

Vegetation of Hitts Siding Prairie Nature Preserve, Will County, Illinois

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ABSTRACT

Hitts Siding Prairie Nature Preserve, 3 km northeast of Braidwood, Will County, Illinois, is dominated by an extensive mesic prairie on sandy loam. The trailing shrub *Rubus flagellaris* was the dominant species of the dry-mesic to mesic prairie with a mean cover of 14.18 and an importance value (I.V.) of 11.9 (possible 200). *Schizachyrium scoparium* was the dominant grass (I.V. of 11.2) followed by *Sorghastrum nutans* (I.V. of 9.2) and *Andropogon gerardii* (I.V. of 6.8). Dominant forbs included *Euthamia gymnospermoides* (I.V. of 10.8), *Helianthus mollis* (I.V. of 10.7), *Solidago missouriensis* (I.V. of 8.6), and *Coreopsis tripteris* (I.V. of 7.6). A total of 106 species were recorded for the survey plots of the prairie. Of the species recorded in the plots 72 had an I.V. of 1.4 or less while six exotic species were recorded. A small sedge meadow dominated by *Carex haydenii/stricta* (I.V. of 51.2) forming small tussocks was surveyed in the Preserve as well as a marsh dominated by *Onoclea sensibilis* (I.V. of 43.3) and *Thelypters palustris* (I.V. of 30.9). We recorded 360 vascular plant species from the Preserve. The study was conducted to determine vascular plant species composition, and vegetation structure of the least disturbed plant communities of the Preserve.

Keywords: Kankakee sand deposits, Illinois, importance values, marsh, mesic prairie, sedge meadow, vegetation surveys

INTRODUCTION

Sand deposits are relatively common in the northern half of Illinois and account for nearly 5% of the land surface of the state (Phillippe et al. 2011). These deposits, mostly the result of erosion events associated with Wisconsin glaciation, developed about 14,500 years ago (King 1981, Schwegman 1973, Willman and Frye 1970). At that time the Kankakee sand deposits were formed after glacial lakes were drained by the Kankakee Torrent. These sand deposits, that remained in northeastern Illinois after the Kankakee Torrent, extend from Newton County, Indiana on the Indiana/Illinois border, west through large parts of Iroquois, Kankakee, Will, and Grundy counties, Illinois, then south, with sand deposits throughout much of the Illinois River valley.

Plant communities of sand deposits are extremely diverse, varying from wet to xeric and from prairie to forest (White and Madany 1978). The Kankakee sand deposits of Will County occur on extensive outwash plains and old lake beds of Wisconsin glaciation. Here sand deposits are interspersed with soils that contain varying amounts of silt and clay, and are classified as sandy loams.

The results are a mosaic with sand communities, such as marshes, sedge meadow, and sand prairie interspersed with "black soil" prairies depending on soil type and drainage. Hitts Siding Prairie Nature Preserve contains prairie communities on both fine sand and sandy loam soils (Hanson 2004).

The present study was undertaken to determine vascular plant species composition and vegetation structure of the major natural plant communities of this Preserve.

STUDY AREA

The 105.7 ha (261.3 acres) Hitts Siding Prairie Nature Preserve is located

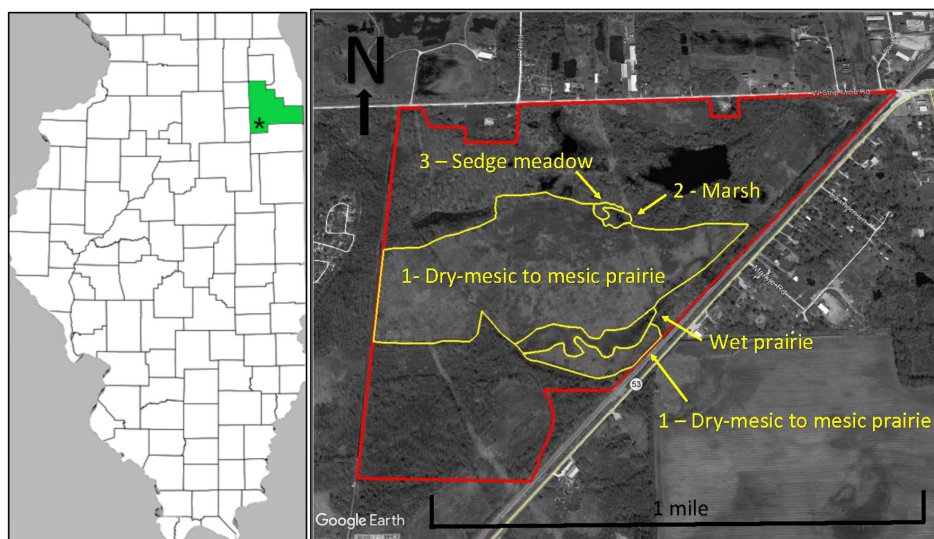


Figure 1. Aerial photography of Hitts Siding Prairie Nature Preserve, Will County, Illinois, showing the location of the plant communities in the area studied. Aerial imagery from Google Earth 2021.

ed in the southwestern corner of Will County about 3 km northeast of Braidwood, and 20 km south of Joliet (E½ S34, NW¼ S35 T33N R9E; 41.29689°N, -88.17267°W). In the 1950s Hitts Siding was a railroad siding that connected an active strip-mine just to the west with a major railroad at the southwest boundary (Figure 1). Presently owned by the Illinois Department of Natural Resources, the Preserve is located in the Kankakee Sand Area Section of the Grand Prairie Natural Division (Schwegman 1973). Extensive areas of the Preserve have been degraded in the past by cultivation, past grazing and other disturbances. Dedicated in 1998, the Preserve contains dry-mesic to mesic prairie; a narrow, poor-quality wet-prairie; some small, poor-quality sand prairies remnants; marshes; sedge meadows; poor-quality forest/savanna; and extensive areas of old fields (McFall and Karnes 1995). Most of the northern third of the Preserve had been farmed and some ponds created. This part of the Preserve was not studied. The southern part of the Preserve, however, still contains native vegetation of fairly high natural quality. Here, a few small sedge meadows, some small marshes, and an extensive dry-mesic to mesic “black soil” prairie exist. Also, a few small sand prairie remnants and a small, elongated wet prairie occur in the preserve. These were not surveyed due to their size.

