

WEEK 8. PRAIRIE GROVES AND GALLERY FORESTS

When the Government Land Office (GLO) surveyors, and later the pioneers, entered the prairie peninsula of Illinois they found broad expanses of prairie, some of the prairie openings many miles across. In the southern part of the prairie peninsula closed canopy forests dominated but prairie openings were common, some being fairly extensive. As the surveyors continued north, prairie openings became more common and larger, forests more restricted to rugged topography, and the transition between prairie and forest more diffuse. Farther north in the recently glaciated lands of central Illinois, the region referred to as the Grand Prairie Division or “black soil” prairie of Illinois, prairies dominated. Trees were still a common feature of the landscape, however, closed canopy forests were found along the rivers and larger streams and other areas of rugged topography. Along the smaller streams gallery forests were common, many less than 100 meters wide. Usually between the forest and prairie there was a transition region where the forest slowly “gave-way” to prairie. Prairie groves were interspersed throughout the prairies and savannas, appearing as islands in an immense sea of prairie.

These prairie groves were small to very large clumps of trees commonly surrounded by prairie and/or savanna. Small prairie groves of the black soil prairie often had an abrupt transition between grove and prairie. Larger groves, particularly those associated with streams of large glacial morainal features usually had a gradual transition from grove to prairie. These larger groves were surrounded by savanna vegetation, and there was a gradual transition from the closed canopy forest of the prairie grove to the savanna where the trees became more and more scattered until only occasional trees were found on an open prairie. Often grubs replaced trees depending on the position of firebreaks, such as rugged topography and wetlands, and the extent, frequency, and severity of fire.

Prairie groves were found throughout most of Illinois where prairies were common. In the southern half of Illinois, particularly in the Illinoian till plain south of the terminal moraine of Wisconsin glaciation, the prairie openings were mostly small, many covering less than a few sections, and few prairie groves were recorded by the GLO surveyors. While studying the GLO notes and plats for the southern Illinois counties of Crawford, Lawrence, and Williamson only four groves were recorded. These counties are on the till plain of Illinoian glaciation, and are dominated by forest, the prairie openings mostly small and scattered.

To the north in the Grand Prairie Division prairie groves were common. In this part of Illinois the prairies were more expansive, and large tracts of forest rare. Prairie groves from a few hectares to thousands of hectares existed. Many groves were so small that the GLO surveyors did not record them since a section line did not dissect the grove. Many were associated with morainal ridges, others with streams and more rugged topography. From a distance the smaller groves appeared as spots of trees interspersed in a grassy landscape. The larger groves, sometimes many km across, appeared like the extensive tracts of timber to the east in Indiana and Ohio, but were actually larger islands of timber surrounded by black soil prairie and usually savanna. The Headwater Region Map of parts of Ford, Livingston, Grundy, and LaSalle counties (Figure 8.1), and plats produced from the GLO survey notes for Champaign County give some indication of the extent of prairie groves in central Illinois (Figure 8.2).

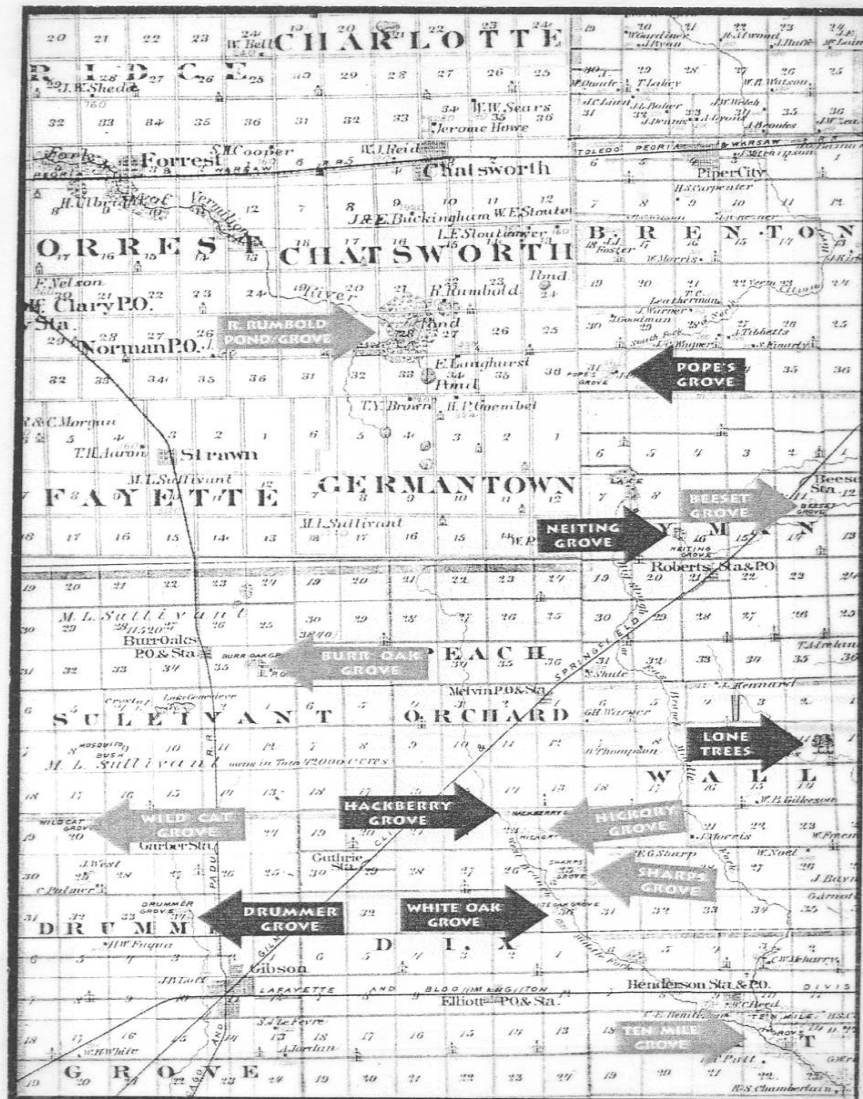


Figure 8.1. Prairie groves of the headwater region of north central Illinois in 1871 that includes parts of Ford, Livingston, Grundy, and La Salle counties, Illinois.

