



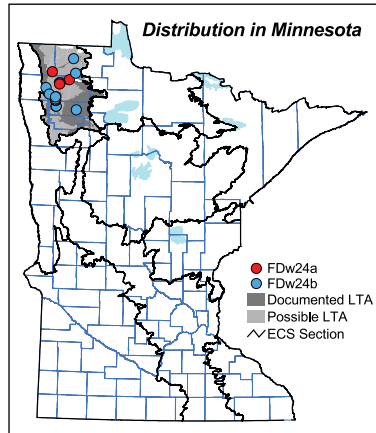
Northwestern Dry-Mesic Oak Woodland

Dry-mesic bur oak–dominated woodlands on gently sloping, sandy and gravelly beach ridges. Surface fires were common historically, with catastrophic crown fires occasional.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 19 plots (relevés).

- **Ground-layer** cover is normally patchy (25–50%). The most common species are Canada mayflower (*Maianthemum canadense*), northern bedstraw (*Galium boreale*), wild sarsaparilla (*Aralia nudicaulis*), Lindley's aster (*Aster ciliolatus*), erect or smooth carrion-flower (*Smilax ecirrata* or *S. herbacea*), veiny pea (*Lathyrus venosus*), spreading dogbane (*Apocynum androsaemifolium*), veiny meadow-rue (*Thalictrum venulosum*), and Pennsylvania sedge (*Carex pennsylvanica*), with wild sarsaparilla and Pennsylvania sedge often abundant.
- **Shrub-layer** cover is patchy to interrupted (25–75%). Common species include bur oak, juneberry (*Amelanchier* spp.), snowberry or wolfberry (*Symphoricarpos albus* or *S. occidentalis*), downy arrowwood (*Viburnum rafinesquianum*), American hazelnut (*Corylus americana*), chokecherry (*Prunus virginiana*), nannyberry (*Viburnum lentago*), gray dogwood (*Cornus racemosa*), and poison ivy (*Toxicodendron rydbergii*).
- **Subcanopy** cover is sparse (5–25%). Bur oak and quaking aspen are often present but normally not abundant.
- **Canopy** cover is patchy to interrupted (25–75%). The most important species is bur oak. Quaking aspen and balsam poplar can also be present but are never abundant.



Landscape Setting & Soils

- **Beach ridges**—Common. Present on beach ridges and on sandy deposits associated with beach ridges on the Glacial Lake Agassiz plain. Crests of ridges are 10 to 20ft (3 to 6m) higher than the adjacent land surface. Parent material is stratified, gravelly calcareous sand lacking large stones. Soil surface is dark in the upper 12in (30cm) because of incorporated organic matter. This organic matter could have been produced by the abundant sedges and grasses typically present in the ground layer of FDw24 or may have originated during former occupation of these sites by prairie or savanna. Soils have subsoil horizons with slight accumulations of clay, but these horizons are too discontinuous and weakly developed to significantly perch snowmelt or rainfall. Deeper soil horizons are gray-colored from shale staining and elements of precipitated lime and are strongly calcareous. Soils are excessively to moderately well drained, and the soil-moisture regime is moderately dry. (LAP, RRV)

Natural History

In the past, fires were very common throughout the range of FDw24. An analysis of Public Land Survey records indicates that the rotation of catastrophic fires was about 100 years and the rotation of moderate surface fires about 15 years. The rotation of all fires combined is estimated to be 14 years. Windthrow was less frequent than fire but still played a significant role in regeneration of the community, with the rotation of catastrophic windthrow estimated at 260 years.

The Public Land Survey bearing-tree data are too sparse within the primary range of FDw24 to propose growth stages for the community. The land surveyors described the



general region in which the community occurs as scattered timber, thickets, and groves separated by brushland and prairie. Aspen clearly dominated younger patches of vegetation in this landscape, while bur oak appears to have been more abundant in older patches, which may approach forest in structure. All of these woodlands are estimated to have been younger than 70 years.

