



## Central Rich Dry Pine Woodland

Dry-mesic pine or hardwood woodlands on sandy, level to gently undulating outwash deposits or occasionally on sandy inclusions in rolling to hummocky stagnation moraines. Crown fires and mild surface fires were common historically.

### Vegetation Structure & Composition

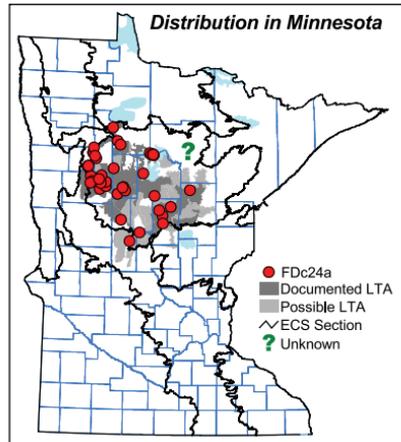
Description is based on summary of vegetation data from 45 plots (relevés).

- **Ground layer** is variable in cover, ranging from sparse to continuous (5–100% cover). Bracken (*Pteridium aquilinum*), Pennsylvania sedge (*Carex pensylvanica*), and mountain rice grass (*Oryzopsis asperifolia*) are often abundant. Other common species are Canada mayflower (*Maianthemum canadense*), northern bedstraw (*Galium boreale*), and common strawberry (*Fragaria virginiana*). Patches of moss are typical, with *Pleurozium schreberi* most commonly reported.

- **Shrub layer** is dense (often with > 75% cover); beaked hazelnut (*Corylus cornuta*), American hazelnut (*Corylus americana*), and bush honeysuckle (*Diervilla lonicera*) are usually abundant. Other common shrub or half-shrub species include prickly or smooth wild rose (*Rosa acicularis* or *R. blanda*), juneberries (*Amelanchier* spp.), poison ivy (*Toxicodendron rydbergii*), and lowbush blueberry (*Vaccinium angustifolium*).

- **Subcanopy** is absent or poorly developed.

- **Canopy** is interrupted to continuous (50–100% cover), most commonly dominated by jack pine but occasionally dominated by red pine, quaking aspen, bur oak, or northern red oak.



### Landscape Setting & Soils

- **Outwash plains**—Common. Landscape is flat to rolling, with deep soils. Parent material is well-sorted sand, often with gravelly lenses but no large stones. Originally the parent material was calcareous, but free carbonates are now at least 30in (75cm) below the soil surface. Soil surface is somewhat dark to very dark in the upper 10in (25cm) because of incorporated organic matter, which indicates that these sites were formerly occupied by deciduous woodlands or prairies. Subsoil horizons that can perch snowmelt or rainfall are absent, although the organic-enriched surface horizons and complex textural banding in the lower horizons help to hold rainfall during the growing season. Soils are somewhat excessively drained. Soil-moisture regime is moderately dry to moderately fresh. (Chippewa Plains and Pine Moraines & Outwash Plains in MDL)

- **Stagnation moraines**—Occasional. Present on flat, local deposits of sand within otherwise hummocky or rolling landscapes. Originally the sandy parent material was calcareous, but free carbonates are now at least 60in (150cm) below the soil surface. Soil surface is somewhat darkened because of incorporated organic matter, which indicates that these sites were formerly occupied by deciduous brushland or woodland. The organic-enriched surface horizons and complex textural banding present in lower horizons help to hold rainfall during the growing season. Soils are well drained to somewhat excessively drained. Soil-moisture regime is moderately dry to moderately fresh. (Hardwood Hills in MIM, St. Louis Moraines and Pine Moraines & Outwash Plains in MDL)

### Natural History

In the past, fires were very common throughout the range of FDC24. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about



130 years, and the rotation of mild surface fires about 30 years. The rotation of all fires combined is estimated to be 23 years. Windthrow was not common, with an estimated rotation exceeding 1,000 years. Based on the historic composition and age structure of these woodlands, FDC24 had three growth stages separated by two periods of transition.

- **0–55 years**—Young woodlands recovering from fire, strongly dominated by jack pine with red pine and quaking aspen present as minor components.
- **55–75 years**—A transition period marked by a partial decline in jack pine, mirrored by an increase in red pine. Northern red oak and bur oak, although minor components, peak during this period when present.
- **75–155 years**—Mature woodlands dominated by jack pine mixed with red pine. Cohorts of younger red pine and jack pine are characteristic in the understory, becoming established following mild surface fires.
- **155–195 years**—A transition period marked by a sharp decline in red pine and a modest decline in jack pine, mirrored by an increase in white pine.
- **> 195 years**—Very old forests dominated by jack pine of several age classes. White pine and some old red pines are present as supercanopy trees. (Jack pine and white pine are rarely present together in contemporary old forests. The apparent discrepancy between historic and contemporary old-forest composition may be an artifact of having too few samples of very old forests. Alternatively, it may have been possible for jack pine to grow among scattered white pines and old red pines on sites with rich sandy soils, which are now mostly farmland.)