J. M. Peck discusses this dominance of forest in "A gazetteer of Illinois" in 1837. On page 8 he describes his observations on the extent of prairie in both the southern and northern parts of Illinois. "In the southern part, that is, south of the national road leading from Terre Haute to the Mississippi, the prairies are comparatively small, varying in size from those of several miles in width, to those which contain only a few acres. As we go northward, they widen and extend on the more elevated ground between the watercourses to a vast distance, and are frequently from six to twelve miles in width. Their borders are by no means uniform. Long points of timber project into the prairie, and line the banks of the streams, and points of prairie project into the timber between the streams. In many instances are copses and groves of timber, from one hundred to two thousand acres, in the midst of prairie, like islands in the ocean. This is a common feature in the country between the Sangamon River and Lake Michigan, and in the northern part of the state. The lead mine region, both in this state and the Wisconsin territory, abounds with these groves."

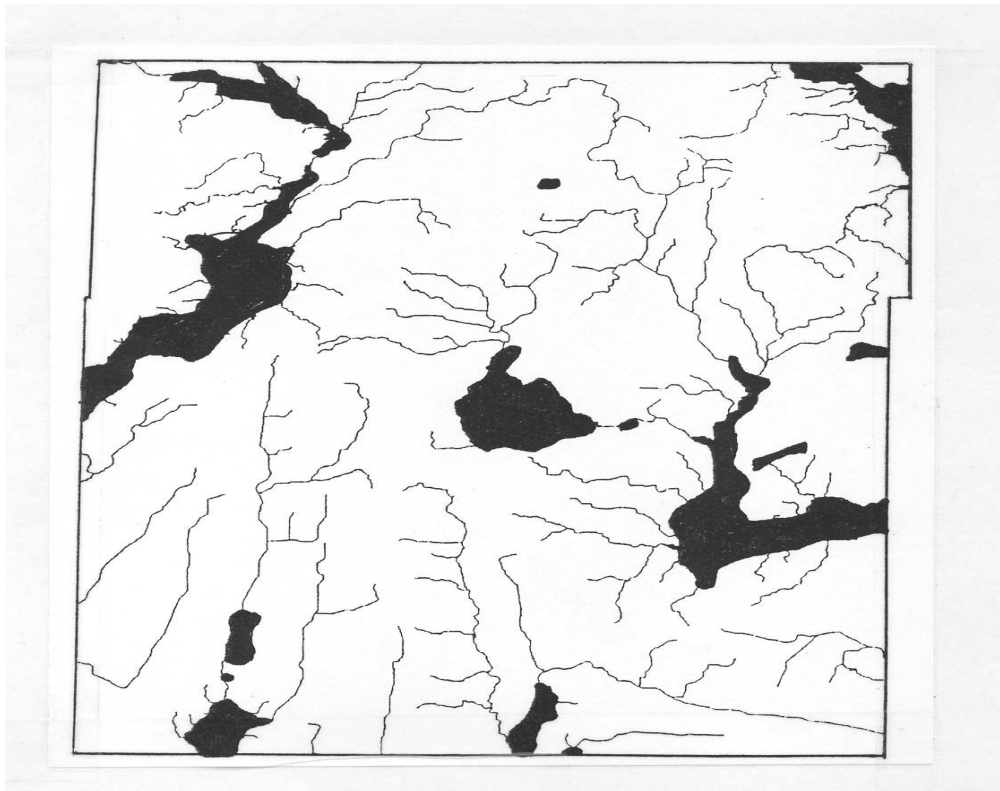


Figure 8.2. Prairie groves of Champaign County, Illinois, based on the original Government Land Office survey plats from the 1830s. The thin lines represent streams.

Early settlers found the groves to be excellent home sites, furnishing the wood necessary for lumber, fencing, and firewood, protection from the harsh winters, and shade from the hot summer sun. By the fall of the year, vegetation of the black soil prairie surrounding the grove was taller than a man, and the harsh climate and biting insects made the prairie a very hostile place for man and his livestock. Living in the groves gave some relief from the harsh conditions, while the savanna and prairies adjacent to the grove could be easily farmed. A common view mentioned by early travelers in Illinois were the girdled trees standing dead among the fields of grain. It was much easier to girdle a few trees and plant a crop on the savanna than to remove the forest.

When a county was first settled, the groves were usually the first places occupied, particularly if a stream or spring was close by. Before the settlers, the Native Americans commonly settled in or near some of the groves. Many of the groves were named after the first settler of the grove resulting in names like Sibley Grove, Hackett's Grove, Oliver's Grove, Funks Grove, Culbertson's Grove, Ward's Grove, Sadorus Grove, Bowse's Grove, along with many others. Other groves were given the name of the dominant overstory tree like Red Oak Grove, Ash Grove, Lynn Grove, Hickory Grove, White Oak Grove, Walnut Grove, Sugar Maple Grove, and even Pawpaw Grove and Crab Apple Grove. Sometimes the shape of the grove was used, creating Long Grove and Round Grove. Some groves were named for an animal species that was once common in or around the grove such as Coon Grove, Skunk's Grove, Mink Grove, Buck Grove, Buffalo Grove and Pigeon Grove. Pigeon Grove was located near Cissna Park in Iroquois County. The grove had originally been a place where flocks of passenger pigeons roosted. The birds would pile upon the trees until the branches would break from the weight of the birds, and all during the night the birds would keep up such a flutter that from a little

distance it sounded like thunder. The locals would go into the grove at night and kill thousands of passenger pigeons with poles and carry them away by the wagonloads. This indiscriminant killing of passenger pigeons was so common throughout the eastern United States that passenger pigeons are now extinct. The last individual died in 1936 at the Cincinnati Zoo.

Due to the pattern of settlement, many groves quickly became the center of pioneer social life. These groves with their large trees, shade, water, and home sites were used for many types of meetings and gatherings. Settlements at some groves continued to grow in size and become small towns and finally large cities, like Bloomington, which was once known as Bloomington Grove. Others became stagecoach stops, and remained small villages on the vast prairie. With the coming of the railroads living in the groves was no longer necessary, so many groves were cleared and the land farmed. One by one, the pioneer names associated with the groves fell into disuse, and the groves of pioneer social life fell into oblivion.

