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Kankakee County, Illinois

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Illinois Natural History Survey

Center for Biodiversity

Technical Report 2003 (8)

Illinois Natural History Survey

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Project Completion Report

Field Work Completed April 2002 to November 2002

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ABSTRACT

The vascular flora of the Pembroke Savannas, Kankakee County, Illinois was studied during the 2002 growing season. A total of 574 taxa were found: 17 fern and fern-allies, 4 gymnosperms, 156 monocots, and 397 dicots. The families with the largest number of taxa included the Asteraceae with 80 taxa, the Poaceae with 74 taxa, and the Cyperaceae with 42 taxa, of which 21 were members of the genus *Carex*. An overstory and ground layer analysis of five mature second growth sand savanna sites was undertaken. In the five sand savanna sites, tree density averaged 135.7 stems/ha, with an average basal area of 7.94 m^2/ha. In the overstory *Quercus velutina* Lamarck (black oak) ranked first with an average importance value (IV) of 170.64 (out of 200). Associated species included *Q. alba* Linnaeus (white oak), and *Q. palustris* Müenchhausen (pin oak). In the ground layer, out of 131 taxa recorded, *Schizachyrium scoparium* (Michaux) Nash (little bluestem) and *Carex pensylvanica* Lamarck (Pennsylvania oak sedge) ranked first and second respectively with IV's of 24.08 and 21.06 (out of 200). Associated species included *Euphorbia corollata* Linnaeus (flowering spurge), *Rosa carolina* Linnaeus (pasture rose), black oak, and *Rhus copallina* Linnaeus (dwarf sumac) all with IV's >7.00

INTRODUCTION

The Pembroke Savannas, Kankakee County, Illinois, are located in the Kankakee Sand Area Section of the Grand Prairie Natural Division (Schwegman, et al. 1973). It is within the eastern edge of the former Lake Watseka, a glacial lake formed approximately 14,000 years ago during the Kankakee Torrent (William & Frye 1970). Lake Watseka was eventually drained, due to incising of the Illinois and Kankakee rivers, exposing large areas of sand deposits along its shoreline. Wind action sorted these sand deposits into sand dunes and swales, largely on terraces along the Kankakee River Valley. These sand dunes and swales, as with most of the major areas of wind-blown sand in Illinois, are largely with little or no loess. A thin cover of loess shows that the wind-blown sand was stabilized late in the interval of loess deposition. In response to hypsithermal climatic stress, about 8300 A.D., prairie vegetation began replacing deciduous forest in Illinois (King 1981). In 1820, prairie vegetation covered 94% of Kankakee County (Iverson, et al. 1989). Regular fires that swept across the prairies was a major factor in the development and maintenance of savanna communities (Johnson & Ebinger 1992). Exclusion of fire allowed many oak savanna communities to become closed forest with dense understories (Gleason 1912, 1913, Transeau 1935, Vogel 1974, Ebinger & McClain 1991). The present study was undertaken to determine the structure and composition of the high quality sand savanna communities at the Pembroke Savannas, develop a vouchered flora, and to locate threatened and endangered species.

MATERIALS AND METHODS

Field trips were made to the Pembroke Savannas at various times during the 2002 growing season (Figure 1). During each trip voucher specimens were collected, habitat for each taxon was determined, and the plant communities were delineated. The material collected was identified and deposited in the herbarium of the Illinois Natural History Survey (ILLS), Champaign, Illinois. Criteria for designating native and non-native taxa followed Fernald (1950), Steyermark (1963), Mohlenbrock (1986), Gleason & Cronquist (1991), and Swink & Wilhelm (1994).

In mid July of 2002 a woody overstory survey (each 1.2 ha in size) was undertaken on five sites of the high quality dry to dry-mesic sand savannas at the Pembroke Savannas. A total of 30 circular plots (each 0.04 ha) were established within the dry to dry-mesic sand savannas. The plot centers were located at 25 m intervals along 2 randomly placed 350 m long parallel transect lines, the parallel transect lines approximately 50 m apart, at each site except Leesville East which had 3 randomly placed parallel transect lines each 100 m long. Figure -2- to Figure 6 give the approximate locations of the permanent markers. In each plot, all living and dead-standing woody individuals 10 cm dbh (diameter at breast height, 1.4 m above the ground) and above were identified and their diameters recorded. From these data, density (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value (IV), and average diameter (cm) were calculated for each species. Determinations of the IV follows the procedure used by McIntosh (1957), and is the sum of the relative density and relative dominance of a given species. Density (stems/ha) of woody understory species was determined using nested circular plots 0.01, 0.001, and 0.0001 ha in size. At each center point of the 0.04 ha circular plots were established a 0.01 ha circular plot. The 0.001 and 0.0001 circular plots were established, on each, 6 m from the center of each 0.04 ha circular plot along the cardinal compass directions. In the 0.01 ha circular plots (30 per site) large saplings (2.5 to 9.9 cm dbh) were counted. In the 0.001 ha circular plots (120 per site) small saplings (>50 cm tall and <2.5 cm dbh) were counted, and in the 0.0001 ha circular plots (120 per site) tree seedlings (≤50 cm tall) and all shrubs were counted.