## Similar Native Plant Community Classes

### • FDC25 Central Dry Oak-Aspen (Pine) Woodland

FDC25 is the class most similar to FDC24, especially when dominated by jack pine (FDC25a). FDC25 generally occurs to the south and east of FDC24 on sandy glacial river terraces in the St. Croix River valley, but the ranges of the two classes overlap in central Minnesota. FDC25 is more likely to have species characteristic of open jack pine barrens communities (including those common to the east in Wisconsin), while FDC24 is more likely to have species characteristic of closed-canopy FDN communities.

FDC24 Indicator Species	(freq%)	
	FDC24	FDC25
Beaked hazelnut ( <i>Corylus cornuta</i> )	78	-
Early meadow-rue ( <i>Thalictrum dioicum</i> )	73	-
Blue giant hyssop ( <i>Agastache foeniculum</i> )	42	-
Twinflower ( <i>Linnæa borealis</i> )	31	-
Red pine (C,U)	29	-
Red raspberry ( <i>Rubus idaeus</i> )	69	13
Wild sarsaparilla ( <i>Aralia nudicaulis</i> )	69	13
Large-leaved aster ( <i>Aster macrophyllus</i> )	62	13

FDC25 Indicator Species	(freq%)	
	FDC24	FDC25
Big bluestem ( <i>Andropogon gerardii</i> )	-	50
Little bluestem ( <i>Schizachyrium scoparium</i> )	-	50
Sweet fern ( <i>Comptonia peregrina</i> )	-	25
Wild bergamot ( <i>Monarda fistulosa</i> )	2	63
Northern pin oak (C,U)	4	100
Woodland sunflower ( <i>Helianthus strumosus</i> )	4	63
Sharp-pointed rice grass ( <i>Oryzopsis pungens</i> )	4	50
Wintergreen ( <i>Gaultheria procumbens</i> )	24	75

### • FDC34 Central Dry-Mesic Pine-Hardwood Forest

FDC34 can be similar to FDC24 but is usually dominated by red pine or white pine with jack pine only of minor importance. FDC34 is more likely to have species (including red and white pine) that occur on sites where relatively fine-textured and rich soils are within the reach of deeper rooting plants. FDC24 is more likely to have species present on the relatively poor soils typically derived from deep deposits of sand and gravel.

FDC24 Indicator Species	(freq%)	
	FDC24	FDC34
Pussytoes ( <i>Antennaria</i> spp.)	18	-
Hoary puccoon ( <i>Lithospermum canescens</i> )	11	-
Blue giant hyssop ( <i>Agastache foeniculum</i> )	42	2
Jack pine (C,U)	84	17
Pin cherry ( <i>Prunus pensylvanica</i> )	33	7
Erect, Smooth, or Illinois carrion-flower*	18	5
Prairie willow ( <i>Salix humilis</i> )	62	20
Pipsissewa ( <i>Chimaphila umbellata</i> )	20	7

FDC34 Indicator Species	(freq%)	
	FDC24	FDC34
Large-flowered bellwort ( <i>Uvularia grandiflora</i> )	2	51
White pine (C)	4	46
Red maple (C)	4	34
Fly honeysuckle ( <i>Lonicera canadensis</i> )	4	27
Rose twistedstalk ( <i>Streptopus roseus</i> )	11	68
Round-leaved dogwood ( <i>Cornus rugosa</i> )	11	44
Bunchberry ( <i>Cornus canadensis</i> )	11	39
Bluebead lily ( <i>Cliantonia borealis</i> )	13	46

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

### • FDC23 Central Dry Pine Woodland

FDC23 is somewhat similar to FDC24 but occurs on sand deposits that have had a longer history of conifer cover; as a result, the soils of FDC23 are poorer in nutrients and have lower organic material content in the upper horizons. FDC23 is much more likely to have species characteristic of prairie habitats.