Topography, climate, soil, and the fires that regularly burned across the prairie determined the vegetational composition, and structure of these groves. In early settlement times, two common types of prairie groves were found in the Grand Prairie Division of Illinois: stream-side groves associated with water courses, and isolated prairie groves on morainal ridges that were somewhat protected from fires by a wetland community and/or certain topographic features.

Isolated Prairie Groves on Morainal Ridges

The vegetation of the prairie groves on morainal ridges has rarely been studied. Soon after settlers arrived, many of the trees of these groves were removed for fencing, firewood, and lumber. The few groves that remain have been extensively degraded by grazing, cutting, exotic species invasion, and fire suppression. Like most Illinois forests the lack of fire has had a detrimental effect on these small groves, resulting in canopy closure, a dense woody understory, and the corresponding loss of the original ground layer species.

Prairie groves on morainal ridges were particularly common in the Headwater Region of east-central Illinois in Ford, Livingston, Grundy, and La Salle counties. Five river systems have their origins in this region and some prairie groves were still found in the region in 1871 (Figure 8.1). Numerous ponds, sloughs, sedge meadows, and other wetland communities occurred between the morainal ridges. The extensive wetlands of the Headwater Region were undoubtedly responsible for the late settlement of this region. The settlement of Ford County did not begin until the railroads came in the 1860s. The numerous wetlands of the region presented major drainage and transportation problems. The time and money necessary to develop the extensive ditches that were needed to drain the land, as well as sickness from malaria and yellow fever, made the area unattractive to early settlers.

Some of these morainal ridges in the Headwater Region supported small groves of timber dominated by *Quercus macrocarpa* (bur oak). These groves existed because most prairie fires would not carry across the wetlands. This allowed for high litter loads on the forest floor. High intensity fires that crossed these wetlands during drought years caused the death of many small diameter bur oaks. These intense fires would also kill some of the large bur oaks if high litter loads existed. Large bur oaks, with their thick, insulating bark would usually survive. Thin-barked species could rarely persist, and after a few fires would be eliminated from the groves.

Many of the wetlands that protected these prairie groves from the recurring prairie fires are no longer obvious. None of the groves were associated with streams or rivers, all

being on morainal ridges with depressions to the north or west. These depressions originally contained ponds, sloughs, or sedge meadows. At the present time these depressions are cultivated fields. Soil cores revealed that 0.6 to more than 1.5 meters of topsoil cover the original sedge meadow muck that was present in the wetlands at the time of European settlement. Since the 1860s, excessive erosion of the surrounding uplands has smoothed the topography and completely covered the original wetlands.

Some of the groves in the Headwater Region have been surveyed recently to determine their overstory composition and structure. All groves studied had relatively low tree densities, ranging from 39.5 stems/ha in Sibley Grove to 75.4 stems/ha in Beset Grove (Table 8.1). Except for scattered opening where trees had recently died, these groves would probably be classified as woodlands since the tree crowns usually touched, and rarely overlapped. Tree densities, however, were not nearly as high as that reported for high quality closed forests where 200 stems/ha are common. Before European settlement these groves were probably more open due to recurring prairie fires that occasionally burned through the groves.

Table 8.1 Densities (stems/ha), basal areas (m²/ha), importance values, and average diameters (cm) of the woody overstory species in the bur oak groves of Ford County, Illinois.

Areas, size (ha), species	Density stems/ha	Basal Area m ² /ha	Importance Value	Average Diameter
Beset Grove				
4.61 ha				
bur oak	59.4	15.54	162.5	56.7
shagbark hickory	14.5	2.45	32.5	45.2
hackberry	1.3	0.48	4.3	55.9
white oak	0.2	0.08	0.7	66.7
Totals	75.4	18.55	200.0	
Sibley Grove East				
13.75 ha				
bur oak	38.8	16.33	197.0	69.9
black walnut	0.6	0.24	2.7	75.3
white oak	0.1	0.02	0.3	51.3
Totals	39.5	16.59	200.0	
Sibley Grove West				
1.62 ha				
bur oak	72.9	24.37	196.8	62.9
black walnut	1.2	0.38	3.2	62.3
Totals	74.1	24.75	200.0	
Wildcat Grove				
4.78 ha				

bur oak	54.6	20.48	195.9	65.7
hackberry	0.6	0.50	3.5	100.8
wild black cherry	0.2	0.04	0.6	46.2
Totals	55.4	21.02	200.0	

Many of the bur oaks of these groves were established long before European man settled the area. A few dead bur oaks in the groves were cut, and individuals between 85 and 145 cm dbh had from 225 to 330 growth rings. These large trees had broad, open crowns that supported many low branches radiating from the top of a 2- to 8-meters tall large basal trunk. These were obviously trees that started growing when the grove was much more open than at present. These trees could have started to grow before the grove even existed, or just after an extremely hot fire had destroyed the entire grove after a prolonged drought. A few of the large trees in these groves still have large branches that arch downward, nearly touching the ground.

Most of Ford County was described in the GLO survey notes of 1823 as “2nd rate prairie, land gently rolling.” The occasional grove was usually described as an oak-hickory forest. Other than the mention of “undergrowth of hazel” no information was given on the woody understory of these groves in the GLO notes. Presently the understory of these groves contain many weedy and exotic woody species, the most common being *Prunus serotina* (wild black cherry), *Crataegus mollis* (red haw), *Celtis occidentalis* (hackberry), *Maclura pomifera* (Osage orange), and *Lonicera maackii* (Amur honeysuckle). Some bur oak reproduction is occurring, mostly in canopy openings and at the grove margins. Eurasia, cool-season grasses and many introduced and weedy annuals and perennials dominate the herbaceous layer in these groves. Occasionally a few native woodland grasses and sedges are encountered, and rarely a few perennial prairie species.