The Preserve is situated near the edge of former glacial Lake Wauponsee that drained about 14,500 years ago during the Kankakee Torrent leaving sandy beaches and near shore sand deposits (Willman and Frye 1970). These sands were reworked by wind creating the present dune and swale topography of parts of this region. Prairie and savanna vegetation became established during the Hypsithermal period about 8,000 years ago (King 1981).

The soils of the Preserve are mostly fine sandy loam (Gilford, Grundy, and Ridgeway) that are poorly drained and relatively high in organic material (Hanson 2004). Oakville fine sands are also present on slightly higher ground and

Table 1. Frequency (%), mean cover (% of total area), relative frequency, relative cover, and importance value (I.V.) of the ground layer species encountered in a mesic prairie at Hitts Siding Prairie Nature Preserve, Will County, Illinois. Species with importance values of <1.4 are listed as others. (*exotic species).

Species	Freq. %	Mean Cover	Rel. Freq.	Rel. Cover	I.V.
<i>Rubus flagellaris</i>	90	14.18	3.6	8.3	11.9
<i>Schizachyrium scoparium</i>	92	12.69	3.8	7.4	11.2
<i>Euthamia gymnospermoides</i>	96	11.76	3.9	6.9	10.8
<i>Helianthus mollis</i>	84	12.53	3.4	7.3	10.7
<i>Sorghastrum nutans</i>	60	11.45	2.5	6.7	9.2
<i>Solidago missouriensis</i>	76	9.42	3.1	5.5	8.6
<i>Coreopsis tripteris</i>	88	6.80	3.6	4.0	7.6
<i>Andropogon gerardii</i>	58	7.57	2.4	4.4	6.8
<i>Liatris spicata</i>	62	6.64	2.5	3.9	6.4
<i>Aristida purpurascens</i>	48	6.69	2.0	3.9	5.9
* <i>Poa pratensis</i>	96	3.24	3.9	1.9	5.8
<i>Pycnanthemum tenuifolium</i>	84	3.43	3.4	2.0	5.4
<i>Viola sagittata</i>	96	1.97	3.9	1.2	5.1
<i>Carex umbellata</i>	76	3.27	3.1	1.9	5.0
<i>Rubus hispidus</i>	20	6.17	0.8	3.6	4.4
<i>Scleria triglomerata</i>	42	3.51	1.7	2.1	3.8
<i>Dichanthelium acuminatum</i>	78	0.79	3.2	0.5	3.7
<i>Solidago speciosa</i>	40	3.60	1.6	2.1	3.7
<i>Eryngium yuccifolium</i>	32	3.90	1.3	2.3	3.6
<i>Agrostis gigantea</i>	44	2.90	1.8	1.7	3.5
<i>Juncus greenei</i>	68	0.79	2.8	0.5	3.3
<i>Parthenium integrifolium</i>	34	3.34	1.4	1.9	3.3
<i>Phlox glaberrima</i>	70	0.70	2.9	0.4	3.3
* <i>Rumex acetosella</i>	66	0.88	2.7	0.5	3.2
<i>Lespedeza capitata</i>	50	1.81	2.0	1.1	3.1
<i>Potentilla simplex</i>	52	1.74	2.1	1.0	3.1
<i>Comandra umbellata</i>	44	2.08	1.8	1.2	3.0
<i>Fragaria virginiana</i>	32	2.25	1.3	1.3	2.6
<i>Prenanthes aspera</i>	46	1.03	1.9	0.6	2.5
<i>Solidago nemoralis</i>	34	1.78	1.4	1.0	2.4
<i>Solidago altissima</i>	14	3.21	0.5	1.9	2.4
<i>Lactuca canadensis</i>	34	0.42	1.4	0.3	1.7
<i>Solidago gigantea</i>	20	1.27	0.8	0.8	1.6
<i>Calamagrostis canadensis</i>	8	2.07	0.3	1.2	1.5
Others (72 species)		14.87	21.2	8.7	29.9
Totals		170.75	100.0	100.0	200.0
Bare ground and litter		26.22			

are mostly dominated by oak savanna. These fine sands developed from windblown sediments and are relatively low in organic material. The climate is continental with warm summers and cold winters. Mean annual precipitation is 98.0 cm, with May having the highest rainfall (11.5 cm). Mean annual temperature is 9.9°C with the hottest month being July (average of 23.6°C), and the coldest being January (average of -5.7°C). Frost-free days range from 141 to 206, with the average being 174 days per year (Midwestern Regional Climate Center 2015; Kankakee, Illinois).

METHODS

Floristic Composition. The Preserve was visited on the average of six times each year throughout the growing seasons of 2007 to 2009 and a few times in 2010. During these visits voucher specimens were collected and deposited in the herbarium of the Illinois Natural History Survey, Champaign, Illinois (ILLS). The designation of exotic species and nomenclature follows Mohlenbrock (2002).