FDc24 Indicator Species	(freq%)	
	FDc24	FDc23
Clayton's sweet cicely ( <i>Osmorhiza claytonii</i> )	27	-
Round-lobed hepatica ( <i>Anemone americana</i> )	18	-
Dwarf raspberry ( <i>Rubus pubescens</i> )	40	8
White pine (U)	20	5
Green ash (U)	27	8
Black cherry (U)	33	11
Sweet-scented bedstraw ( <i>Galium triflorum</i> )	56	22
Large-leaved aster ( <i>Aster macrophyllus</i> )	62	24

FDc23 Indicator Species	(freq%)	
	FDc24	FDc23
Big bluestem ( <i>Andropogon gerardii</i> )	-	73
Skyblue aster ( <i>Aster oolentangiensis</i> )	2	54
Balsam ragwort ( <i>Senecio pauperculus</i> )	2	46
Smooth blue aster ( <i>Aster laevis</i> )	4	51
Bearberry ( <i>Arctostaphylos uva-ursi</i> )	7	62
Hoary puccoon ( <i>Lithospermum canescens</i> )	11	78
Harebell ( <i>Campanula rotundifolia</i> )	11	65
Poverty grass ( <i>Danthonia spicata</i> )	13	73

### • FDn33 Northern Dry-Mesic Mixed Woodland

FDn33 often occurs on sand deposits and can be similar to FDc24. FDn33 is present mainly to the north and east of FDc24 although both classes occur in the central part of the MDL. FDn33 is dominated by red pine, white pine, quaking aspen, paper birch, or black spruce and only rarely has abundant jack pine.

FDc24 Indicator Species	(freq%)	
	FDc24	FDn33
Blue giant hyssop ( <i>Agastache foeniculum</i> )	42	-
Hoary puccoon ( <i>Lithospermum canescens</i> )	11	1
American hazelnut ( <i>Corylus americana</i> )	76	7
Black cherry (U)	33	3
Poison ivy ( <i>Toxicodendron rydbergii</i> )	84	10
Virginia creeper ( <i>Parthenocissus</i> spp.)	33	5
Snowberry or Wolfberry*	71	13
Jack pine (C)	84	18

FDn33 Indicator Species	(freq%)	
	FDc24	FDn33
Mountain maple ( <i>Acer spicatum</i> )	2	31
Fly honeysuckle ( <i>Lonicera canadensis</i> )	4	60
Red baneberry ( <i>Actaea rubra</i> )	2	28
White pine (C)	4	31
Red maple (C)	4	27
Bunchberry ( <i>Cornus canadensis</i> )	11	66
Rose twistedstalk ( <i>Streptopus roseus</i> )	11	63
Bluebead lily ( <i>Clintonia borealis</i> )	13	65

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

## Native Plant Community Types in Class

### • FDc24a Jack Pine - (Bush Honeysuckle) Woodland

FDc24a is the only recognized community type in this class. It is divided into two subtypes:

#### ◦ FDc24a1 Bracken Subtype

Canopy is dominated by jack pine or, less frequently, red pine, with occasional paper birch and quaking aspen. Subcanopy is sparse. Ground layer has abundant bracken. FDc24a1 differs from FDc24a2 by greater frequency or abundance of red maple in the understory, along with bracken, lowbush blueberry, beaked hazelnut, twinflower (*Linnaea borealis*), and broad-leaved evergreen species such as wintergreen (*Gaultheria procumbens*) and pipsissewa (*Chimaphila umbellata*). Present across the western half of the MDL and in adjacent parts of northern the MIM. Description is based on summary of vegetation data from 32 plots.

#### ◦ FDc24a2 Bur Oak - Carrion-flower Subtype

Canopy is dominated by jack pine or bur oak and occasionally has abundant northern red oak, red pine, or quaking aspen. Bur oak is common in the subcanopy. FDc24a2 differs from FDc24a1 by greater frequency or abundance of erect, smooth, or Illinois carrion-flower (*Smilax ecirrata*, *S. herbacea*, or *S. illinoensis*), downy arrowwood (*Viburnum rafinesquianum*), and gray dogwood (*Cornus racemosa*) in the understory, and bur oak in the canopy. Present in the western part of the MDL and in adjacent parts of northern the MIM. Description is based on summary of vegetation data from 13 plots.