The most extensive of these groves is located in the Sibley Burr Oak Grove Nature Preserve. This dedicated nature preserve is being managed to restore the presettlement structure and composition of the overstory and ground layer vegetation. Settlement of the Sibley area began in 1860 when Michael Sullivant purchased 40,000 acres around Sibley Grove and started a farming operation. During Sullivant’s occupancy, Burr Oak Farms was the world’s largest farm and was featured in *Harper’s Weekly Magazine* in 1871. Due to two consecutive droughts Michael Sullivant was forced to sell, and by 1879 Hiram Sibley owned the farm. From the 1860s until 1930 the grove was used as a staging area for farming operations and for the grazing of livestock. From 1930 until 1960 the grove was part of a hog farm operation, hogs being allowed to roam throughout the woods. After 1960 the grove was not grazed, resulting in the growth of a dense understory of red haw, wild black cherry, Osage orange, and hackberry. In the fall of 1995 the grove was donated to The Nature Conservancy, and restoration efforts were started.

At the present time the grove consists of two tracts of timber, an eastern tract of 13.75 hectares, and a small western tract of 1.62 hectares. Between these tracts was a cultivated field about 50 meters wide that according to early records was originally a small pond and sedge meadow. Presently the exotic and weedy woody understory species have been removed from the groves, and management fires have been introduced. The small pond and sedge meadow that originally existed between the two tracts have been restored. This involved the removal of 65 cm of mineral soil that had accumulated over the original sedge meadow muck since the time of settlement.

During an overstory survey 661 canopy and subcanopy trees were recorded for Sibley Grove of which 651 were bur oaks, nine were *Juglans nigra* (black walnut), and one was

a *Quercus alba* (white oak). Bur oaks dominated all diameter classes, and were characterized by open-grown crowns having 2-7 main crown branches. Most bur oaks had low branches or branch scars; the first branch or large branch scar averaged 3.3 meters above the ground. Crown diameters range from 13.03 to 23.20 meters depending on tree diameter, typical for trees that were mostly open-grown (Table 8.2). Bur oak trunk diameters ranged from 30.0 to 139.9 cm dbh. There were 170 bur oaks that had diameters greater than 80 cm, and 61 that had diameters in excess of 100 cm dbh. One dead individual 96 cm dbh was cut and aged at 330 years. In the larger tract to the east density was 39.34 stems/ha and basal area averaged 16.59 m²/ha, with bur oak averaging nearly 70 cm dbh. In the smaller western tract tree density averaged 74.1 stems/ha with a basal area of 24.75 m²/ha and bur oak averaging 63 cm dbh (Table 8.1). Canopy closure was 85 percent in the western tract, while the eastern tract was more open with 76 percent cover. In presettlement times, recurring prairie fires would have helped maintained a more open canopy.

Table 8.2 Average crown diameters (m) by broad diameter classes of the bur oaks at the Sibley Burr Oak Grove Nature Preserve, Ford County, Illinois.

Diameter Classes (cm)	Number Examined	Average Crown Diameter (m)
40.0-59.9	20	13.03
60.0-79.9	24	19.07
80.0-99.9	40	20.14
100.0-119.9	17	21.91
120.0-139.9	8	23.20

Isolated prairie groves associated with morainal ridges were usually small and covered less than a section of land. Though common in the Grand Prairie Division in presettlement time, most have been destroyed. Little information, except what is mentioned in the GLO survey field notes, is known about their floristic composition. In these small groves bur oaks were the common overstory species listed, but sometimes the GLO surveyors mentioned *Carya ovata* (shagbark hickory), or another species as dominating the overstory. Much larger isolated prairie groves were present on the prairie, however, many covering more than 10 sections. As the groves become larger, they become more complex, and species diversity increased. In these larger isolated prairie groves mesic species such as *Acer saccharum* (sugar maple), *Carya cordiformis* (bitternut hickory), *Fraxinus quadrangulata* (blue ash), *Ulmus rubra* (slippery elm), *Ulmus americana* (American elm), black walnut, hackberry, and very rarely *Tilia americana* (basswood) were reported by the GLO surveyors or mentioned by early travelers.

Royal Grove was a relatively large isolated prairie grove with high species diversity for which a small remnant still exists. This remnant gives almost no indication of the past grandeur of the grove, but early reports by a professional botanist has made the grove historically significant. Located in the east-central part of Champaign County, this grove was originally studied by Henry Allan Gleason, a plant geographer and ecologist from early in the last century. This grove extended for about 800 hectares (more than 3 square mile sections) along a series of low morainal ridges that were surrounded by a series of low depressions referred to as sloughs. These sloughs varied from about 75 meters to more than 500 meters in width with a maximum depth of 3 meters. Receiving all of the drainage from the ridges, the sloughs were filled throughout most of the year with standing water. The extensive sloughs on the west side of the forested ridges, were the firebreak that prevented recurring prairie fires from reaching and destroying the grove. Even under extreme droughty conditions the prevailing westerly winds may not have

been able to drive the prairie fires into the grove.

In the 1910s tiles had already been laid, ditches dug, and most of the sloughs reclaimed for agriculture. A few of the deeper sloughs were still occupied by permanent ponds, but by this time much of the grove had been cut while the rest was being used for permanent pasture. Since the 1910s erosion and cultivation have greatly reduced the depth of the slough areas and the ponds are no longer present. Presently, the only indications of these early sloughs are a few wide, shallow depressions running through agricultural fields to the west and north of the remaining small remnant of the grove.

Table 8.3 Species listed by habit that were recorded during a 1911 survey conducted by Henry Allan Gleason (1912) at the Royal Prairie Grove, Champaign County, Illinois.

TREES

Carya ovata
Carya cordiformia
Celtis occidentalis
Gleditsia triacanthos
Juglans nigra
Populus grandidentata
Prunus serotina
Quercus alba
Quercus imbricaria
Quercus macrocarpa
Quercus rubra
Quercus velutina
Tilia americana
Ulmus americana
Ulmus rubra

Amphicarpa brateata
Anemone virginiana
Antenoron virginianum
Aquilegia canadensis
Arisaema triphyllum
Aster drummondii
Campanulastrum americanum
Circaea lutetiana
Cryptotaenia canadensis
Dasistoma macrophylla
Dioscorea villosa
Galium concinnum
Geum canadense
Hedeoma pulegioides
Helianthus strumosus
Heuchera americana
Impatiens capensis
Impatiens pallida
Lactuca floridana

SHRUBS AND UNDERSTORY

TREES

Corylus americana
Crataegus crus-galli
Euonymus atropurpureus
Malus coronaria
Prunus americana
Rosa setigera
Sambucus canadensis
Viburnum prunifolium
Zanthoxylum americanum

Lespedeza intermedia
Muhlenbergia schreberi
Parietaria pensylvanica
Penstemon digitalis
Phlox divaricata
Phryma leptostachya
Phytolacca americana
Pilea pumila
Podophyllum peltatum
Polygala senega
Ranunculus abortivus
Sanicula canadensis
Silene stellata
Smilax ecirrhata
Trillium recurvatum
Triosteum perfoliatum
Verbesina helianthoides
Veronicastrum virginicum
Viola sp.