Similar Native Plant Community Classes

• FDw34 Northwestern Mesic Aspen-Oak Woodland

FDw34 is very similar to FDw24 but is more likely to be dominated by quaking aspen, often mixed with some bur oak, while FDw24 is almost always strongly dominated by bur oak, occasionally with a fair amount of quaking aspen. The ranges of the two classes overlap in the LAP, although FDw34 occurs mostly on flat sandy soils on the Glacial Lake Agassiz plain, while FDw24 occurs mostly on sandy and gravelly beach ridges.

FDw24 Indicator Species	(freq%)	
	FDw24	FDw34
Early meadow-rue (<i>Thalictrum dioicum</i>)	26	-
Lopseed (<i>Phryma leptostachya</i>)	26	-
Clayton's sweet cicely (<i>Osmorhiza claytonii</i>)	16	-
Hairy Solomon's seal (<i>Polygonatum pubescens</i>)	16	-
Hawthorn (<i>Crataegus</i> spp.)	37	6
Climbing bittersweet (<i>Celastrus scandens</i>)	32	6
Columbine (<i>Aquilegia canadensis</i>)	26	6
Blue giant hyssop (<i>Agastache foeniculum</i>)	47	11

FDw34 Indicator Species	(freq%)	
	FDw24	FDw34
Bluejoint (<i>Calamagrostis canadensis</i>)	-	50
Virginia thimbleweed (<i>Anemone virginiana</i>)	-	39
Meadowsweet (<i>Spiraea alba</i>)	-	33
Swamp gooseberry (<i>Ribes hirtellum</i>)	-	33
Pin cherry (<i>Prunus pensylvanica</i>)	-	28
Lowbush blueberry (<i>Vaccinium angustifolium</i>)	-	28
Bebb's willow (<i>Salix bebbiana</i>)	5	72
Golden alexanders (<i>Zizia aurea</i>)	11	72

• FDw44 Northwestern Wet-Mesic Aspen Woodland

FDw44 is somewhat similar to FDw24 but is usually strongly dominated by quaking aspen, with bur oak of only minor importance. The ranges of the two classes overlap in the LAP, although FDw44 tends to occur on moist sites on flat sandy soils on the Glacial Lake Agassiz plain, while FDw24 tends to occur on dry sites on sandy and gravelly beach ridges.

FDw24 Indicator Species	(freq%)	
	FDw24	FDw44
Wild bergamot (<i>Monarda fistulosa</i>)	16	-
Blue giant hyssop (<i>Agastache foeniculum</i>)	47	2
Climbing bittersweet (<i>Celastrus scandens</i>)	32	2
Kalm's brome (<i>Bromus kalmii</i>)	32	2
Lopseed (<i>Phryma leptostachya</i>)	26	2
Hawthorn (<i>Crataegus</i> spp.)	37	7
Snowberry or Wollberry*	95	18
Veiny pea (<i>Lathyrus venosus</i>)	68	14

FDw44 Indicator Species	(freq%)	
	FDw24	FDw44
Bluejoint (<i>Calamagrostis canadensis</i>)	-	66
Swamp gooseberry (<i>Ribes hirtellum</i>)	-	64
Dwarf alder (<i>Rhamnus alnifolia</i>)	-	57
Side-flowering aster (<i>Aster lateriflorus</i>)	-	57
Fringed loosestrife (<i>Lysimachia ciliata</i>)	-	48
Swamp thistle (<i>Cirsium muticum</i>)	-	43
Marsh vetchling (<i>Lathyrus palustris</i>)	-	34
Red-osier dogwood (<i>Cornus sericea</i>)	5	64

*Snowberry or Wollberry (*Symphoricarpos albus* or *S. occidentalis*)

• UPn13 Northern Dry Savanna

In the absence of fire, UPn13 succeeds to woodland and can become similar to occurrences of FDw24 in which prairie species are common in the ground layer (FDw24a). However, the tree canopy is not well developed in UPn13, and the shrub layer is not as dense as in FDw24. The low shrubs prairie rose (*Rosa arkansana*) and leadplant (*Amorpha canescens*) are common in UPn13 but absent from FDw24. By contrast, juneberries (*Amelanchier alnifolia* or *A. humilis*) and American hazelnut are more common in FDw24 than UPn13. Several dry prairie species are present in UPn13 but absent from FDw24, including porcupine grass (*Stipa spartea*) and rough blazing star (*Liatris aspera*), while woodland species such as Canada mayflower and false melic grass (*Schizachne purpurascens*) are common in FDw24 but rare or absent from UPn13. The ranges of the two classes overlap in the LAP, where both occur on dry sandy and gravelly beach ridges.