photo by E.R. Flowe MN DNR

Becker County, MN



### FDC24 Central Rich Dry Pine Woodland – Species Frequency & Cover

	freq %	cover		freq %	cover		freq %	cover		freq %	cover
<b>Forbs, Ferns &amp; Fern Allies</b>											
Canada mayflower ( <i>Maianthemum canadense</i> )	96	••									
Common strawberry ( <i>Fragaria virginiana</i> )	87	••									
Northern bedstraw ( <i>Galium boreale</i> )	87	••									
Early meadow-rue ( <i>Thalictrum dioicum</i> )	73	••									
Wood anemone ( <i>Anemone quinquefolia</i> )	69	••									
Wild sarsaparilla ( <i>Arelia nudicaulis</i> )	69	••									
Bracken ( <i>Pteridium aquilinum</i> )	64	••••									
Large-leaved aster ( <i>Aster macrophyllus</i> )	62	••••									
Sweet-scented bedstraw ( <i>Galium triflorum</i> )	56	••									
Pale veitching ( <i>Lathyrus ochroleucus</i> )	56	••									
Spreading dogbane ( <i>Apocynum androsaemifolium</i> )	56	••									
One-sided pyrola ( <i>Pyrola secunda</i> )	53	••									
Lindley's aster ( <i>Aster ciliolatus</i> )	51	••									
Blue giant hyssop ( <i>Agastache foeniculum</i> )	42	••									
American vetch ( <i>Vicia americana</i> )	40	••									
Dwarf raspberry ( <i>Rubus pubescens</i> )	40	••									
Maryland black snakeroot ( <i>Sanicula marilandica</i> )	40	••									
Pale bellwort ( <i>Uvularia sessilifolia</i> )	36	••									
Twintower ( <i>Limnaea borealis</i> )	31	••									
Veiny pea ( <i>Lathyrus venosus</i> )	31	••									
Starflower ( <i>Trientalis borealis</i> )	27	••									
Clayton's sweet cicely ( <i>Osmorhiza claytonii</i> )	27	••									
Columbine ( <i>Aquilegia canadensis</i> )	24	••									
Spinulose shield fern or Glandular wood fern*	20	••									
Round-leaved hepatica ( <i>Anemone americana</i> )	18	••									
Smooth carrion-flower ( <i>Smilax herbacea</i> )	18	••									
Round-leaved pyrola ( <i>Pyrola rotundifolia</i> )	18	••									
<b>Grasses &amp; Sedges</b>											
Mountain rice grass ( <i>Oryzopsis asperifolia</i> )	84	••••									
Pennsylvania sedge ( <i>Carex pensylvanica</i> )	71	••••									
False melic grass ( <i>Schizachne purpurascens</i> )	36	••									
<b>Climbing Plants</b>											
Virginia creeper ( <i>Parthenocissus</i> spp.)	33	••									
Wild honeysuckle ( <i>Lonicera dioica</i> )	20	••									
<b>Low Shrubs</b>											
Lowbush blueberry ( <i>Vaccinium angustifolium</i> )	80	••									
Red raspberry ( <i>Rubus idaeus</i> )	69	••									
Tall blackberries ( <i>Rubus allegheniensis</i> and similar <i>Rubus</i> spp.)	29	••									
Wrightgreen ( <i>Gaultheria procumbens</i> )	24	••									
Pipsissewa ( <i>Chimaphila umbellata</i> )	20	••									
<b>Shrubs</b>											
Juneberry ( <i>Amelanchier</i> spp.)	87	••									
Poison ivy ( <i>Toxicodendron rydbergii</i> )	84	••									
Prickly or Smooth wild rose ( <i>Rosa acicularis</i> or <i>R. blanda</i> )	82	••									
Beaked hazelnut ( <i>Corylus cornuta</i> )	78	••••									
American hazelnut ( <i>Corylus americana</i> )	76	••••									
Chokecherry ( <i>Prunus virginiana</i> )	76	••••									
Bush honeysuckle ( <i>Diervilla lonicera</i> )	71	••••									
Snowberry or Wolfberry ( <i>Symphoricarpos albus</i> or <i>S. occidentalis</i> )	71	••									
Prairie willow ( <i>Salix humilis</i> )	62	••									
Downy arrowwood ( <i>Viburnum rafinesquianum</i> )	44	••									
Pin cherry ( <i>Prunus pensylvanica</i> )	33	••									
Gray dogwood ( <i>Cornus racemosa</i> )	24	••									
Hawthorn ( <i>Crataegus</i> spp.)	18	••									
<b>Trees</b>											
Jack pine	84	••••	11	••••	-						
Quaking aspen	31	••••	33	••	42						
Red pine	29	••••	11	•	-						
Paper birch	27	••••	20	••	16						
Bur oak	24	••••	56	••	64						
Northern red oak	18	••••	49	••	71						
Black cherry	-	-	29	••	27						
Red maple	-	-	20	••	29						
Green ash	-	-	11	••	24						
Big-toothed aspen	-	-	11	••	11						
Balsam fir	-	-	9	••	22						
White pine	-	-	9	••	18						

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