Aster macrophyllus)*	2	**51**
Bush honeysuckle *(Diervilla lonicera)*	2	**36**
Red maple (C,U)	7	**67**
Pale bellwort *(Uvularia sessilifolia)*	7	**62**
Quaking aspen (C,U)	5	**29**
Spreading dogbane *(Apocynum androsaemifolium)*	7	**40**
Northern pin oak (C,U)	23	**60**

Native Plant Community Types in Class

- **MHs37a Red Oak - White Oak Forest**

Canopy is dominated by northern red oak, often with white oak and (in the PPL) shagbark hickory. Basswood and box elder are present in the subcanopy in most stands. Northern red oak, box elder, basswood, and black cherry are commonly present in the shrub layer with chokecherry, poison ivy *(Toxicodendron rydbergii)*, prickly gooseberry *(Ribes cynosbati)*, American hazelnut, and red raspberry *(Rubus idaeus)*. MHs37a is distinguished from MHs37b by lower abundance of sugar maple. When present, round-leaved dogwood *(Cornus rugosa)*, red-berried elder *(Sambucus racemosa)*, American spikenard (*Aralia racemosa*), spinulose shield fern or glandular wood fern *(Dryopteris carthusiana* or *D. intermedia)*, woodland sunflower *(Helianthus strumosus)*, Canada mayflower *(Maianthemum canadense)*, and wild lettuce *(Lactuca* spp.) also help to distinguish MHs37a from MHs37b. Documented in the PPL and MIM. Description is based on summary of vegetation data from 20 plots.

- **MHs37b Red Oak - White Oak - (Sugar Maple) Forest**

Canopy is most often dominated by northern red oak or white oak. Some stands may have abundant northern pin oak, bur oak, or white pine. Ironwood is common in the understory, with occasional sugar maple, black cherry, basswood, and other tree species. Bitternut hickory and black cherry are frequently present in the shrub layer with American hazelnut, chokecherry, Missouri gooseberry, prickly ash *(Zanthoxylum americanum)*, and pagoda dogwood. Species that can help to distinguish MHs37b from MHs37a include sugar maple or green ash in the canopy or subcanopy, along with prickly ash, black raspberry *(Rubus occidentalis)*, stinging nettle *(Urtica dioica)*, wood nettle *(Laportea canadensis)*, rugulose or yellow violet *(Viola canadensis* or *V. pubescens)*, touch-me-not *(Impatiens* spp.), and starry sedge *(Carex rosea)*. Documented in the PPL and MIM. Description is based on summary of vegetation data from 23 plots.

photo by D.S. Wovcha MN DNR

Scott County, MN

MHs37 Southern Dry-Mesic Oak Forest – Species Frequency & Cover

	freq%	cover
Forbs, Ferns & Fern Allies		
Lady fern *(Athyrium filix-femina)*	91	●●
Pointed-leaved tick trefoil *(Desmodium glutinosum)*	88	●●
Clayton's sweet cicely *(Osmorhiza claytonii)*	86	●
Common enchanter's nightshade *(Circaea lutetiana)*	81	●
Wild geranium *(Geranium maculatum)*	79	●
Honewort *(Cryptotaenia canadensis)*	72	●
White avens *(Geum canadense)*	72	●
Lopseed *(Phryma leptostachya)*	72	●
Hog peanut *(Amphicarpaea bracteata)*	70	●●
White snakeroot *(Eupatorium rugosum)*	65	●
Common false Solomon's seal *(Smilacina racemosa)*	65	●
Large-flowered bellwort *(Uvularia grandiflora)*	63	●
Gregarious black snakeroot *(Sanicula gregaria)*	58	●
Maidenhair fern *(Adiantum pedatum)*	56	●
Wild sarsaparilla *(Aralia nudicaulis)*	56	●
Jack-in-the-pulpit *(Arisaema triphyllum)*	56	●
Sweet-scented bedstraw *(Galium triflorum)*	53	●
Rattlesnake fern *(Botrychium virginianum)*	51	●
Spreading Jacob's ladder *(Polemonium reptans)*	47	●
Blue cohosh *(Caulophyllum thalictroides)*	47	●
Erect, Smooth, or Illinois carrion-flower*	44	●
Wood anemone *(Anemone quinquefolia)*	42	●
Red baneberry *(Actaea rubra)*	42	●
Bracken *(Pteridium aquilinum)*	40	●
Cleavers *(Galium aparine)*	40	●
Bloodroot *(Sanguinaria canadensis)*	40	●
Early meadow-rue *(Thalictrum dioicum)*	35	●
Maryland black snakeroot *(Sanicula marilandica)*	35	●
Zigzag goldenrod *(Solidago flexicaulis)*	33	●
Clearweed *(Pilea* spp.)	28	●
Grasses & Sedges		
Starry sedge *(Carex rosea)*	37	●
Pennsylvania sedge *(Carex pensylvanica)*	35	●
Bland sedge *(Carex blanda)*	23	●

	freq%	cover
Climbing Plants		
Virginia creeper *(Parthenocissus* spp.)	86	●●
Wild grape *(Vitis riparia)*	79	●
Low Shrubs		
Red raspberry *(Rubus idaeus)*	42	●
Black raspberry *(Rubus occidentalis)*	30	●
Tall blackberries *(Rubus allegheniensis* and similar *Rubus* spp.)	28	●●
Shrubs		
Chokecherry *(Prunus virginiana)*	79	●●
American hazelnut *(Corylus americana)*	72	●●
Missouri gooseberry *(Ribes missouriense)*	63	●●
Poison ivy *(Toxicodendron rydbergii)*	63	●
Pagoda dogwood *(Cornus alternifolia)*	58	●●
Prickly gooseberry *(Ribes cynosbati)*	51	●●●
Gray dogwood *(Cornus racemosa)*	42	●
Round-leaved dogwood *(Cornus rugosa)*	30	●●
Nannyberry *(Viburnum lentago)*	26	●

Trees	Canopy		Subcanopy		Shrub Layer	
	freq%	cover	freq%	cover	freq%	cover
Northern red oak	91	●●●●	35	●	72	●
White oak	67	●●●●	30	●●	28	●
Basswood	51	●●	74	●●	60	●
American elm	40	●●●	51	●●●	40	●
Sugar maple	35	●●	49	●	28	●
Black cherry	33	●	67	●	70	●
Ironwood	30	●●	56	●●	35	●
Bur oak	30	●●●	12	●	12	●
Red elm	30	●●●	51	●●●	51	●●
Shagbark hickory	28	●	30	●●	28	●
Northern pin oak	23	●●●●	-	-	-	-
Hackberry	23	●	47	●	37	●
Paper birch	21	●●	-	-	-	-
Bitternut hickory	19	●	37	●●●	56	●
Box elder	14	●	56	●●	67	●

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