FDw24 Indicator Species	(freq%)	
	FDw24	UPn13
Downy arrowwood (<i>Viburnum rafinesquianum</i>)	67	-
Canada mayflower (<i>Maianthemum canadense</i>)	67	-
Early meadow-rue (<i>Thalictrum dioicum</i>)	17	-
Wild sarsaparilla (<i>Aralia nudicaulis</i>)	17	-
False melic grass (<i>Schizachne purpurascens</i>)	67	7
Maryland black snakeroot (<i>Sanicula marilandica</i>)	50	7
Mountain rice grass (<i>Oryzopsis aspenifolia</i>)	50	7
Lindley's aster (<i>Aster ciliolatus</i>)	100	14

UPn13 Indicator Species	(freq%)	
	FDw24	UPn13
White sage (<i>Artemisia ludoviciana</i>)	-	93
Porcupine grass (<i>Stipa spartea</i>)	-	93
Hoary puccoon (<i>Lithospermum canescens</i>)	-	71
Rough blazing star (<i>Liatris aspera</i>)	-	71
Smooth blue aster (<i>Aster laevis</i>)	-	71
Field or Variable pussytoes*	-	64
Silky aster (<i>Aster sericeus</i>)	-	64
White prairie clover (<i>Dalea candida</i>)	-	50

*Field or Variable pussytoes (*Antennaria neglecta* or *A. neoidica*)



• MHw36 Northwestern Wet-Mesic Hardwood Forest

MHw36 is similar to FDw24 but in addition to abundant bur oak in the canopy, quaking aspen, basswood, and American elm are all common. Quaking aspen is present in FDw24 only occasionally, and basswood and American elm are absent from the canopy (American elm appears occasionally in the subcanopy and shrub layers). The ranges of the two classes overlap in the LAP, but MHw36 occurs on alluvial river bottoms on silt or very fine sand and occasionally on fine sandy deposits on broad flats associated with shoreline features of Glacial Lake Agassiz. By contrast, FDw24 occurs in upland settings, on sandy and gravelly beach ridges.

FDw24 Indicator Species	(freq%)		MHw36 Indicator Species	(freq%)	
	FDw24	MHw36		FDw24	MHw36
Climbing bitterweet (<i>Celastrus scandens</i>)	46	-	Basswood (C,U)	-	33
Hawthorn (<i>Crataegus</i> spp.)	38	-	Box elder (C)	-	33
Nodding wild rye (<i>Elymus canadensis</i>)	38	-	Rose twistedstalk (<i>Streptopus roseus</i>)	-	33
American vetch (<i>Vicia americana</i>)	31	-	Green ash (C)	8	83
Wild plum (<i>Prunus americana</i>)	23	-	Nodding trillium (<i>Trillium cernuum</i>)	8	83
Blue giant hyssop (<i>Agastache foeniculum</i>)	23	-	Rattlesnake fern (<i>Botrychium virginianum</i>)	8	67
Snowberry or Wolfberry*	92	17	Dwarf raspberry (<i>Rubus pubescens</i>)	15	83
American hazelnut (<i>Corylus americana</i>)	69	17	American elm (C,U)	23	83

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

• FDs36 Southern Dry-Mesic Oak-Aspen Forest

FDs36 is similar to FDw24 when FDw24 has abundant forest herbs in the ground layer (FDw24b). Bur oak is abundant in FDs36 with quaking aspen and occasionally with basswood. Bur oak is also abundant in FDw24, but quaking aspen is much less common, and basswood is rare or absent. FDs36 typically occurs on hummocky stagnation moraines on well-drained, gravelly, loamy till. By contrast, FDw24 occurs on sandy and gravelly beach ridges. Currently, the ranges of the two classes are not known to overlap, but they are similar and have the potential to occur in the same area.

