



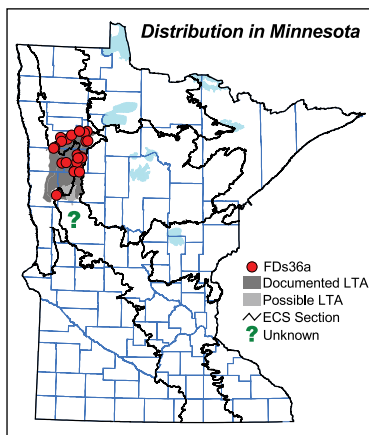
## Southern Dry-Mesic Oak-Aspen Forest

Dry-mesic hardwood forests dominated by a mix of bur oak and quaking aspen. Present on hummocky stagnation moraines on well-drained, gravelly, loamy, calcareous till in northwestern Minnesota.

### Vegetation Structure & Composition

Description is based on summary of vegetation data from 25 plots (relevés).

- **Ground-layer** cover is patchy to continuous (25–100%). Common species include large-flowered bellwort (*Uvularia grandiflora*), early meadow-rue (*Thalictrum dioicum*), Maryland black snakeroot (*Sanicula marilandica*), Clayton's sweet cicely (*Osmorhiza claytonii*), wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), and Pennsylvania sedge (*Carex pensylvanica*).
- **Shrub-layer** cover is patchy to interrupted (25–75%); common species include downy arrowwood (*Viburnum rafinesquianum*), poison ivy (*Toxicodendron rydbergii*), chokecherry (*Prunus virginiana*), juneberry (*Amelanchier* spp.), wolfberry (*Symphoricarpos occidentalis*), American hazelnut (*Corylus americana*), and gray dogwood (*Cornus racemosa*).
- **Subcanopy** cover is interrupted (50–75%); quaking aspen and green ash are the most common species. Occasionally, American elm is present.
- **Canopy** cover is mostly interrupted to continuous (50–100%); the most common species are bur oak and quaking aspen. Occasional species include basswood, American elm, green ash, and paper birch.



### Landscape Setting & Soils

- **Stagnation moraines**—Occasional. Present on rolling to hummocky terrain. Parent material typically is gravelly, loamy, calcareous till but may also include sandy lacustrine deposits. Soils have very dark surface horizons typical of prairies, suggesting these sites were formerly occupied by prairie or open woodland (or that following fire in FDs36, soil development processes are similar to those in prairies). Soils have firm, clayey subsoil horizons that perch snowmelt and rainfall. These clayey horizons have elements of precipitated lime, and deeper horizons are highly calcareous. Soils are well drained, and the soil-moisture regime is fresh. (Hardwood Hills in MIM, RRV)

### Natural History

In the past, fires were very common throughout the range of FDs36. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about 100 years, and the rotation of mild surface fires was about 20 years. The rotation of all fires combined is estimated to be 18 years. Windthrow was not common, with the estimated rotation exceeding 1,000 years. Based on the historic composition and age structure of these forests, FDs36 had three growth stages separated by two periods of transition.

- **0–35 years**—Young forests recovering from fire, strongly dominated by quaking aspen with minor amounts of bur oak.
- **35–75 years**—A transition period marked by a precipitous decline in quaking aspen, mirrored by increases in bur oak. American elm also increases during this period.
- **75–135 years**—Mature forests consisting of mixed stands of bur oak, senescent quaking aspen, and young American elm. Several cohorts of quaking aspen may be present in the understory or in small patches following surface fires.



- **135–175 years**—A transition period marked by the continuing decline of quaking aspen and some decline in bur oak. American elm and possibly white pine (see below) increase during this period.
- **> 175 years**—Very old forests dominated by bur oak mixed with some elm and apparently white pine. (The historic occurrence of white pine in this community is questionable because samples from modern stands lack white pine.)

### Similar Native Plant Community Classes

#### • FDs37 Southern Dry-Mesic Oak (Maple) Woodland

FDs37 can be similar to FDs36, and the ranges of the two communities overlap in the central part of the Hardwood Hills Subsection in the MIM and adjacent parts of the RRV. FDs37 tends to occur on fine sand or sand-gravel rather than loamy soils and is more likely to have abundant northern pin oak in the canopy and a continuous (rather than patchy) shrub layer.