Ground Layer Sampling. In September of 2007 transects were located randomly along cardinal compass directions

within the three communities studied ($n = 25$ to 50 plots in each community). Along each transect, 1m² quadrats were located alternately, at 1m to 2m intervals, to the right then left along each transect. A random numbers table was used to determine the distance (0 to 9 m for mesic prairie / 0 to 4 m for others) a quadrat was located from the transect line. Species cover was determined using the Daubenmire (1959) cover class system as modified by Bailey and Poulton (1968). The modified Daubenmire cover scale is as follows: class 1 = 0 to 1%; class 2 = >1 to 5%; class 3 = >5 to 25%; class 4 = >25 to 50%; class 5 = >50 to 75%; class 6 = >75 to 95%; class 7 = >95 to 100%. Mean cover was determined for each taxon using the mid-point values for each cover class, while the Importance Value (I.V.) was calculated by summing relative cover and relative frequency.

RESULTS

Floristic Composition. The Preserve supports a total of 360 vascular plant taxa in 82 families (Appendix I). Fern, fern-allies, and gymnosperms were represented by six taxa in five families. Of the remaining taxa, 105 were monocots in 13 families, and 249 were dicots in 64 families. Non-native (exotic) species accounted for 45 taxa, 12.5% of the species collected. Predominant plant families were Asteraceae (50 taxa), Poaceae (50), and Cyperaceae (25). The only state endangered species found was *Dichanthelium boreale* (northern panic grass), while one state threatened species was encountered, *Rubus schneideri* (bristly blackberry) (Illinois Endangered Species Protection Board 2020). Five additional Illinois listed species reported from the Preserve were not encountered during this study.

Mesic prairie. This prairie extended through much of the southern half of the Preserve on Ridgeville and Gilford fine sandy loam soils that are relatively high in organic material. The trailing shrub *Rubus flagellaris* (common dewberry) was the dominant species recorded with a mean cover of 14.18 and an I.V. of 11.9 (Table 1). The dominant grasses were *Schizachyrium scoparium*

Table 2. Frequency (%), mean cover (% of total area), relative frequency, relative cover, and importance value (I.V.) of the ground layer species encountered in a marsh community at Hitts Siding Prairie Nature Preserve, Will County, Illinois. Species with importance values of <0.4 are listed as others. (*exotic species).

Species	Freq. %	Mean Cover	Rel. Freq.	Rel. Cover	I.V.
<i>Onoclea sensibilis</i>	98	43.51	12.3	31.0	43.3
<i>Thelypteris palustris</i>	98	26.07	12.3	18.6	30.9
<i>Carex haydenii/stricta</i>	74	28.95	9.2	20.7	29.9
<i>Carex lacustris</i>	64	14.62	8.0	10.5	18.5
<i>Boehmeria cylindrica</i>	78	8.32	9.7	5.9	15.6
<i>Scutellaria galericulata</i>	60	4.14	7.4	3.0	10.4
<i>Lycopus americanus</i>	44	2.03	5.5	1.4	6.9
<i>Persicaria coccinea</i>	32	2.78	4.0	2.0	6.0
<i>Mentha arvensis</i>	32	1.77	4.0	1.3	5.3
<i>Campanula aparinoides</i>	28	0.97	3.5	0.7	4.2
<i>Lycopus uniflorus</i>	28	0.73	3.5	0.5	4.0
<i>Bidens polylepis</i>	26	0.77	3.3	0.5	3.8
<i>Galium obtusum</i>	24	0.81	3.0	0.6	3.6
<i>Lysimachia thyrsiflora</i>	24	0.61	3.0	0.4	3.4
<i>Eupatoriadelphus maculatus</i>	12	1.56	1.5	1.1	2.6
<i>Epilobium coloratum</i>	18	0.14	2.3	0.1	2.4
<i>Calamagrostis canadensis</i>	12	0.98	1.5	0.7	2.2
<i>Persicaria punctata</i>	8	0.09	1.0	0.1	1.1
<i>Eupatorium perfoliatum</i>	4	0.07	0.5	0.1	0.6
<i>Scutellaria lateriflora</i>	4	0.07	0.5	0.1	0.6
<i>Verbena hastata</i>	4	0.12	0.5	0.1	0.6
<i>Stachys pilosa</i> var. <i>homotricha</i>	4	0.02	0.5	--	0.5
<i>Scirpus cyperinus</i>	2	0.30	0.2	0.2	0.4
<i>Mimulus ringens</i>	2	0.30	0.2	0.2	0.4
<i>Vitis riparia</i>	2	0.30	0.2	0.2	0.4
Others (12 species)		0.22	2.4	--	2.4
Totals		140.25	100.0	100.0	200.0
Bare ground and litter		14.20			

(little bluestem) with a mean cover of 12.69 and an I.V. of 11.2, followed by *Sorghastrum nutans* (Indian grass) with an I.V. of 9.2, and *Andropogon gerardii* (big bluestem) with an I.V. of 6.8, and ranked second, fifth, and eighth in I.V., respectively. *Schizachyrium scoparium* was distributed throughout the prairie as indicated by its high frequency (>92%), the other two grass species being less common with frequencies close to 60%. Dominant forbs included *Euthamia gymnospermoides* (viscid grass-leaved goldenrod) with a mean cover of 11.76 and an I.V. of 10.8, *Helianthus mollis* (downy sunflower) with an I.V. of 10.7, *Solidago missouriensis* (Missouri goldenrod) with an I.V. of 8.6, and *Coreopsis tripteris* (tall coreopsis) with an I.V. of 7.6, and ranked third, fourth, sixth, and seventh, in I.V. respectively. Overall, these eight species dominate the prairie, having the highest importance, though 106 species were record-

ed on the 50 plots surveyed. Of the species recorded in the plots 72 had an I.V. of 1.4 or less while eight exotic species were found in the plots, *Poa pratensis* (Kentucky blue grass) and *Rumex acetosella* (sour dock) being the most common. Overall, the species encountered were typical prairie species, most of which are commonly associated with mesic "black soil" prairie habitat.

