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-roe (*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.

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

*FDs36 IndicatorSpecies (freq%)

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

*MHc37 Indicator Species (freq%)

• 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.

<table>
<thead>
<tr>
<th>FDs36 Indicator Species</th>
<th>(freq%)</th>
<th>FDs36</th>
<th>MHw36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large-flowered bellwort (Uvularia grandiflora)</td>
<td>88</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Pointed-leaved tick trefoil (Desmodium glutinosum)</td>
<td>40</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Zigzag goldenrod (Solidago flexicaulis)</td>
<td>32</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Climbing bittersweet (Celastrus scandens)</td>
<td>28</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Northern red oak (U)</td>
<td>24</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Wild plum (Prunus americana)</td>
<td>24</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Round-lobed hepatica (Anemone americana)</td>
<td>24</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>American hazelnut ( Corylus americana)</td>
<td>68</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

*FDs36 Indicator Species (freq%)

<table>
<thead>
<tr>
<th>MHw36 Indicator Species</th>
<th>(freq%)</th>
<th>MHw36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balsam poplar (C.U)</td>
<td>-</td>
<td>67</td>
</tr>
<tr>
<td>Veiny meadow-rue (Thalictrum venulosum)</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>Virginia thimbleweed (Anemone virginiana)</td>
<td>-</td>
<td>33</td>
</tr>
<tr>
<td>Giant Solomon’s seal (Polygonatum biflorum)</td>
<td>-</td>
<td>33</td>
</tr>
<tr>
<td>Giant goldenrod (Solidago gigantea)</td>
<td>-</td>
<td>33</td>
</tr>
<tr>
<td>Nodding false (Festuca subverticillata)</td>
<td>-</td>
<td>33</td>
</tr>
<tr>
<td>Nodding trillium (Trillium cuneatum)</td>
<td>12</td>
<td>83</td>
</tr>
<tr>
<td>Veiny pea (Lathyrus venosus)</td>
<td>12</td>
<td>50</td>
</tr>
</tbody>
</table>

*MHw36 Indicator Species (freq%)

• 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 Central Mesic Hardwood Forest (Eastern)**

MHc36 sometimes has quaking aspen or bur oak in the canopy—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.

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

**FDs36a Bur Oak - Aspen Forest**

FDs36a is the only community type recognized in this class.
Forbs, Ferns & Fern Allies

Large-flowered bellwort (Uvularia grandiflora) 88

••
Early meadow-rue (Thalictrum dioicum) 80

•
Maryland black snakeroot (Sanicula marilandica) 80

•
Clayton's sweet cicely (Osmorhiza claytonii) 76

•
Wild sarsaparilla (Aralia nudicaulis) 72

••
Canada mayflower (Maianthemum canadense) 72

•
Common strawberry (Fragaria virginiana) 68

•
Lindley's aster (Aster ciliolatus) 64

•
Hog peanut (Amphicarpaea bracteata) 64

•
Lopseed (Phryma leptostachya) 60

•
Smooth carrion-flower (Smilax herbacea) 52

•
Sweet-scented bedstraw (Galium triflorum) 44

•
Pointed-leaved tick trefoil (Desmodium glutinosum) 40

•
Columbine (Aquilegia canadensis) 40

•
Starry false Solomon's seal (Smilacina stellata) 36

•
Spreading dogbane (Apocynum androsaemifolium) 36

•
Rugulose or Yellow violet (Viola canadensis or V. pubescens) 36

•
Bloodroot (Sanguinaria canadensis) 32

•
Canada goldenrod (Solidago canadensis) 32

•
Bracken (Pteridium aquilinum) 32

••
Common false Solomon's seal (Smilacina racemosa) 32

•
Zigzag goldenrod (Solidago flexicaulis) 32

•
Dwarf raspberry (Rubus pubescens) 32

•
Rattlesnake fern (Botrychium virginianum) 32

•
Wood anemone (Anemone quinquefolia) 32

•
Blue cohosh (Caulophyllum thalictroides) 28

•
Red cohosh (Caulophyllum thalictroides) 28

•
Wild grape (Vitis riparia) 24

•
Climbing bittersweet (Celastrus scandens) 28

•
Wild honeysuckle (Lonicera dioica) 28

•
Poison ivy (Toxicodendron rydbergii) 28

••
Chokecherry (Prunus virginiana) 76

•
Juneberries (Amelanchier spp.) 76

•
Gray dogwood (Cornus racemosa) 68

•••
American hazelnut (Corylus americana) 68

•
Snowberry or Wolfberry (Symphoricarpos albus or S. occidentalis) 68

•
Prickly ash (Zanthoxylum americanum) 44

•
Pink shinleaf (Pyrola asarifolia) 24

•
Yellow lady's slipper (Cypripedium calceolus) 16

•
Wild ginger (Asarum canadense) 12

••
Pale vetchling (Lathyrus ochroleucus) 12

Grasses & Sedges

Pennsylvania sedge (Carex pensylvanica) 78

••
Mountain rice grass (Oryzopsis asperifolia) 44

•
Bottlebrush grass (Elymus hystrix) 28

Woody Vines

Virginia creeper (Parthenocissus spp.) 48

••
Wild honeysuckle (Lonicera dioica) 28

•
Climbing bittersweet (Celastrus scandens) 28

•
Wild grape (Vitis riparia) 24

Low Shrubs

Red raspberry (Rubus idaeus) 32

Tall Shrubs

Downy arrowwood (Viburnum rafinesquianum) 88

••
Poison ivy (Toxicodendron rydbergii) 84

•••
Chokecherry (Prunus virginiana) 76

•
Juneberries (Amelanchier spp.) 76

•
Gray dogwood (Cornus racemosa) 68

•••
American hazelnut (Corylus americana) 68

•
Snowberry or Wolfberry (Symphoricarpos albus or S. occidentalis) 68

•
Prickly ash (Zanthoxylum americanum) 44

•
Beaked hazelnut (Corylus cornuta) 40

•••
Prickly or Smooth wild rose (Rosa acicularis or R. blanda) 32

Trees

- Species
- Frequency & Cover
- Canopy
- Subcanopy
- Shrub
- Layer

- Bur oak
- Quaking aspen
- Basswood
- American elm
- Green ash
- Paper birch
- Northern red oak
- Box elder
- Ironwood
- Black cherry
- Canopy
- Subcanopy
- Shrub

- Frequency & Cover
- Layer
- 32
- 60
- 40
- 68
- 76
- 80
- 88
- 28
- 44
- 8
- 32
- 68
- 76
- 80
- 88
- 28
- 44
- 8
- 32
- 68
- 76
- 80
- 88
- 28
- 44
- 8
- 32
- 68
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- 80
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- 8
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- 28
- 44
- 8
- 32
- 68
- 76
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- 88
- 28
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- 8
- 32
- 68
- 76
- 80
- 88