In the last week of August of 2002, a ground layer species (including woody species ≤50 cm tall) survey was undertaken on the five sites of the dry to dry-mesic sand savannas. A total of 100 quadrats, 1 m on a side, were established within the dry to dry-mesic sand savannas. Quadrats were located along the permanent center transect lines established for sampling the woody overstory in each study site. Starting north (Bentley/Crawford-Jordan & Liebert sites), east (Leesville East & Sweet Fern sites), or west (Mt. Fraker site) at 25 m intervals, 20 of the 30 potential points were selected. The first 10 points were used from each transect line except Leesville East which had 3 parallel transect lines where 7, 7, and 6 points were used, 6 in the center transect line. At each of the 20 points, 5 plots 1 m^2 were located right (odd-numbered meters) or left (even-numbered meters) of a 5 m long segment from the transect point. Direction of the 5 m segment was established perpendicular to the transect line starting on the right and alternating left and then back right, etc. down the transect line. The cover of each species rooted in a quadrat was determined using Daubenmire (1959) cover classes as modified by Bailey and Poulton (1968) (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%). From these data, cover (%), relative cover, frequency (%), relative frequency, and importance values of each species were calculated. Nomenclature mostly follows Mohlenbrock (1986), Gleason & Cronquist (1991) for grasses, and Flora of North America, Volumes 2 (1993), 3 (1997), 22 (2000), and 26 (2002).

DESCRIPTION OF THE STUDY AREA

The Pembroke Savannas, located east and a little northeast of St. Anne (about 65 mile south of Chicago), in southeast Kankakee County, Illinois were recognized as high quality dry to dry-mesic sand savannas by the Illinois Natural Areas Inventory (White & Madany 1978). The Leesville East site (Site 2, 74.73 ha) is owned in part (some parts are privately owned) by the Illinois Department of Natural Resources, the Sweet Fern site (Site 5, 31.10 ha) is a Land and Water Reserve owned by Marianne Hahn, while the remaining four sites, Bentley/Crawford-Jordan (Site 1, 25.62 ha), De Young (54.65 ha), Liebert (Site 3, 268.06 ha), and Mt. Fraker (Site 4, 26.87 ha), are owned by The Nature Conservancy. These 481.03 ha tracts of dry sand savanna, dry-mesic sand savanna, dry sand prairie, wet sand prairie, sand flatwoods, shrub prairie, and successional communities are a little north of the Kankakee and Iroquois county line and a little west of the Illinois & Indiana state line. The high quality (Grade A & B) dry and dry-mesic sand savanna

from four of out sites. A few additional notable species were recorded and their location mapped (Figure 2 -to- Figure 8). For a complete list of taxa and their natural communities where the species were observed see Appendix 1. For a brief discussion on tree and large shrub encroachment at Pembroke Savannas see Appendix II.

Woody Overstory of the Sand Savannas: The canopy layer densities demonstrated a wide range of variability at the five sites surveyed (Figure 2 -to- Figure 6) with an average of 135.7 stems/ha, ranging from 287.6 stems/ha at Site 1 to 43.3 stems/ha at Site 4 (Table 2). From these canopy densities it is apparent that the savanna at Site 1 is approaching a closed forest condition, containing many more trees/ha than found at the other sites (1.7 times Site 3; 2.8 times Site 5; 3.9 times Site 2; 7.7 times Site 4). The dominant species was black oak, with an average IV of 170.64, ranging from153.1 at Site 1 to 200 at Site 4. White oak and pin oak were the only other tree species recorded. White oak was the next most common tree, with an average IV of 26.58, where it was most commonly encountered in Site 1 (IV 46.9) and was commonly encountered at all the other sites, Site 3 (IV 31.3), Site 5 (IV 29.6), Site 2 (IV 25.1), except Site 4 which lacked white oak. Those sites that contained white oak were at slightly lower elevations or contained small inclusions of lower elevated areas where the savanna was locally more mesic than at Site 4. Pin oak was recorded during the survey at Site 2 (IV 13.9) in a small sand flatwoods inclusion. Average diameter of black oak (28.9 cm) at all 5 sites and of white oak (26.1 cm) at the 4 sites it was encountered indicate a similar age throughout the Pembroke Savannas (Table 2). Size class distribution (Table 2) of black oak varied somewhat between the 5 sites, trees less than 50 cm dbh were absent at Sites 3 & 4, but the majority of the trees were less than 40 cm dbh (98.4% at Site 1; 76.1% at site 2; 98.8% at Site 3, 76.9% at Site 4; 78.4% at Site 5) indicating that all sites have a similar development history.