Marsh. Located near the center of the preserve along the norther edge of the dry-mesic to mesic prairie is a small depression about 1-2 ha in size that contain marsh vegetation (Table 2). *Onoclea sensibilis* (sensitive fern) was the dominant species encountered in the plots with a mean cover of 43.51% and an I.V. of 43.3 followed by *Thelypteris palustris* (marsh fern) with a mean cover of 26.07% and an I.V. of 30.9. The common sedges were *Carex haydenii/stricta* (tussock sedge) with an I.V. of 29.9 and *C. lacustris* (lake sedge) with an I.V. of

18.5. Throughout this shallow depression *Carex haydenii* (Hayden's sedge) and possibly some *C. stricta* (tussock sedge) formed short tussocks. The few flowering stems found were all identified to *C. haydenii*, though both species were probably present. These species are difficult to separate based on vegetative material. *Boehmeria cylindrica* (false nettle) and *Scutellaria galericulata* (marsh skullcap) were the only other species present with an I.V. greater than 7.0 (Table 2). Of the 37 species encountered in the plots, all were native.

Sedge Meadow. Located next to the marsh is a small sedge meadow about 0.4 ha in size (Table 3). It is dominated by *Carex haydenii/stricta*, with a mean cover of 58.90% and an I.V. of 51.2, forming low tussocks on which other species sometimes grow. *Onoclea sensibilis* was second in importance with an I.V. of 24.0 followed by *Calamagrostis canadensis* (bluejoint grass) with an I.V. of 20.9. Of the 41 species encountered in the plots, two were exotic species, *Phragmites australis* (reed) and *Poa pratensis*. This sedge meadow was dry when studied. The tussocks were not well developed, usually only 5-10 cm tall.

DISCUSSION

In 1976 personnel from the Illinois Natural Areas Inventory surveyed the mesic prairie and marsh communities that we examined (White 1978). Their records, maintained by the Illinois Department of Natural Resources, indicate that much of the mesic prairie was grade B quality, which indicated a community in late successional stages or lightly disturbed. Presently, this community is of fairly high quality with good species composition, but lack some of the "rarer species" commonly associated with mature mesic prairies.

The mesic prairie surveyed is unusual in that the dominant species was *Rubus flagellaris*, probably the result of past over-grazing. Also, the dominant grasses, *Schizachyrium scoparium* along with smaller amounts of *Sorghastrum nutans* and *Andropogon gerardii*, were not clumped nor restricted to certain areas, an indication that the communi-

Table 3. Frequency (%), mean cover (% of total area), relative frequency, relative cover, and importance value (I.V.) of the ground layer species encountered in a sedge meadow at Hitts Siding Prairie Nature Preserve, Will County, Illinois. Species with importance values of <0.5 are listed as others. (*exotic species).

Species	Freq. %	Mean Cover	Rel. Freq.	Rel. Cover	I.V.
<i>Carex haydenii/stricta</i>	96	58.90	10.1	41.1	51.2
<i>Onoclea sensibilis</i>	60	25.42	6.3	17.7	24.0
<i>Calamagrostis canadensis</i>	80	17.86	8.4	12.5	20.9
<i>Boehmeria cylindrica</i>	48	6.14	5.0	4.3	9.3
<i>Verbena hastata</i>	52	3.38	5.4	2.4	7.8
<i>Galium obtusum</i>	56	1.94	5.9	1.4	7.3
<i>Parthenocissus quinquefolia</i>	44	3.52	4.6	2.5	7.1
<i>Solidago gigantea</i>	44	3.42	4.6	2.4	7.0
<i>Erechtites hieracifolia</i>	52	0.26	5.4	0.2	5.6
<i>Carex pellita</i>	40	0.88	4.2	0.6	4.8
<i>Eupatorium perfoliatum</i>	24	2.54	2.5	1.8	4.3
<i>Euthamia graminifolia</i>	20	3.00	2.1	2.1	4.2
<i>Stachys pilosa var. homotricha</i>	28	0.84	2.9	0.6	3.5
<i>Campanula aparinoides</i>	32	0.16	3.3	0.1	3.4
<i>Helianthus grosseserratus</i>	16	2.40	1.7	1.7	3.4
<i>Scutellaria galericulata</i>	20	1.46	2.1	1.0	3.1
<i>Solidago altissima</i>	16	1.44	1.7	1.0	2.7
<i>Carex scoparia</i>	20	0.68	2.1	0.5	2.6
<i>Cornus obliqua</i>	16	1.34	1.7	0.9	2.6
<i>Equisetum arvense</i>	20	0.40	2.1	0.3	2.4
<i>Carex buxbaumii</i>	68	0.79	2.8	0.5	3.3
<i>Corylus americana</i>	34	3.34	1.4	1.9	3.3
<i>Cicuta maculata</i>	70	0.70	2.9	0.4	3.3
<i>Epilobium coloratum</i>	66	0.88	2.7	0.5	3.2
<i>Agrimonia parviflora</i>	50	1.81	2.0	1.1	3.1
* <i>Phragmites australis</i>	52	1.74	2.1	1.0	3.1
<i>Toxicodendron radicans</i>	44	2.08	1.8	1.2	3.0
<i>Rubus flagellaris</i>	32	2.25	1.3	1.3	2.6
* <i>Poa pratensis</i>	46	1.03	1.9	0.6	2.5
<i>Salix interior</i>	34	1.78	1.4	1.0	2.4
<i>Acalypha rhomboidea</i>	8	0.14	0.8	0.1	0.9
<i>Lycopus uniflorus</i>	4	0.60	0.4	0.4	0.8
<i>Hypericum sphaerocarpum</i>	8	0.04	0.8	--	0.8
<i>Thelypteris palustris</i>	4	0.60	0.4	0.4	0.8
<i>Eupatorium serotinum</i>	4	0.12	0.4	0.1	0.5
Others (6 species)		0.12	2.4	--	2.4
Totals		143.36	100.0	100.0	200.0
Bare ground and litter		1.50			

