

NORTH-CENTRAL BUR OAK OPENING

Site Characteristics: This dry-mesic to mesic oak opening (or oak savanna) commonly occurs on level to moderately steep, fire-prone landscapes in the upper Midwestern United States. This community occurs on level to rolling topography on well-drained outwash plains and coarse-textured end moraines, as well as steep, fire-prone, shallow-to-bedrock hills in the Driftless Area. The pH varies from 6.1-7.3. Soils are excessively to moderately well-drained and range from loams to sandy loams, and include silt loams close to bedrock in the Driftless Area.

Vegetation Characteristics: Canopy cover ranges from 10-30% closure. The tree layer is dominated by Bur Oak and White Oak. Black Oak can also become codominant, but only on sandier loam soils. The ground layer is dominated by graminoids, especially Big Bluestem and Little Bluestem, accompanied by a large diversity of forbs. Shrub cover can range widely from 0-100%, with New Jersey Tea and Leadplant being two of the most important shrub species. Understory species typical of oak openings require some direct sunlight throughout the growing season and are quickly reduced when heavily shaded by either tree or shrub canopy. Common shrubs in this community are adapted to the moderate fire frequencies found in oak openings, and resprout vigorously after burning. These savannas exhibit a mosaic of physiognomies, with smaller patches of grassland and forest interdigitating in complex patterns. Typically, there are two main structural layers, tree canopy and herbaceous, though shrubs could be scattered or clumped. Tree densities for stems greater than 10 cm dbh may historically have been between 1 and 40 stems per hectare. The tree layer is composed of Bur Oak, White Oak, and Black Oak, with some Shagbark Hickory. Black Oak is more common on sandier soils. The ground layer is dominated by graminoids, especially Big Bluestem and Little Bluestem, accompanied by a large diversity of forbs.

Vegetation Variability: Macroclimate, as expressed in relative moisture stress levels, is thought to play an important role in species composition variation from east to west in the Oak Openings region. Although an Oak Opening in Iowa and Ohio may have soils of the same water-holding capacity, plants in the Iowa site will experience more drought stress than plants in the more humid climate of Ohio. Thus, species that compete best in droughty situations will require a more open canopy to compete in an eastern Oak Opening than they will in a western Oak Opening of similar soil type. Conversely, species that compete best in sunny but moist situations will require a less open canopy to compete in an eastern Oak Opening than they will in a western Oak Opening of similar soil type.

Structure in this community ranges from large open-grown trees 10-12 m tall, to gnarled trees 2-4 m tall. Shrub cover can become significant, and even predominant, over graminoid cover. Smaller gnarled trees tend to be found on drier soils which preclude even moderate tree growth. Canopy cover ranges from 10-30%, with higher canopy cover more likely to form in areas of slightly lower fire frequency, areas with greater microtopographic variability that allows for more fire protection, and areas under less grazing pressure.

Iowa NRCS Plant Community Description

This community description is a compilation of the Community Association and its over-riding Community Alliance descriptions as provided by NatureServe (www.natureserve.org/explorer). Where necessary, community descriptions were adapted as recommended by Iowa plant community experts.

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Range:

Conservation Status: G1 - Critically Imperiled

Management Considerations: Most examples of this community have been eliminated by cultivation, grazing, or conversion to woodland or forest due to fire suppression. Most of the remaining examples are relatively small. The abundance of oak openings has historically shifted back and forth from east to west over the past 10,000 years. Pollen records indicate that deciduous forests dominated the western Midwest 9000 years before present (BP). The climate became drier about 8300 BP, with graminoid-dominated communities (prairie, savanna, and oak woodland) becoming predominant. About 5000 BP, the climate started becoming more moist again and forest development renewed. It is thought that a much greater proportion of the forest-prairie transition zone would have grown up to forest during the last few thousand years if it were not for repeated burning of the region by Native Americans.

Following European settlement fire was almost entirely eliminated from the landscape. Observers in the mid to late 1800s noted that nearly all of the former prairies and oak openings which had not yet been converted to agriculture were growing up into oak brush and eventually oak woodlands due to lack of fire. Most of the oak forests extant today in the Upper Midwest were oak openings or oak woodlands during the early European settlement era.