Coppice trees are relatively common in the savannas, averaging 42.8 stems/ha and ranging from 6.7 stems/ha at Site 2 to 85.0 stems/ha at Site 1. Coppice stems were found at all 5 sites and both black oak and white oak produced coppice stems (Table 2). Black oak accounted for most of the coppice stems/ha (33.2% at Site 1; 8.4% at Site 2; 36.1% at Site 3; 32.6% at Site 4, 39.2% at Site 5). These multiple stemmed trees could be the result of past cutting, but many are likely the result of fire which kills the above ground parts of saplings and small trees.

Woody Understory of the Sand Savanna: All shrubs and all woody seedlings ($\leq$50 cm tall) densities averaged 10666.6 stems/ha. Site 2 had the greatest density with 13,583.3 stems/ha and Site 4 had the lowest density with 6,500 stems/ha (Table 3). Black oak had the greatest density (stems/ha) in four of the five sites, followed by *Rhus copallina* Linnaeus (dwarf sumac) and *Rhus glabra* Linnaeus (smooth sumac). Site 2 had the greatest diversity with nine species. Regular burns probably enhanced the growth of some shrub species (dwarf sumac and smooth sumac), while less frequent burns were important for the establishment and continued success of others, especially seedlings of black oak and white oak.

Small Saplings of the Sand Savanna: Small saplings (>50 cm tall <2,5 cm dbh) densities averaged 3,245 stems/ha. Site 1 had the greatest density with 4,483.3 stems/ha and Site 3 had the greatest diversity with 10 species encountered (Table 4). Black oak, dwarf sumac, and smooth sumac were encountered at all five sites and black oak had the greatest density of stems/ha at Sites 2, 4, and 5 while at Site 1 dwarf sumac and at Site 3 smooth sumac had the greatest density stems/ha. *Prunus serotina* Ehrhart (wild black cherry) and *Sassafras albidum* (Nuttall) Nees (sassafras) were encountered at four of the five sites. While not particularly abundant at most of these sites, sassafras was second in abundance (1,391.7 stems/ha) and wild black cherry was fourth in abundance (475 stems/ha) at Site 1.

Large Saplings of the Sand Savanna: Large saplings (2.5 to 9.9 cm dbh) densities averaged 19.64 stems/ha. Site 2 had the greatest density with 43.3 stems/ha and Site 4 did not have any large saplings within the 30, 0.01 ha, sample sites (Table 5). Large saplings of black oak dominated

four of the five sites. Other large saplings recorded were white oak (Sites 1, 2, 3, & 5), pin oak (Site 2), wild black cherry (Sites 1 & 2), and sassafras (Site 1).