ty was a little drier than typical mesic prairies. The forbs, in contrast, were those associated with mesic prairies, and the large number of species encountered in the plots was typical of mesic sites. The few exotic species present in the prairie, and the general lack of woody species indicates that most of the prairie is of fairly high natural quality. The floristic quality of this prairie communities will continue to improve with proper management, particularly occasion prescribed burns and the removal of trees and forest shrubs.

In the Preserve two wetland commu-

nities with sedge meadow characteristics were examined (White and Madany,1978). The first wetland was a typical sedge meadow with tussock sedge dominating and forming small tussocks (Table 3). The second wetland we classified as a marsh (Table 2). Tussock sedge was also common here, but the tussocks were not well developed and the species was scattered. Variations in the water table, attempts to draining the depressions, or past grazing and trampling by cattle, could all be responsible for this present floristic composition and structure. Few exotic species were encountered, but the pres-

ence and abundance of *Phragmites australis* (reed) should be monitored and controlled. In addition to controlling invasive species the use of periodic burns within sedge meadow communities is recommended as this could promote forb recruitment and enhanced diversity (Kost and De Steven 2000). The relatively high species diversity in this small area, however indicates it is recovering from past disturbances.

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APPENDIX 1. Vascular plant species encountered at Hitts Siding Prairie Nature Preserve, Will County, Illinois, are listed alphabetically by family under major plant groups. Collecting numbers preceded by an M were collected by Paul B. Marcum, those preceded by a P were collected by Loy R. Phillippe. All specimens are deposited in the Illinois Natural History Survey Herbarium, Champaign, Illinois (ILLS). (*exotic species)

FERN AND FERN-ALLIES

Aspleniaceae

Asplenium platyneuron (L.) Oakes: M4954

Equisetaceae

Equisetum arvense L.: M4678

Equisetum laevigatum A. Br.: P41685

Onocleaceae

Onoclea sensibilis L.: M4732

Osmundaceae

Osmunda regalis L.: M4720

Thelypteridaceae

Thelypteris palustris Schott: M4796

MONOCOTS

Alismataceae

Alisma subcordatum Raf.: M4944

Sagittaria brevirostra Mack. & Bush: P42064

Sagittaria graminea Michx.: M4799

Commelinaceae

Tradescantia ohiensis Raf.: M4698

Cyperaceae

Bulbostylis capillaris (L.) C.B. Clarke: M4810

Carex bicknellii Britt.: M4766

Carex buxbaumii Wahl.: M4712

Carex comosa Boott: M4686

Carex cristatella Britt.: M4728

Carex haydenii Dewey: M4668

Carex lacustris Willd.: P42540

Carex longii Mack.: M4742

Carex pellita Willd.: M4677

Carex sartwellii Dewey: M4757

Carex scoparia Schk.: M4737

Carex swanii (Fern.) Mack.: M4743

Carex vulpinoidea Michx.: M4787

Cyperus erythrorhizos Muhl.: M4832

Cyperus lupulinus (Spreng.) Marcks var. *macilentus* (Fern.) Marcks: M4901

Cyperus schweinitzii Torr.: M4949

Cyperus strigosus L.: M4745

Eleocharis erythropoda Steud.: M4800

Eleocharis ovata (Roth) Roem. & Schultes var. *obtusa* (Willd.) Kukenth.: M4827

Fimbristylis autumnalis (L.) Roem. & Schultes: M4808

Rhynchospora capitellata (Michx.) Vahl: M4907

Schoenoplectus tabernaemontani (K.C. Gmel.) Palla: M4685

Scirpus cyperinus (L.) Kunth: M4676

Scirpus pendulus Muhl.: M4674

Scleria triglomerata Michx.: M4695

Iridaceae

Iris shrevei Small: M4694

Sisyrinchium campestre Bickn.: M4887

Juncaceae

Juncus acuminatus Michx.: M4804

Juncus antherlatus (Wieg.) R.E. Brooks: M4929

Juncus brachycarpus Engelm.: M4862

Juncus canadensis J. Gay: M4806

Juncus dudleyi Wieg.: P41724

Juncus effusus L. var. *solutus* Fern. & Wieg.: M4738

Juncus greenei Oakes & Tuckerm.: M4740

Juncus marginatus Rostk.: M4697

Juncus tenuis Willd.: P41714

Juncus torreyi Coville: M4756

Luzula bulbosa (A.W. Wood) Smyth: M4681

Lemnaceae

Lemna trisulca L.: M4869
Spirodela polyrrhiza (L.) Schleiden: M4868

Liliaceae

Aletris farinosa L.: M4683
Lilium michiganense Farw.: M4657

Orchidaceae

Liparis liliifolia (L.) Rich.: M4704, M5222
Platanthera lacera (Michx.) G. Don.: M4703, P41704
Spiranthes cernua (L.) Rich.: M4950
Spiranthes magnicamporum Sheviak: M4883