Oak openings have been able to persist only where fires have been allowed to occur. One such site is railroad rights-of-way. Another is formerly burned woodlots. Burning of sparse oak openings to provide pasture was a common practice in parts of the Upper Midwest (notably the Driftless Area) before World War II. However, total fire suppression has become standard and the dry-mesic oak opening remnants which survived as sparsely wooded pastures until the early 1940s have since grown up into oak woodlands and forests. Some of these sites may still be recoverable as oak openings, especially those on soils shallow-to-bedrock. Such soils prevent fast canopy regrowth rates. This delays the time before full canopy closure and thereby increases the period of persistence for oak opening understory flora.

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SCIENTIFIC NAME	COMMON NAME	STRATA	FUNCTIONAL GROUP	IA CofC	SEEDS/LB	STATE STATUS
<i>Amorpha canescens</i>	Lead plant	Shrub Layer, Dominant	SUB-SHRUB, LEGUME	8	256000	
<i>Andropogon gerardii</i>	Big bluestem	Herbaceous Layer, Dominant	P-GRASS, WARM SEASON	4	160000	
<i>Antennaria neglecta</i>	Pussytoes	Herbaceous Layer	P-FORB	2	3360000	
<i>Antennaria plantaginifolia</i>	Ladies'-tobacco	Herbaceous Layer	P-FORB	2	4400000	
<i>Calamagrostis canadensis</i>	Bluejoint	Herbaceous Layer	P-GRASS, COOL SEASON	5	4480000	
<i>Carex</i> spp.	True Sedges	Herbaceous Layer	SEDGE, COOL SEASON			
<i>Carya ovata</i>	Shagbark hickory	Canopy, Associate	TREE	5	96	
<i>Ceanothus americanus</i>	New Jersey tea	Shrub Layer, Dominant	SUB-SHRUB	8	121600	
<i>Cornus foemina</i>	Gray dogwood	Shrub Layer	SHRUB	1	17718	
<i>Corylus americana</i>	Hazelnut	Shrub Layer, Dominant	SHRUB	3	480	
<i>Hesperostipa spartea</i>	Porcupine grass	Herbaceous Layer, Dominant	P-GRASS, COOL SEASON	6	10880	
<i>Lespedeza capitata</i>	Round-headed bush clover	Herbaceous Layer	P-FORB, LEGUME	3	128000	
<i>Quercus alba</i>	White oak	Canopy, Dominant	TREE	6	128	
<i>Quercus bicolor</i>	Swamp white oak	Canopy, Associate	TREE	8	112	
<i>Quercus macrocarpa</i>	Bur oak	Canopy, Dominant	TREE	4	64	
<i>Quercus stellata</i>	Post oak	Canopy, Associate	TREE	4	380	
<i>Quercus velutina</i>	Black oak	Canopy, Co-dominant	TREE	4	245	
<i>Ratibida pinnata</i>	Gray-headed coneflower	Herbaceous Layer	P-FORB	4	672000	
<i>Rosa</i> spp.	Wild rose	Shrub Layer	SUB-SHRUB			
<i>Rubus allegheniensis</i>	Blackberry	Shrub Layer	SUB-SHRUB	2	262000	
<i>Schizachyrium scoparium</i>	Little bluestem	Herbaceous Layer, Dominant	P-GRASS, WARM SEASON	5	240000	
<i>Silphium laciniatum</i>	Compass plant	Herbaceous Layer	P-FORB	7	19200	
<i>Sorghastrum nutans</i>	Indian grass	Herbaceous Layer, Dominant	P-GRASS, WARM SEASON	4	192000	
<i>Sporobolus heterolepis</i>	Prairie dropseed	Herbaceous Layer, Dominant	P-GRASS, WARM SEASON	9	256000	
<i>Symphoricarpos occidentalis</i>	Wolfberry, buckbrush	Shrub Layer	SHRUB	0	75033	
<i>Zizia aurea</i>	Golden Alexander's	Herbaceous Layer	P-FORB	6	176000	

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