WOODY VINES

Celastrus scandens
Menispermum canadense
Parthenocissus quinquefolia
Smilax tamnoides var. *hispida*
Vitis vulpina

HERBACEOUS

Ageratina altissima
Agrimonia pubescens
Allium tricoccum

Since the grove was isolated and well protected from prairie fires, the woody overstory in the 1910s was relatively diverse. Along the southern edge of the grove the forest was open, the trees small, mostly less than 30 cm dbh, although a few large veteran trees were still standing. *Quercus velutina* (black oak), shagbark hickory, bitternut hickory and an occasional black walnut were common along with occasional thickets of *Corylus americana* (hazelnut). At the grove margins were small thickets of *Malus coronaria* (wild sweet crab apple), *Prunus americana* (wild plum), and *Viburnum prunifolium* (black haw). Near the middle of the grove bur oaks were common, some over 1 meter dbh, along with numerous individuals of black walnut, slippery elm, hackberry, wild black cherry, *Gleditsia triacanthos* (honey locust), and *Quercus imbricaria* (shingle oak). Numerous woody shrubs and vines grew here along with a many common herbaceous species (Table 8.3). Along the northern edge of the groves most of the species listed previously were still present along with *Populus grandidentata* (large-toothed aspen), *Quercus rubra* (red oak), and occasionally basswood.

At the present time only a very small part of the original grove exists. This small 16-hectares remnant still has many large, open grown bur oaks with low branches and branch scars. In a walk-through survey in 2001 a total of 117 individual oaks were encountered that exceeded 50 cm dbh (Table 8.4). Among these larger individuals bur oak was the most common followed by black, white, shingle, and red oak. A survey of the woody overstory was conducted in 2002 (Table 8.5). Presently, the overstory is extremely dense with an average of 572 stems/ha and a basal area of 23.767 m²/ha. Overall, bur oak was the dominant species with an importance value to 61.4 (possible 200) followed by wild black cherry (IV of 34.0), shingle oak (IV of 32.7), hackberry (IV of 23.0) and black walnut (IV of 19.9). Many of the overstory species recorded are the same as those listed in the 1910s by Henry Allan Gleason. The thorny species red haw and Osage orange, and *Morus alba* (white mulberry) are probably relatively recent introductions, the results of past grazing.

Table 8.4 Total stems, density (stems/ha), basal area (m²/ha), and average diameter (cm) of the oaks species larger than 50 cm dbh recorded in 2001 for Royal Prairie Grove, Champaign County, Illinois.

Species	Total individuals	Density (stems/ha)	Basal Area (m ² /ha)	Average Diameter
bur oak	82	5.07	2.99	85.2
black oak	21	1.30	0.76	85.4
white oak	7	0.43	0.25	85.9
shingle oak	5	0.31	0.08	77.4
red oak	2	0.12	0.15	92.9
Totals	117	7.23	4.23	

This high overstory density in Royal Prairie Grove reflects the elimination of grazing which was stopped in the late 1940s. Grazing kept the understory open, removing seedlings of the overstory species, eliminating most of the shrubby species, and killing much of the herbaceous understory. Most of the overstory stems are in the lower diameter classes with nearly 90 percent of the individuals less than 30 cm dbh (Table 8.5). Most of these individuals were only seedlings or small saplings when grazing stopped about 60 years ago. These young trees have created a closed canopy, while the dense woody understory has eliminated much of the natural ground layer that originally existed in a prairie grove.

Another large isolated prairie grove with high species diversity is located near the town of Elkhart about 20 km north of Springfield in Logan County. It is extraordinary in being the only prairie grove in Illinois that occurs on a glacial kame. This glacial deposit is the sediment of a large lake that originally was situated in or on the glacier and when the glacier melted the sediment was left behind as a large mound or hill. About 250 hectares in size and rising nearly 55 meters above the surrounding landscape, nearly 130 hectares of the steep parts of the kame are forested with about 75 hectares being relatively undisturbed old-growth forest.

Table 8.5 Density (stems/ha), basal area (m²/ha,) importance values, and average diameters (cm) of the woody overstory species in Royal Prairie Grove, Champaign County, Illinois.

Species	Density (stems/ha)	Basal Area (m ² /ha)	Importance Value	Average Diameter (cm)
bur oak	112.5	9.917	61.4	25.2
wild black cherry	122.4	2.998	34.0	16.9
shingle oak	112.4	3.078	32.7	17.6
hackberry	81.7	2.076	23.0	17.2
black walnut	57.5	2.299	19.9	20.6
shagbark hickory	22.4	2.066	12.6	27.9
red haw	24.2	0.303	5.5	12.5
bitternut hickory	20.0	0.345	4.9	14.5
white mulberry	10.9	0.351	3.4	19.1
Osage orange	2.5	0.032	0.6	17.3
slippery elm	1.6	0.081	0.6	23.9
others	4.0	0.221	1.4	
Totals	572.1	23.767	200.0	

Based on GLO survey notes from 1823 this hill was completely covered with timber, which included elm, hackberry, sugar tree (sugar maple), lynn (basswood or linden), ash, walnut, and cherry with an understory of *Asimina triloba* (pawpaw) and spicewood (probably *Lindera benzoin*, spice bush). Situated in the Springfield Section of the Grand Prairie Division the kame is on Illinoian till. The area around the base of the kame was originally a deep slough under cordgrass and sedges in thick loess. The soil contained an abundance of shell fragments of snails that lived in the shallow but permanent bodies of water that nearly encircled the kame. These extensive sloughs retarded the movement of the numerous prairie fires resulting in the development of a mesic forest community. Erosion and cultivation has nearly eliminated any trace of these sloughs.