Poaceae

Agrostis gigantea Roth.: M4741
Agrostis hyemalis (Walt.) BSP.: M4702
Agrostis stolonifera L.: M4946
Andropogon gerardii Vitman: M4848
Aristida purpurascens Poir.: M4891
**Bromus japonicus* Thunb.: P41693
**Bromus tectorum* L.: P41699
Calamagrostis canadensis (Michx.) P. Beauv.: M4659
Cenchrus longispinus (Hack.) Fern.: P42074
Danthonia spicata (L.) Roem. & Schultes: M4682
Dichanthelium acuminatum (Sw.) Gould & Clark var. *implicatum* (Scribn.) Gould & Clark: M4951
Dichanthelium boreale (Nash) Freckm.: P41703
Dichanthelium clandestinum (L.) Gould: P42539
Dichanthelium oligosanthes (Schult.) Gould var. *scribnerianum* (Nash) Gould: M4909
Dichanthelium praecocius (Hitchc. & Chase) Mohlenbr.: M4824
Dichanthelium villosissimum (Nash) Freckm.: P41697
**Digitaria ischaemum* (Schreb.) Schreb.: M4918
**Echinochloa crus-galli* (L.) P. Beauv.: P42067
Elymus canadensis L.: M4785
Elymus villosus Muhl.: M4710
Elymus virginicus L.: P42084
**Elytrigia repens* (L.) Desv.: P41727
Eragrostis spectabilis (Pursh) Steud.: P42061
**Festuca arundinacea* Schreb.: P41694
Glyceria septentrionalis Hitchc.: M4684
Glyceria striata (Lam.) Hitchc.: P42075
Heterostipa spartea (Trin.) Barkworth: P41705
Leersia oryzoides (L.) Swartz: P42068
Leersia virginica Willd.: P42066
Leptoloma cognatum (Schult.) Chase: M4750
Muhlenbergia frondosa (Poir.) Fern.: M4938
Muhlenbergia mexicana (L.) Trin.: M4935
Muhlenbergia schreberi J.F. Gmel.: M4937
Panicum capillare L.: M4930
Panicum rigidulum Bosc: M4805
Panicum virgatum L.: M4744
Paspalum laeve Michx. var. *circularis* (Nash)

Stone: M4934

Paspalum setaceum Michx. var. *stramineum* (Nash) D.J. Banks: M4916
**Phalaris arundinacea* L.: M4788
**Phleum pratense* L.: P41718
**Phragmites australis* (Cav.) Trin.: M4790
**Poa compressa* L.: M4910
**Poa pratensis* L.: P41692
Schizachyrium scoparium (Michx.) Nash: M4958
Sorghastrum nutans (L.) Nash: M4861
Spartina pectinata Link: M4778
Sphenopholis intermedia (Rydb.) Rydb.: M4693
Sporobolus cryptandrus (Torr.) Gray: M4948
Tridens flavus (L.) Hitchc.: M4906
Triplasis purpurea (Walt.) Chapm.: M4943

Pontederiaceae

Pontederia cordata L.: M4825

Potamogetonaceae

Potamogeton diversifolius Raf.: M4809
Potamogeton foliosus Raf.: M4871

Sparganiaceae

Sparganium americanum Nutt.: M4828

Typhaceae

Typha latifolia L.: P42065

DICOTS

Acanthaceae

Ruellia humilis Nutt.: M4915

Aceraceae

Acer saccharinum L.: P42076

Anacardiaceae

Rhus glabra L.: P42543
Toxicodendron radicans (L.) Kuntze: P41716

Apiaceae

Cicuta maculata L.: M4691
**Daucus carota* L.: M4905
Eryngium yuccifolium Michx.: M4762
Oxyopolis rigidior (L.) Raf.: M4859
Sanicula canadensis L.: M4705
Sanicula odorata (Raf.) Pryer & Phillippe: M4706
Sium suave Walt.: M4845
Zizia aurea (L.) Koch: M4714

Apocynaceae

Apocynum cannabinum L.: M4791

Asclepiadaceae

Asclepias hirtella (Pennell) Woodson: M4696
Asclepias incarnata L.: M4722
Asclepias sullivantii Engelm.: M4690
Asclepias syriaca L.: P41731

Asteraceae

**Achillea millefolium* L.: P41706
Ageratina altissima (L.) R.M. King & H. Robins.: M4921
Ambrosia artemisiifolia L.: M4900
Ambrosia trifida L.: P42090
Arnoglossum plantagineum Raf.: M4665
Aster dumosus L.: M4903
Aster ericoides L.: M4957
Aster pilosus Willd.: M4897
Aster praealtus Poir.: M4823
Bidens frondosa L.: M4941
Bidens polylepis Blake: M4932
**Cirsium arvense* (L.) Scop.: M4664
Cirsium discolor (Muhl.) Spreng.: M4947
Conyza canadensis (L.) Cronq.: M4815
Coreopsis tripteris L.: M4850
Erechtites hieracifolia (L.) Raf.: M4814
Erigeron annuus (L.) Pers.: P41687.2
Erigeron strigosus Muhl.: M4768
Eupatoriadelphus maculatus (L.) R.M. King & H. Robins.: M4834
Eupatorium altissimum L.: P42062
Eupatorium perfoliatum L.: M4803
Eupatorium serotinum Michx.: M4820
Euthamia graminifolia (L.) Nutt.: M4885
Euthamia gymnospermoides Greene: M4852
Helenium autumnale L.: M4858
Helianthus grosseserratus Martens: M4723
Helianthus mollis Lam.: M4847
Hieracium canadense Michx.: M4811
Hieracium gronovii L.: M4813
Lactuca canadensis L.: M4926
Lactuca floridana (L.) Gaertn.: P42082
Liatris aspera Michx.: M4899
Liatris pycnostachya Michx.: M4854
Liatris spicata (L.) Willd.: M4855
Oligoneuron rigidum (L.) Small var. *humile* (T.C. Porter) Nesom: M4955
Parthenium integrifolium L.: M4760
Prenanthes aspera Michx.: M4860
Prenanthes racemosa Michx.: M4890
Pseudognaphalium obtusifolium (L.) Hilliard & Burt.: M4904
Ratibida pinnata (Vent.) Barnh.: M4780
Rudbeckia hirta L.: M4689
Silphium integrifolium Michx. var. *neglectum* Settle & Fisher: M4924
Solidago altissima L.: M4912
Solidago gigantea Ait.: M4835
Solidago missouriensis Nutt.: M4746
Solidago nemoralis Ait.: M4894
Solidago speciosa Nutt.: M4892
**Tragopogon dubius* Scop.: P41730
Vernonia fasciculata Michx.: M4779
Vernonia missurica Raf.: M4846