FDs36 Indicator Species	(freq%)	
	FDs36	FDs37
Canada goldenrod ( <i>Solidago canadensis</i> )	32	2
Tall coneflower ( <i>Rudbeckia laciniata</i> )	28	2
Golden alexanders ( <i>Zizia aurea</i> )	28	2
Basswood (C)	40	4
American elm (C)	36	7
Large-flowered bellwort ( <i>Uvularia grandiflora</i> )	88	20
Lindley's aster ( <i>Aster ciliolatus</i> )	64	16
Bloodroot ( <i>Sanguinaria canadensis</i> )	32	9

\*Tall blackberries (*Rubus allegheniensis* and similar *Rubus* spp.)

FDs37 Indicator Species	(freq%)	
	FDs36	FDs37
Northern pin oak (C,U)	-	60
Tall blackberries*	-	53
Large-leaved aster ( <i>Aster macrophyllus</i> )	-	51
Giant Solomon's seal ( <i>Polygonatum biflorum</i> )	-	27
Wild geranium ( <i>Geranium maculatum</i> )	4	71
Red maple (C,U)	4	67
Lady fern ( <i>Athyrium filix-femina</i> )	8	53
Black cherry (C,U)	16	87

#### • MHc37 Central Mesic Hardwood Forest (Western)

MHc37 is somewhat similar to FDs36, and the two classes have overlapping ranges in the northern part of the MIM and adjacent areas. Sugar maple is common in all tree species vegetation layers in MHc37 while absent from the canopy and subcanopy and only rarely present in the shrub layer in FDs36.

FDs36 Indicator Species	(freq%)	
	FDs36	MHc37
Golden alexanders ( <i>Zizia aurea</i> )	28	-
Gray dogwood ( <i>Cornus racemosa</i> )	72	5
Wild grape ( <i>Vitis riparia</i> )	24	2
Snowberry or Wolfberry*	68	6
Red raspberry ( <i>Rubus idaeus</i> )	36	6
Wild plum ( <i>Prunus americana</i> )	24	4
Tall meadow-rue ( <i>Thalictrum dasycarpum</i> )	28	6
Starry false Solomon's seal ( <i>Smilacina stellata</i> )	36	7

\*Snowberry or Wolfberry (*Symphoricarpos albus* or *S. occidentalis*)

MHc37 Indicator Species	(freq%)	
	FDs36	MHc37
Large-leaved aster ( <i>Aster macrophyllus</i> )	-	23
Sugar maple (C,U)	8	93
Leatherwood ( <i>Dirca palustris</i> )	8	68
Northern red oak (C)	8	44
Rose twistedstalk ( <i>Streptopus roseus</i> )	12	43
Paper birch (C,U)	20	65
American spikenard ( <i>Aralia racemosa</i> )	12	38
Northern red oak (U)	24	68

#### • MHW36 Northwestern Wet-Mesic Hardwood Forest

Data for MHW36 are limited, but it generally occurs on moister sites (such as riparian areas) than FDs36 and is more likely to have abundant basswood, American elm, or green ash in the canopy. The ranges of the two classes overlap in the southern part of the LAP.

FDs36 Indicator Species	(freq%)	
	FDs36	MHW36
Large-flowered bellwort ( <i>Uvularia grandiflora</i> )	88	-
Pointed-leaved tick trefoil ( <i>Desmodium glutinosum</i> )	40	-
Zigzag goldenrod ( <i>Solidago flexicaulis</i> )	32	-
Climbing bittersweet ( <i>Celastrus scandens</i> )	28	-
Northern red oak (U)	24	-
Wild plum ( <i>Prunus americana</i> )	24	-
Round-lobed hepatica ( <i>Anemone americana</i> )	24	-
American hazelnut ( <i>Corylus americana</i> )	68	17

MHW36 Indicator Species	(freq%)	
	FDs36	MHW36
Balsam poplar (C,U)	-	67
Veiny meadow-rue ( <i>Thalictrum venulosum</i> )	-	50
Virginia thimbleweed ( <i>Anemone virginiana</i> )	-	33
Giant Solomon's seal ( <i>Polygonatum biflorum</i> )	-	33
Giant goldenrod ( <i>Solidago gigantea</i> )	-	33
Nodding fescue ( <i>Festuca subverticillata</i> )	-	33
Nodding trillium ( <i>Trillium cernuum</i> )	12	83
Veiny pea ( <i>Lathyrus venosus</i> )	12	50

#### • MHs38 Southern Mesic Oak-Basswood Forest

MHs38 is most similar to FDs36 when dominated by basswood, bur oak, or green ash (MHs38b). MHs38 occurs on soil derived from gravelly, partially sorted, weakly calcareous till and is less likely than FDs36 to have quaking aspen in the canopy.