Ferdinand Ernst, a German immigrant, visited Elkhart Hill in 1819, and described the site as a “not an insignificant hill covered with timber. . . in a prairie eight miles broad.” He characterized the timber as having “sugar trees three to four feet in diameter.” John Dean Gillette, who became known as the “Cattle King,” and one of the most prominent cattle barons of the Illinois prairie, purchased the forest and much of the surrounding prairie during the 1860s and 1870s, obtaining nearly 25,000 acres. Grazed until about 1939, some timber has been removed from the grove for building materials and fencing, while a selective harvest of black walnut took place in about 1954.

When surveyed in 1996 a total of 14 canopy trees and six understory tree species were identified in the woods (Ebinger et al. 1997). Of the species encountered sugar maple ranked first with an IV of 83.8 (possible 200), accounted for nearly 45 percent of the total

density of the woods, and dominated all but the 70+ cm diameter class (Table 8.6). Common tree species with most individuals in the lower diameter classes included slippery elm, which was second in IV, hackberry, third in IV, and American elm, fifth in IV. These three species averaged 20 to 28 cm dbh and had few individuals in the larger diameter classes. In contrast, blue ash, fourth in IV, and bur oak, sixth in IV, were poorly represented in the smaller diameter classes, many individuals exceeding 70 cm dbh (Table 8.6).

Table 8.6 Density (stems/ha), basal area (m²/ha), importance value, and average diameter (cm) of the woody overstory in Elkhart Prairie Grove, Logan County, Illinois.

Species	Density (stems/ha)	Basal Area (m ² /ha)	Importance Value	Average Diameter (cm)
sugar maple	132.5	9.33	83.8	24.4
slippery elm	41.0	3.44	28.2	27.6
hackberry	39.1	3.00	25.7	24.0
blue ash	10.8	3.62	18.1	62.0
American elm	24.3	0.88	12.0	20.8
bur oak	3.4	1.67	7.8	78.1
basswood	7.5	0.76	5.7	30.8
black walnut	3.7	0.84	4.7	52.6
Kentucky coffee tree	4.4	0.69	4.3	42.0
pawpaw	9.9	0.11	3.9	11.6
honey locust	1.3	0.35	1.8	59.5
bitternut hickory	1.5	0.27	1.5	46.1
red haw	3.2	0.09	1.4	18.1
black oak	0.1	0.09	0.3	111.5
butternut	0.4	0.03	0.3	29.1
Osage orange	0.2	0.02	0.1	28.9
wild black cherry	0.2	0.01	0.1	19.1
southern catalpa	0.1	0.02	0.1	46.8
mockernut hickory	0.1	0.01	0.1	34.1
red mulberry	0.1	0.01	0.1	16.5
Totals	283.8	25.24	200.0	

Elkhart Prairie Grove is probably the best example of a large isolated prairie grove situated on a glacial morainal deposit. The high species diversity, large trees, and relatively undisturbed forest indicate an area of high natural quality. Even the ground layer of the grove is fairly well developed with 28 species being reported from a spring survey of the woods, while 22 species were encountered in plots in early summer. Many other herbaceous species were observed in the woodlot, only a few of which were introduced exotic species.

Streamside Prairie Groves

Many of the prairie groves found in the Grand Prairie Division of central Illinois were associated with streams and small rivers. These streamside groves were usually large; many in presettlement times were more than 20 square km in size. They also had high woody species diversity with as many as 20 tree species entering the canopy. Most of these groves had high densities of sugar maple and other thin-barked, fire-sensitive

species. Oaks and hickories were also present, however, usually having low importance values (Table 8.7). The position of these groves along many streams in the Grand Prairie suggested that they had been cut-off from larger forested areas by attrition from repeated fires.

Table 8.7 Importance values (based on 100) for the woody overstory species in three stream-side prairie groves in central Illinois.

Species	Funks Grove	Trelease Woods	Brownfield Woods
sugar maple	29.0	27.5	40.7
elms	17.6	9.5	8.2
white oak	14.5	--	--
basswood	6.5	7.3	7.1
ashes	6.4	12.3	8.2
hickories	4.8	--	--
hackberry	4.2	11.6	6.9
bur oak	3.6	3.2	4.7
red oak	2.7	7.0	12.0
others	10.7	21.6	12.2
Totals	100.0	100.0	100.0

Large remnants of these extensive streamside groves, modified by disturbance and fire suppression, still exist. A few have been studied, including the Funk's Grove Natural Area along Timber Creek, McLean County, Trelease Woods, and Brownfield Woods, the last two being remnants of the "Big Grove" along the Salt Fork River in Champaign County (Figures 8.2). The majority of the tree species entering the canopy were thin-barked and fire-sensitive, such as sugar maple, slippery elm, American elm, basswood (or linden), and hackberry. Oaks were important components, white oak being common, bur oak and black oak usually being present as scattered, large-diameter trees. The presence of the thin-bark, fire-sensitive species suggest that the interiors of these large groves only rarely burned, and then only by low, creeping, relatively cool fires that rarely scarred the trees, but top-killing the woody undergrowth.

One of the best preserved of these large prairie groves associated with streams is Funk's Grove (originally called Sugar Grove) in McLean County. More than 8 km long and 2 km wide, located along both sides of Sugar Creek (now called Timber Creek), the grove, originally covered about 4900 acres (2000 hectares). Presently Funk's Grove Natural Area is a 340 hectare remnant of the original Funk's Grove, the remainder now in agriculture. At the time of settlement by European man much of McLean County was in prairie with timber restricted to groves along the streams. Most of these groves have been converted to agricultural uses; the remainder are highly degraded. Funk's Grove Natural Areas is the one remaining example that contains high quality mesic upland forest and mesic floodplain forests. It is probably the best representative of the streamside groves that once occurred in the Grand Prairie Division left in Illinois. The Funk family has protected a part of this grove since 1833.