Betulaceae

Betula nigra L.: P41708

Bignoniaceae

**Catalpa speciosa* Warder: P41726

Boraginaceae

Hackelia virginiana (L.) I.M. Johnston: P42081
Lithospermum croceum Fern.: M4923

Brassicaceae

**Alliaria petiolata* (Bieb.) Cavara & Grande: M4707
Lepidium virginicum L.: P41683

Cactaceae

Opuntia humifusa (Raf.) Raf.: M4754

Caesalpiniaceae

Chamaecrista fasciculata (Michx.) Greene: M4749

Campanulaceae

Campanula aparinoides Pursh: M4667
Campanulastrum americanum (L.) Small: M4783
Lobelia cardinalis L.: P42078
Lobelia siphilitica L.: M4833
Lobelia spicata Lam.: M4679

Caprifoliaceae

**Lonicera morrowii* Gray: M4680

Caryophyllaceae

**Cerastium fontanum* Baum: M4886
**Dianthus armeria* L.: P41688
**Saponaria officinalis* L.: M4913
Silene antirrhina L.: P41700
**Silene pratensis* (Spreng.) Godron & Gren.: P41698

Celastraceae

Celastrus scandens L.: P42091

Ceratophyllaceae

Ceratophyllum demersum L.: M4870

Cistaceae

Helianthemum bicknellii Fern.: M4902
Lechea mucronata Raf.: M4911
Lechea pulchella Raf.: M4928

Convolvulaceae

Calystegia sepium (L.) R. Br.: M4789

Cornaceae

Cornus obliqua Raf.: M4781
Cornus racemosa Lam.: M4794
Cornus sericea L.: M4857

Corylaceae

Corylus americana Walt.: M4936

Cuscutaceae

Cuscuta gronovii Willd.: M4896

Elaeagnaceae

**Elaeagnus umbellata* Thunb.: P41689

Ericaceae

Gaylussacia baccata (Wang.) K. Koch: M4739

Euphorbiaceae

Acalypha gracilens Gray: M4933
Acalypha rhomboidea Raf.: M4839
Croton glandulosus L.: M4914
Euphorbia corollata L.: M4763

Fabaceae

Apios americana Medic.: P42542
Baptisia alba (L.) Vent.: M4927
Dalea purpurea Vent.: M4864
Desmodium canadense (L.) DC.: M4863
Desmodium sessilifolium (Torr.) Torr. & Gray: P42063
Lathyrus palustris L.: M4713
Lespedeza capitata Michx.: M4849
**Lotus corniculatus* L.: P41686
**Medicago lupulina* L.: P41690
**Melilotus albus* Medic.: M4765
**Melilotus officinalis* (L.) Pallas: P41684
**Robinia pseudoacacia* L.: P41715
Strophostyles helvula (L.) Ell.: M4922
Tephrosia virginiana (L.) Pers.: M4953
**Trifolium hybridum* L.: P41719
**Trifolium pratense* L.: P41725
**Trifolium repens* L.: P41717

Fagaceae

Quercus alba L.: M4920
Quercus velutina Lam.: M4908

Gentianaceae

Bartonia virginica (L.) BSP.: M4770
Gentiana andrewsii Griseb.: M4884

Grossulariaceae

Ribes missouriense Nutt.: P42085

Haloragidaceae

Proserpinaca palustris L.: M4731

Hypericaceae

Hypericum majus (Gray) Britt.: M4812
Hypericum mutilum L.: M4826
Hypericum sphaerocarpon Michx.: M4774
Triadenum fraseri (Spach) Gl.: M4866

Lamiaceae

Lycopus americanus Muhl.: M4726
Lycopus uniflorus Michx.: M4802
Lycopus virginicus L.: M4882
Mentha arvensis L. var. *villosa* (Benth.) S.R. Stewart: M4773
Monarda fistulosa L.: M4711
**Nepeta cataria* L.: M4939
Physostegia virginiana (L.) Benth.: M4851
Prunella vulgaris L.: M4771
Pycnanthemum tenuifolium Schrad.: M4764
Pycnanthemum virginianum (L.) Dur. & B.D. Jacks.: M4670
Scutellaria galericulata L.: M4660

Scutellaria lateriflora L.: M4945

Stachys pilosa Nutt. var. *homotricha* (Fern.) Mohlenbr.: M4727
Teucrium canadense L.: M4747