FDw24 Indicator Species	(freq%)		FDs36 Indicator Species	(freq%)	
	FDw24	FDs36		FDw24	FDs36
Veiny meadow-rue (<i>Thalictrum venulosum</i>)	46	-	Large-flowered bellwort (<i>Uvularia grandiflora</i>)	-	88
Nodding wild rye (<i>Elymus canadensis</i>)	38	-	Prickly ash (<i>Zanthoxylum americanum</i>)	-	44
American vetch (<i>Vicia americana</i>)	31	-	Basswood (C,U)	-	40
Blue giant hyssop (<i>Agastache foeniculum</i>)	23	-	Pointed-leaved tick trefoil (<i>Desmodium glutinosum</i>)	-	40
Giant goldenrod (<i>Solidago gigantea</i>)	23	-	American elm (C)	-	36
Northern bedstraw (<i>Galium boreale</i>)	69	8	Bloodroot (<i>Sanguinaria canadensis</i>)	-	32
Nannyberry (<i>Viburnum lentago</i>)	69	12	Common false Solomon's seal (<i>Smilacina racemosa</i>)	-	32
Veiny pea (<i>Lathyrus venosus</i>)	62	12	Zigzag goldenrod (<i>Solidago flexicaulis</i>)	-	32

Native Plant Community Types in Class

• FDw24a Bur Oak - (Prairie Herb) Woodland

Canopy is dominated by bur oak. The understory and shrub layers also have bur oak, but it is not abundant. American hazelnut, snowberry or wolfberry, juneberries, and poison ivy are common in the shrub layer. FDw24a is distinguished from FDw24b by the presence of ground-layer species more commonly associated with prairies. These may include bastard toadflax (*Comandra umbellata*), wild bergamot (*Monarda fistulosa*), and big bluestem (*Andropogon gerardii*). Other species useful for distinguishing the two types include long-headed thimbleweed (*Anemone cylindrica*), blue giant hyssop (*Agastache foeniculum*), gray goldenrod (*Solidago nemoralis*), poverty grass (*Danthonia spicata*), and Kalm's brome (*Bromus kalmii*). FDw24a has been documented in the LAP. Description is based on summary of vegetation data from 6 plots.

• FDw24b Bur Oak - (Forest Herb) Woodland

Canopy is dominated by bur oak with occasional quaking aspen and balsam poplar. The subcanopy may contain occasional bur oak and quaking aspen, but this layer is often absent or not well differentiated from the canopy. Common shrub-layer species are similar to those of FDw24a; in addition, beaked hazelnut (*Corylus cornuta*) can be abundant in the shrub layer, and wild plum (*Prunus americana*) may be present. FDw24b is distinguished from FDw24a by the absence of species more commonly associated with prairies and by the increased presence of woodland species. These may include wild sarsaparilla, erect or smooth carrion-flower, Clayton's sweet cicely (*Osmorhiza clayto-*



nii), climbing bittersweet (*Celastrus scandens*), lopseed (*Phryma leptostachya*), wood anemone (*Anemone quinquefolia*), and Pennsylvania sedge (*Carex pensylvanica*). FDw24b has been documented in the central part of the LAP. Description is based on summary of vegetation data from 13 plots.