In the GLO survey notes the grove occupied the slopes and flat uplands adjacent to Sugar Creek. The common tree species listed in the GLO survey were white oak, elms, ashes, basswood, sugar maple, black oak, red oak, hickories, bur oak, hackberry, honey locust, and black walnut. The understory was probably open, but for a few section lines the GLO survey listed the undergrowth species as hazel, brush, briars, and vines. Other historic

accounts mention that in some places on the level uplands, scattered, large trees grew out onto the prairie forming a limited savanna. Mostly, however, the edges of the grove probably occurred as a wall of trees next to prairie, forming a sharp clear timber boundary.

Based on the GLO survey records, on the drier uplands around the grove black oak was common while the dry-mesic upland sites along the prairie/forest transition had large scattered, open-grown bur oaks and white oaks with a ground cover of prairie vegetation. The more mesic slopes had a greater number of canopy trees, probably had a closed canopy, and no clear dominants. Red oak, white oak, American ash, blue ash, shagbark hickory, sugar maple, American elm, slippery elm, basswood, hackberry, and black walnut must have been common here. The lower slopes and stream terraces were dominated by sugar maple, American and slippery elms, and bitternut hickory. Prairie fires rarely reached this part of the woods. *Salix nigra* (black willow), *Populus deltoides* (eastern cottonwood), *Acer negundo* (box elder), *Acer saccharinum* (silver maple), and very large individuals of *Platanus occidentalis* (sycamore) grew along the narrow floodplain and on the stream banks. The understory of the uplands and slopes was probably sparse; the ground generally open and clear of brush except for scattered thickets of hazelnut while pawpaw was common on the lower slopes and terraces where fire rarely penetrated.

Funk's Grove is on some of the more rugged terrain in McLean County, which probably helped to maintain the grove, giving some protection from the frequent and intense prairie fires. Originally, it is very likely that the oaks (black, bur, and white) along with hickories were the more common species of the grove, but sugar maple and other fire-sensitive, shade-tolerant species were common in the grove interior. Fire suppression in early settlement times along with disturbances, both natural and anthropomorphic, have favored the more mesic, fire-sensitive species that may not have been important canopy trees in the 1800s. Logging, the selective removal of black walnut, and Dutch elm disease have definitely changed the species composition of the grove. Fire suppression has caused a drastic reduction in oak and hickory regeneration and changed their size class distribution. Also, the oaks were originally the dominants at the prairie/forest transition, and these savannas were the first disturbed by the early settlers for agriculture and grazing. Also the removal of firewood since early settlement times, mostly being oaks and hickories, had a profound effect on forest composition and structure.

Oliver's Grove, located in the southwestern corner of Livingston County, is another grove associated with a river system. Originally about 2.4 km across, the grove had a high diversity of woody species. At the time of European settlement the grove was the home of the Pottawatomie and Kickapoo Indians as it was an attractive place with timber, good quality water, and abundant game. The first permanent European settler, Frank Oliver, moved his family into the grove in 1832. At one time Mr. Oliver owned 1600 ha of land including the grove, as well as prairie, and an extensive wetland.

This grove has characteristics of both a streamside grove and an isolated prairie grove associated with a morainal ridge. Most of the land surrounding Oliver's Grove was dominated by tallgrass prairie, a large portion of which was wet. Sloughs, sedge meadows, marshes, and glacial lakes were common features of the GLO survey records for the region, particularly just to the west of the grove. A small grove dominated by bur oak was associated with the morainal ridge at the western edge of Oliver's Grove. The sloughs and sedge meadows protected the small ridge (Figure 8.3).

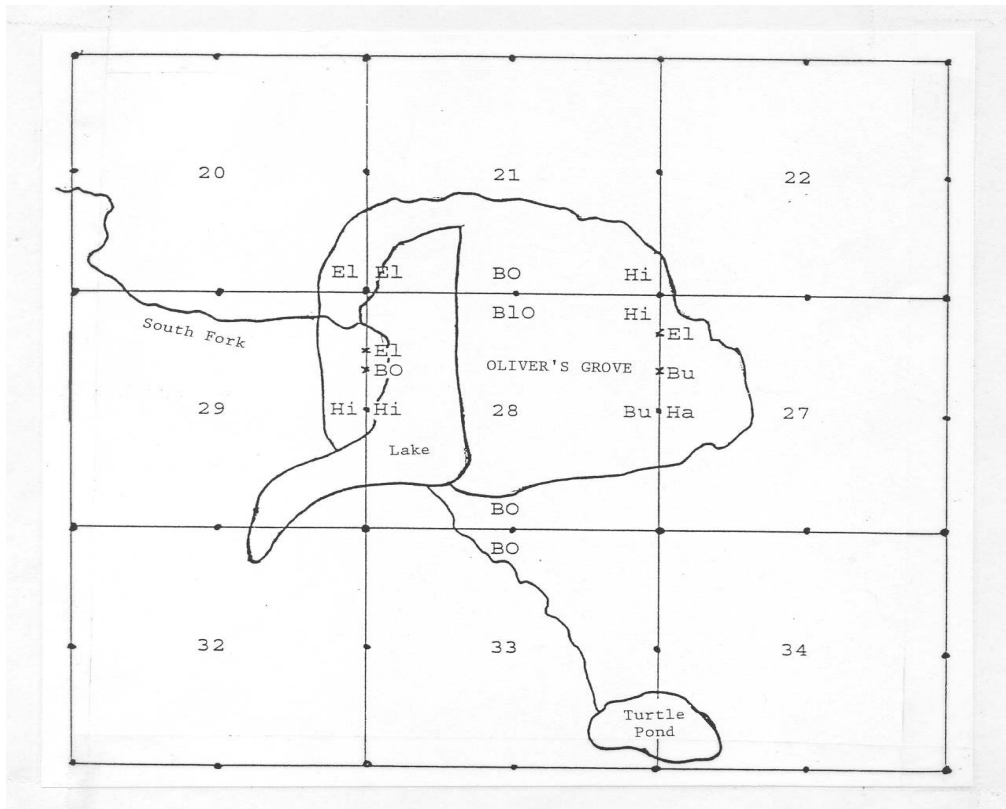


Figure 8.3. Portion of the GLO plat for T26N R8E that includes Oliver's Grove, just south of Chatsworth, Livingston County, Illinois. The survey of the county was started 13 October 1833 and completed on 22 May 1834 by James Dunn, William Phillips, and Washington Atchinson. (BO = bur oak, BLO = black oak, Bu = Ohio buckeye, El = elms, Ha = hackberry, Hi = hickories).