FDs36 Indicator Species	(freq%)	
	FDs36	MHs38
Prickly or Smooth wild rose*	32	-
Downy arrowwood ( <i>Viburnum rafinesquianum</i> )	88	7
Round-lobed hepatica ( <i>Anemone americana</i> )	24	2
Lindley's aster ( <i>Aster ciliolatus</i> )	40	7
Beaked hazelnut ( <i>Corylus cornuta</i> )	64	5
Quaking aspen (C,U)	72	9
Juneberries ( <i>Amelanchier</i> spp.)	76	12
American hazelnut ( <i>Corylus americana</i> )	68	14

\*Prickly or Smooth wild rose (*Rosa acicularis* or *R. blanda*)

MHs38 Indicator Species	(freq%)	
	FDs36	MHs38
Virginia waterleaf ( <i>Hydrophyllum virginianum</i> )	-	77
Cleavers ( <i>Galium aparine</i> )	-	47
Starry sedge ( <i>Carex rosea</i> )	-	44
Hackberry (U)	-	42
Canada moonseed ( <i>Menispermum canadense</i> )	-	26
Giant Solomon's seal ( <i>Polygonatum biflorum</i> )	-	23
Jack-in-the-pulpit ( <i>Arisaema triphyllum</i> )	4	65
Ironwood (C,U)	24	81

### • MHC36 Central Mesic Hardwood Forest (Eastern)

MHC36 sometimes has quaking aspen or bur oak in the canopy—although it is most often strongly dominated by basswood, sugar maple, and northern red oak—and can appear similar to FDs36. MHC36 occurs mainly to the east of FDs36 and is more likely to have species with affinity for mesic forests.

FDs36 Indicator Species	(freq%)	
	FDs36	MHC36
Box elder (U)	32	1
Canada goldenrod ( <i>Solidago canadensis</i> )	32	1
Snowberry or Wolfberry*	68	3
Prickly or Smooth wild rose**	32	2
Golden alexanders ( <i>Zizia aurea</i> )	28	2
Tall meadow-rue ( <i>Thalictrum dasycarpum</i> )	28	2
Gray dogwood ( <i>Cornus racemosa</i> )	72	7
Starry false Solomon's seal ( <i>Smilacina stellata</i> )	36	5

\*Snowberry or Wolfberry (*Symphoricarpos albus* or *S. occidentalis*) \*\*Prickly or Smooth wild rose (*Rosa acicularis* or *R. blanda*)

MHC36 Indicator Species	(freq%)	
	FDs36	MHC36
Large-leaved aster ( <i>Aster macrophyllus</i> )	-	77
Long-stalked sedge ( <i>Carex pedunculata</i> )	-	53
Wild geranium ( <i>Geranium maculatum</i> )	4	52
Large-flowered trillium ( <i>Trillium grandiflorum</i> )	4	52
Red maple (C,U)	4	50
Jack-in-the-pulpit ( <i>Arisaema triphyllum</i> )	4	50
Sugar maple (C,U)	8	91
Lady fern ( <i>Athyrium filix-femina</i> )	8	88

### Native Plant Community Types in Class

#### • FDs36a Bur Oak - Aspen Forest

FDs36a is the only community type recognized in this class.