Lauraceae

Sassafras albidum (Nutt.) Nees.: M4895

Lentibulariaceae

Utricularia macrorhiza LeComte: M4867

Linaceae

Linum medium (Planch.) Britt.: M4767

Lythraceae

Lythrum alatum Pursh: M4658
**Lythrum salicaria* L.: M4942
Rotala ramosior (L.) Koehne: M4807

Melastomaceae

Rhexia virginica L.: M4795

Molluginaceae

**Mollugo verticillata* L.: M4831

Monotropaceae

Monotropa hypopithys L.: P42541

Oleaceae

Fraxinus lanceolata Borkh.: P42080

Onagraceae

Circaea lutetiana Aschers. & Magnus: M4840
Epilobium leptophyllum Raf.: M4844
Epilobium x wisconsinensis Ugent: M4841
Gaura biennis L.: M4853
Ludwigia alternifolia L.: M4725
Ludwigia palustris (L.) Ell.: M4940
Ludwigia polycarpa Short & Peter: M4755
Oenothera biennis L.: P42088
Oenothera clelandii W. Dietr., Raven, & W.L. Wagner: M4748
Oenothera pilosella Raf.: M4687
Oenothera villosa Thunb.: M4842

Oxalidaceae

Oxalis stricta L.: P41707

Phytolaccaceae

Phytolacca americana L.: M4821

Plantaginaceae

Plantago aristata Michx.: P41696
**Plantago lanceolata* L.: P41691

Polemoniaceae

Phlox glaberrima L. ssp. *interior* (Wherry) Wherry: M4662

Polygalaceae

Polygala cruciata L.: M4751
Polygala polygama Walt.: M4699
Polygala sanguinea L.: M4700

Polygonaceae

Fallopia scandens (L.) Holub.: M4837
Persicaria coccinea (Muhl.) Greene: M4838
Persicaria hydropiperoides (Michx.) Small:
M4777
Persicaria opelousana (Riddell) Small: M4753
Persicaria pennsylvanica (L.) Small: M4819
Persicaria punctata (Ell.) Small: M4816
**Persicaria vulgaris* Webb & Moq.: M4836
**Rumex acetosella* L.: M4818
**Rumex crispus* L.: P41721
Rumex verticillatus L.: M4830

Primulaceae

Dodecatheon meadia L.: M5223
Lysimachia lanceolata Walt.: M4701
Lysimachia quadriflora Sims: M4692
Lysimachia terrestris (L.) BSP.: P41711
Lysimachia thrysiflora L.: M4881

Ranunculaceae

Anemone cylindrica Gray: M4675
Anemone virginiana L.: M4782

Rhamnaceae

**Frangula alnus* Mill.: M4666

Rosaceae

Agrimonia gryposepala Wallr.: M4730
Agrimonia parviflora Sol.: M4734
Aronia melanocarpa (Michx.) Ell.: M4752
Fragaria virginiana Duchesne: P41713
Geum canadense Jacq.: M4709
Geum laciniatum Murr. var. *trichocarpum*
Fern.: M4661
Malus ioensis (Wood) Britt.: M4733
**Malus sieboldii* (Regel) Rehd.: M4889
Potentilla simplex Michx.: P41728
Prunus serotina Ehrh.: M4784
Rosa carolina L.: M4856
**Rosa multiflora* Thunb.: P42077
Rosa setigera Michx.: M4673
Rubus flagellaris Willd.: M4952
Rubus frondosus Bigel.: M4729
Rubus hispidus L.: M4769
Rubus pensilvanicus Poir.: P41701
Rubus schneideri Bailey: M4671
Spiraea alba DuRoi: M4735
Spiraea tomentosa L.: M4758

Rubiaceae

Cephalanthus occidentalis L.: M4798
Diodia teres Walt.: M4917
Galium obtusum Bigel.: M4792
Galium triflorum Michx.: M4817

Rutaceae

Ptelea trifoliata L.: P41722

Salicaceae

**Populus alba* L.: P41729
Populus deltoides Marsh.: P42092
Populus tremuloides Michx.: P42073

Salix discolor Muhl.: M4931
Salix fragilis L.: M4736
Salix interior Rowlee: P42071
Salix nigra Marsh.: P42072

Santalaceae

Comandra umbellata (L.) Nutt.: P42086.2

Saxifragaceae

Penthorum sedoides L.: M4775

Scrophulariaceae

Agalinis purpurea (L.) Pennell: M4822
Agalinis tenuifolia (Vahl) Raf.: M4843
Mimulus ringens L.: M4772
Pedicularis canadensis L.: M4688
Pedicularis lanceolata Michx.: M4759
Penstemon digitalis Nutt.: M4793
Scrophularia lanceolata Pursh: P41720
Tomanthera auriculata (Michx.) Raf.: M4865
**Verbascum thapsus* L.: P41723
Veronicastrum virginicum (L.) Farw.: M4672

Solanaceae

Solanum carolinense L.: M4919
**Solanum dulcamara* L.: M4669

Ulmaceae

Ulmus americana L.: P42087
**Ulmus pumila* L.: P41695

Urticaceae

Boehmeria cylindrica (L.) Sw.: M4721
Parietaria pensylvanica Muhl.: M4708

Verbenaceae

Phyla lanceolata (Michx.) Greene: M4776
Verbena hastata L.: M4663
Verbena stricta Vent.: M4925
Verbena urticifolia L.: M4786

Violaceae

Viola lanceolata L. ssp. *vittata* (Greene) Rus-
sell: M4888
Viola sagittata Ait.: P41712

Vitaceae

Parthenocissus quinquefolia (L.) Planch.:
P42086.1
Vitis riparia Michx.: P42089