photo by R. P. Dana, MN DNR



Kittson County, MN



FDw24 Northwestern Dry-Mesic Oak Woodland — Species Frequency & Cover

	freq% cover	freq% cover
Forbs, Ferns & Fern Allies		
Canada mayflower (<i>Maianthemum canadense</i>)	84	•
Northern bedstraw (<i>Galium boreale</i>)	79	••
Wild sarsaparilla (<i>Aralia nudicaulis</i>)	74	••••
Lindley's aster (<i>Aster ciliolatus</i>)	74	••
Erect or Smooth carrion-flower*	68	•
Vetly pea (<i>Lathyrus venosus</i>)	68	•
Spreading dogbane (<i>Apocynum androsaemifolium</i>)	63	••
Canada goldenrod (<i>Solidago canadensis</i>)	63	•
Vetly meadow-rue (<i>Thalictrum venulosum</i>)	58	••
Mayland black snakeroot (<i>Sanicula marilandica</i>)	53	•
American vetch (<i>Vicia americana</i>)	53	•
Blue giant hyssop (<i>Agastache foeniculum</i>)	47	•
Starry false Solomon's seal (<i>Smilacina stellata</i>)	47	•
Common strawberry (<i>Fragaria virginiana</i>)	37	••
Bastard toadflax (<i>Comandra umbellata</i>)	32	•
Yarrow (<i>Achillea millefolium</i>)	32	•
Wood anemone (<i>Anemone quinquefolia</i>)	26	•
Early meadow-rue (<i>Thalictrum dioicum</i>)	26	•
Tall meadow-rue (<i>Thalictrum dasycarpum</i>)	26	•
Columbine (<i>Aquilegia canadensis</i>)	26	•
Lopseed (<i>Phryma leptostachya</i>)	26	•
Long-headed thimbleweed (<i>Anemone cylindrica</i>)	26	•
Giant goldenrod (<i>Solidago gigantea</i>)	21	•
Sweet-scented bedstraw (<i>Galium triflorum</i>)	21	•
Hairy Solomon's seal (<i>Polygonatum pubescens</i>)	16	•
Pale vetchling (<i>Lathyrus ochroleucus</i>)	16	•
Gray goldenrod (<i>Solidago nemoralis</i>)	16	•
Clayton's sweet cicely (<i>Osmorhiza claytonii</i>)	16	•
Bracken (<i>Pteridium aquilinum</i>)	16	•••
Wild bergamot (<i>Monarda fistulosa</i>)	16	••
Grasses & Sedges		
Pennsylvania sedge (<i>Carex pennsylvanica</i>)	74	••••
Mountain rice grass (<i>Oryzopsis asperifolia</i>)	47	••
Nodding wild rye (<i>Elymus canadensis</i>)	42	•
Trees		
False melic grass (<i>Schizachne purpurascens</i>)		42
Kalm's brome (<i>Bromus kalmii</i>)		32
Marsh muhly grass (<i>Muhlenbergia racemosa</i>)		21
Interrupted wild rye (<i>Elymus diversiglumis</i>)		21
Poverty grass (<i>Danthonia spicata</i>)		16
Big bluestem (<i>Andropogon gerardii</i>)		16
Fringed brome (<i>Bromus ciliatus</i>)		16
Woody Vines		
Wild honeysuckle (<i>Lonicera dioica</i>)		37
Climbing bittersweet (<i>Celastrus scandens</i>)		32
Virginia creeper (<i>Parthenocissus</i> spp.)		11
Low Shrubs		
Poison ivy (<i>Toxicodendron rydbergii</i>)		100
Red raspberry (<i>Rubus idaeus</i>)		26
Tall Shrubs		
Juneberry (<i>Amelanchier</i> spp.)		100
Snowberry or Wolfberry (<i>Symphoricarpos albus</i> or <i>S. occidentalis</i>)		95
Downy arrowwood (<i>Viburnum rafinesquianum</i>)		84
American hazelnut (<i>Corylus americana</i>)		74
Chokecherry (<i>Prunus virginiana</i>)		68
Nannyberry (<i>Viburnum lentago</i>)		58
Gray dogwood (<i>Cornus racemosa</i>)		42
Pickly or Smooth wild rose (<i>Rosa acicularis</i> or <i>R. blanda</i>)		42
Hawthorn (<i>Crataegus</i> spp.)		37
Wild plum (<i>Prunus americana</i>)		16
Beaked hazelnut (<i>Corylus cornuta</i>)		11
Subcanopy		
Bur oak	95	••••
Quaking aspen	16	•
Balsam poplar	11	•
Canada poplar	5	•
Green ash	5	•
Box elder	-	-
Shrub Layer		
Bur oak	42	••
Quaking aspen	21	•
Balsam poplar	-	-
Canada poplar	11	•
Green ash	5	•
Box elder	11	•

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