photo by Craig Anderson, MN DNR



### FDs36 Southern Dry-Mesic Oak-Aspen Forest — Species Frequency & Cover

Forbs, Ferns & Fern Allies		freq %	cover
Large-flowered bellwort ( <i>Uvularia grandiflora</i> )	88	•••	
Early meadow-rue ( <i>Thalictrum dioicum</i> )	80	••	
Maryland black snakeroot ( <i>Sanicula marilandica</i> )	80	•	
Clayton's sweet cicely ( <i>Osmorhiza claytonii</i> )	76	•	
Wild sarsaparilla ( <i>Aralia nudicaulis</i> )	72	•••	
Canada mayflower ( <i>Maianthemum canadense</i> )	72	••	
Common strawberry ( <i>Fragaria virginiana</i> )	68	•	
Lindley's aster ( <i>Aster ciliolatus</i> )	64	•	
Hog peanut ( <i>Amphicarpaea bracteata</i> )	64	•	
Lopseed ( <i>Phytma leptostachya</i> )	60	•	
Smooth carrion-flower ( <i>Smilax herbacea</i> )	52	•	
Sweet-scented bedstraw ( <i>Galium triflorum</i> )	44	•	
Pointed-leaved tick trefoil ( <i>Desmodium glutinosum</i> )	40	••	
Columbine ( <i>Aquilegia canadensis</i> )	40	•	
Starry false Solomon's seal ( <i>Smilacina stellata</i> )	36	•	
Spreading dogbane ( <i>Apocynum androsaemifolium</i> )	36	•	
Rugulose or Yellow violet ( <i>Viola canadensis</i> or <i>V. pubescens</i> )	36	•	
Bloodroot ( <i>Sanguinaria canadensis</i> )	32	•	
Canada goldenrod ( <i>Solidago canadensis</i> )	32	•	
Bracken ( <i>Pteridium aquilinum</i> )	32	••	
Common false Solomon's seal ( <i>Smilacina racemosa</i> )	32	•	
Zigzag goldenrod ( <i>Solidago flexicaulis</i> )	32	•	
Dwarf raspberry ( <i>Rubus pubescens</i> )	32	•	
Rattlesnake fern ( <i>Botrychium virginianum</i> )	32	•	
Wood anemone ( <i>Anemone quinquefolia</i> )	28	•	
Blue cohosh ( <i>Caulophyllum thalictroides</i> )	28	•	
Red daneberry ( <i>Actaea rubra</i> )	28	•	
Tall coneflower ( <i>Rudbeckia laciniata</i> )	28	••	
Tall meadow-rue ( <i>Thalictrum dasycarpum</i> )	28	••	
Golden alexanders ( <i>Zizia aurea</i> )	28	•	
Pink shinleaf ( <i>Pyrola asarifolia</i> )	24	•	
Yellow lady's slipper ( <i>Cypripedium calceolus</i> )	16	•	
Wild ginger ( <i>Asarum canadense</i> )	12	•••	
Pale yetchling ( <i>Lathyrus ochroleucus</i> )	12	•	

Grasses & Sedges		freq %	cover
Pennsylvania sedge ( <i>Carex pensylvanica</i> )	84	•••	
Mountain rice grass ( <i>Oryzopsis asperifolia</i> )	44	•	
Bottlebrush grass ( <i>Elymus hystrix</i> )	28	•	

Woody Vines		freq %	cover
Virginia creeper ( <i>Parthenocissus</i> spp.)	48	••	
Wild honeysuckle ( <i>Lonicera dioica</i> )	28	•	
Climbing bittersweet ( <i>Celastrus scandens</i> )	28	•	
Wild grape ( <i>Vitis riparia</i> )	24	•	

Low Shrubs		freq %	cover
Red raspberry ( <i>Rubus idaeus</i> )	32	•	

Tall Shrubs		freq %	cover
Downy arrowwood ( <i>Viburnum rafinesquianum</i> )	88	••	
Poison ivy ( <i>Toxicodendron rydbergii</i> )	84	•••	
Chokecherry ( <i>Prunus virginiana</i> )	76	•	
Junberries ( <i>Amelanchier</i> spp.)	76	•	
Gray dogwood ( <i>Cornus racemosa</i> )	68	•••	
American hazelnut ( <i>Corylus americana</i> )	68	•••	
Snowberry or Wolfberry ( <i>Symphoricarpos albus</i> or <i>S. occidentalis</i> )	68	•	
Prickly ash ( <i>Zanthoxylum americanum</i> )	44	•	
Beaked hazelnut ( <i>Corylus cornuta</i> )	40	•••	
Prickly or Smooth wild rose ( <i>Rosa acicularis</i> or <i>R. blanda</i> )	32	•	

Trees		Canopy	Subcanopy	Shrub Layer		
	freq %	cover	freq %	cover		
Bur oak	76	••••	24	•••	28	•
Quaking aspen	72	•••	60	••	44	•
Basswood	40	•••	16	••	24	•
American elm	36	••	28	••	32	•
Green ash	20	•	36	•	64	•
Paper birch	20	•	-	-	8	•
Northern red oak	8	••••	8	•	20	•
Box elder	-	-	24	•	24	•
Ironwood	-	-	20	•	24	•
Black cherry	-	-	12	•	12	•