Ground Layer Species of the Sand Savanna: Ground layer species (including woody species ≤50 cm tall) were diverse, 131 taxa were recorded in the plots. Of these six were naturalized, *Achillea millefolium* Linnaeus (common yarrow), *Daucus carota* Linnaeus (wild carrot), *Mollugo verticillatus* Linnaeus (carpetweed), *Poa pratensis* Linnaeus (Kentucky bluegrass), *Rumex acetosella* Linnaeus (sour dock), and *Tragopogon dubius* Scopoli (sand goat's beard). Diversity of ground layer species averaged 74 species and ranged from 85 species (Site 1) to 60 species (Site 4). *Schizachyrium scoparium* (Michaux) Nash (little bluestem) and *Carex pensylvanica* Lamarck (Pennsylvania oak sedge), with an average IV of 24.08 (15.7 at Site 1; 17.8 at Site 2; 28.1 at Site 3; 34.1 at Site 4; 24.7 at Site 5) and 21.06 (14.1 at Site 1, 18.7 at Site 2, 33.5 at Site 3, 23.8 at Site 4, 15.2 at Site 5) respectively, were the dominant species in the ground layer at the Pembroke Savannas (Tables 6, 7, 8, 9, 10). Little bluestem was dominant at Sites 4 & 5 and second in IV at Sites 2 & 3. Pennsylvania oak sedge was dominant at Sites 2 & 3 and second in IV at Sites 4 & 5. One additional graminoid species, *Panicum villosissimum* Nash (white-haried panic grass) was common. Prominent forbs included *Euphorbia* corollata Linnaeus (Flowering sedge) and *Cassia nictitans* Linnaeus (wild sensitive plant). The common woody species was black oak. The most common shrubs were *Rosa carolina* Linnaeus (pasture rose) and dwarf sumac. Bare ground had an average cover of 40.61% and ranged from 35.72 (Site 3) to 51.70 (Site 1). The high percentage of bare ground in the sand savannas at Pembroke Savannas is clearly related to the limited availability of moisture in these dry uplands.

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Table 1. Summary by natural community of hectares of grade B & C land at the Pembroke Savannas, Kankakee County, Illinois.

Natural Community	Grade	Bentley/Crawford--Jordan	De Young	Leesville East	Liebert	Mt. Fraker	Sweet Fern	Totals
dry sand savanna	B	7.55	--	13.27	22.46	26.52	8.37	78.41
	C	0.27	8.19	--	114.28	--	2.85	125.59
	<C	0.54	--	5.66	--	--	3.43	9.63
dry-mesic sand savanna	B	4.16	--	6.62	--	--	2.40	13.18
	C	3.84	27.18	--	--	--	--	31.02
	<C	0.52	--	9.43	--	--	1.13	11.08
dry sand prairie	B	1.75	--	--	--	--	0.30	2.05
	C	--	--	--	--	--	--	--
	<C	--	--	--	--	--	--	--
wet sand prairie	B	--	--	--	--	--	--	--
	C	--	--	--	--	--	--	--
	<C	--	1.79	--	--	--	--	1.79
sand flatwoods	B	--	--	--	--	--	--	--
	C	--	--	0.24	--	--	--	0.24
	<C	--	14.86	2.53	--	--	2.42	19.81
shrub prairie	B	--	--	--	--	--	--	--
	C	0.66	--	--	--	--	--	0.66
	<C	--	--	--	--	--	--	--
cultural		6.34	2.63	36.73	131.32	0.35	10.20	187.57
Total		25.62	54.65	74.72	268.06	26.87	31.10	481.03

Table 2. Density by diameter class (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value, average diameter, and percent of coppice growth of the woody species recorded for five sites studied at the Pembroke Savannas, Kankakee County, Illinois.

Species	Diameter Classes (cm) 10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60+	Total stems/ha	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	I.V.	Av. Diam. (cm)	% Coppice
Site # 1 -- Bentley/Crawford-Jordan Site													
Quercus velutina	39.2	124.2	41.7	2.5	0.8	---	208.4	11.017	72.5	80.6	153.1	25.2	33.2
Quercus alba	46.7	25.8	6.7	---	---	---	79.2	2.652	27.5	19.4	46.9	19.9	52.6
Totals	85.9	150.0	48.4	2.5	0.8	---	287.6	13.669	100.0	100.0	200.0		
Site # 2 -- Leesville East Site													
Quercus velutina	20.8	10.0	14.2	5.8	5.8	2.5	59.1	5.168	79.8	81.2	161.0	31.9	8.4
Quercus alba	0.8	2.5	0.8	---	0.8	1.7	6.6	1.026	9.0	16.1	25.1	40.3	25.0
Quercus palustris	6.7	1.7	---	---	---	---	8.4	0.168	11.2	2.7	13.9	15.7	---
Totals	28.3	14.2	15.0	5.8	6.6	4.2	74.1	6.362	100.0	100.0	200.0		
Site # 3 -- Liebert Site													
Quercus velutina	61.7	52.5	25.0	1.7	---	---	140.9	6.271	83.3	85.4	168.7	22.3	36.1
Quercus alba	12.5	13.3	2.5	---	---	---	28.3	1.074	16.7	14.6	31.3	21.2	61.7
Totals	74.2	65.8	27.5	1.7	---	---	169.2	7.345	100.0	100.0	200.0		
Site # 4 -- Mt. Fraker Site													
Quercus velutina	---	7.5	25.8	10.0	---	---	43.3	4.215	100.0	100.0	200.0	34.6	32.6
Totals	---	7.5	25.8	10.0	---	---	43.3	4.215	100.0	100.0	200.0		
Site # 5 -- Sweet Fern Site													
Quercus velutina	22.5	13.3	30.8	14.2	2.5	1.7	85.0	7.220	81.6	88.8	170.4	30.3	39.2
Quercus alba	7.5	7.5	3.3	0.8	---	---	19.1	0.911	18.4	11.2	29.6	23.1	34.8
Totals	30.0	20.8	34.1	15.0	2.5	1.7	104.1	8.131	100.0	100.0	200.0		