In 1833 the GLO surveyors described a large area just east of the morainal ridge as a lake, marsh, pond, or wet area. This large wet area and the South Fork of the Vermilion River protected much of the eastern part of the grove from prairie fires (Figure 8.3). Within the grove the GLO surveyors encountered a diverse assemblage of many fire-sensitive woody species including black walnut, basswood, hackberry, elm, and *Aesculus glabra* (Ohio buckeye). To the west of the extensive wetland prairie fires were more extreme and the thick-barked, fire-tolerant bur oak dominated. A cross-section of a 160 year-old bur oak from the western part of the grove revealed a fire scar from 1871, the year of the Chicago fire. Many large trees, some exceeding 100 cm dbh are still present in the core of this grove just to the east of the large wetland (Figure 8.3). In one extensive woodlot basswood is the dominant tree species with an importance value of 65.9 (total possible 200), while other fire-sensitive species present include hackberry, red oak, black walnut, and honey locust (Table 8.8).

Table 8.8. Density (stems/ha), basal area (m²/ha), importance value, and average diameter (cm) of the woody overstory species in two woodlots of Oliver's Grove. Gerth's Farm Woodlot is located west of the extensive wetland while Oliver's Farm Woodlot is protected from prairie fires by the extensive wetland.

Species and Location	Density (stems/ha)	Basal Area (m ² /ha)	Importance Value	Average Diameter (cm)
Gerth's Farm				
bur oak	33.0	11.387	131.2	64.2
shagbark hickory	25.5	3.828	68.8	42.8
Total	58.5	15.215	200.0	
Oliver's Farm				
basswood	36.0	8.667	65.9	53.1
hackberry	26.0	4.995	41.5	42.6
red haw	42.5	0.727	32.5	14.2
red oak	4.0	2.351	14.0	85.9
Osage orange	15.5	0.641	13.7	21.9
bur oak	3.0	1.559	9.4	79.1
shagbark hickory	6.0	0.501	6.5	31.8
black walnut	4.0	0.702	6.1	45.3
honey locust	4.5	0.293	4.5	23.3
others (6 species)	5.0	0.575	5.9	
Totals	146.5	21.011	200.0	

Gallery Forests on the Prairie Peninsula of Illinois

Many of the smaller streams of the prairie peninsula were associated with narrow strips of timber that were sometimes referred to as gallery forests. Usually these gallery forests were continuous strips extending for many kms across much of a prairie opening. In the prairie peninsula of Illinois, however, small isolated elongated groves were sometimes created when successive prairie fires broke through the gallery forest isolating individual segments. Topography was important in developing and maintaining the integrity of these gallery forests as were the position of wetlands such as sloughs, ponds, and sedge meadows. Where stream down-cutting resulted in steep slopes, or a stream was associated with a series of morainal ridges, the rough topography could slow the prairie fires that burned slowly and with low intensity down the slopes into the lowlands. Also, wetlands to the west and north of these gallery forests would have a similar effect, slowing or stop the prairie fires.

To the west and northwest of Illinois gallery forests were common, occurring as finger-like extensions along the river valleys in South Dakota, Iowa, Nebraska, and Kansas. These forests, which represent the western edge of the eastern deciduous forest, were dominated by bur oak and *Quercus muhlenbergii* (chinquapin oak or yellow chestnut oak). Like the gallery forests in Illinois, the extent of these gallery forests and the distribution of tree

species were related to topographic relief, soil, and moisture availability. On Konza prairie in northeast Kansas, bur oak usually dominated mesic and intermediate sites while chinquapin oak dominated the more xeric, droughty sites.

The GLO survey notes give some information on the floristic composition of these thin bands of woodlands growing along stream channels and in narrow ravines in the prairies of Illinois. These narrow strips of timber were usually less than a few hundred meters across, and occasionally a section or quarter section post was placed in a gallery forest. Also, it was not uncommon for the surveyors to blaze and record line trees along the section lines, to record when they entered and left the timber, and to describe the timber and sometimes the woody understory of these thin bands of timber. In Illinois counties with extensive prairie and few forested regions, gallery forests were relatively common, particularly in some of the counties of the Springfield Section of the Grand Prairie Natural Division.

GLO survey records for Logan County, that were completed in the summer and fall of 1822, record a few narrow gallery forests, some less than 200 meters across. The surveyors repeatedly crossed through these gallery forests, recording characteristics of the land and the associated timber. Generally the ground was listed as rolling, second rate, or ground gently rolling, while sloughs, lakes, ponds, and wet prairies were commonly recorded for much of the county. While crossing through the gallery forests the surveyors often recorded the forest overstory as “timber oak, hickory, elm, sycamore,” “timber elm, sycamore, hackberry,” “timber oak, hickory, sycamore, maple,” or “timber oak, walnut, sycamore.” In a few instances the surveyors recorded the woody understory composition as “understory hazel, pawpaw, vines,” or “understory pawpaw, spice, prickly ash.” Another common phrase was “creek has a narrow strip of timber on its banks of maple, sycamore, etc.” Unfortunately the species of maple was not recorded, but probably was silver maple.

Of the few section and quarter section posts recorded from the gallery forests, the common witness tree species listed were maple, bur oak, white oak, sycamore, and black walnut, while line trees included lynn (linden or basswood), black walnut, and honey locust. One of the white oaks listed was 36 inches dbh. In these narrow bands of timber it appears that sycamore, silver maple, elms, and hackberries were on the stream banks and the narrow floodplains associated with these streams. Here these thin-barked, fire-sensitive species could survive because of low fire frequencies, the low fire intensity, and the low litter loads. The fire-insensitive, shade-intolerant oaks, and possibly hickories, were probably more common near the edges of these gallery forests. Where these gallery forests were wider they became the streamside prairie grove forests discussed above, and tree species diversity increased.