Table 3. Density (stems/ha) of woody seedlings encountered in the study sites of the Pembroke Savannas, Kankakee County, Illinois. (Site 1 = Bentley/Crawford-Jordan, Site 2 - Leesville East, Site 3 = Liebert, Site 4 = Mt. Fraker, Site 5 = Sweet Fern)

Species	Site 1	Site 2	Site 3	Site 4	Site 5
Quercus velutina	5250.0	3416.7	7000.0	5166.7	5583.3
Quercus alba	500.0	1750.0	83.3	—	416.7
Quercus palustris	—	500.0	—	—	83.3
Rhus copallina	1416.7	5833.3	4166.7	916.7	1666.7
Rhus glabra	—	1166.7	1750.0	333.3	583.3
Rhus typhina	83.3	500.0	83.3	—	—
Prunus serotina	333.3	83.3	83.3	83.3	166.7
Sassafras albidum	3500.0	83.3	83.3	—	—
Salix humilis	250.0	250.0	—	—	166.7
Totals	11333.3	13583.3	13249.9	6500.0	8666.7

Table 4. Density (stems/ha) of small saplings encountered in the study sites of the Pembroke Savannas, Kankakee County, Illinois. (Site 1 = Bentley/Crawford-Jordan, Site 2 - Leesville East, Site 3 = Liebert, Site 4 =Mt. Fraker, Site 5 = Sweet Fern)

Species	Site 1	Site 2	Site 3	Site 4	Site 5
Quercus velutina	550.0	2425.0	916.7	358.3	1916.7
Quercus alba	166.7	58.3	250.0	—	400.0
Quercus palustris	8.3	316.7	—	—	—
Rhus copallina	1508.3	450.0	1133.3	50.0	16.6
Rhus glabra	91.7	216.7	1575.0	16.7	516.7
Rhus typhina	258.3	100.0	66.7	—	391.7
Prunus serotina	475.0	16.7	16.7	—	8.3
Sassafras albidum	1391.7	58.3	16.7	58.3	—
Salix humilis	33.3	25.0	8.3	—	216.7
Robinia pseudoacacia	—	—	58.3	—	—
Malus ioensis	—	—	25.0	—	—
Nyssa sylvatica	—	—	—	—	8.3
Totals	4483.3	3666.7	4066.7	483.3	3525.0

Table 5. Density (stems/ha) of large saplings encountered in the study sites of the Pembroke Savannas, Kankakee County, Illinois. (Site 1 = Bentley/Crawford-Jordan, Site 2 - Leesville East, Site 3 = Liebert, Site 4 = Mt. Fraker, Site 5 = Sweet Fern)

Species	Site 1	Site 2	Site 3	Site 4	Site 5
Quercus velutina	2.5	41.7	25.0	—	17.5
Quercus alba	0.8	0.8	2.5	—	3.3
Quercus palustris	—	0.8	—	—	—
Prunus serotina	0.8	—	—	—	0.8
Sassafras albidum	1.7	—	—	—	—
Totals	5.8	43.3	27.5	—	21.6

Table 6. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered at Bentley/Crawford-Jordan (Site # 1) at the Pembroke Savanas, Kankakee County, Illinois. (* = exotic species)

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Helianthus divaricatus	68	7.76	6.6	14.5	21.1
Rosa carolina	67	5.10	6.5	9.6	16.1
Schizachyrium scoparium	53	5.67	5.1	10.6	15.7
Carex pensylvanica	97	2.44	9.5	4.6	14.1
Rhus copallina	21	3.72	2.1	7.0	9.1
Cassia nictitans	58	1.75	5.6	3.3	8.9
Euphorbia corollata	47	1.35	4.5	2.5	7.0
Maianthemum racemosum	20	2.47	2.0	4.6	6.6
Quercus velutina	29	1.76	2.9	3.3	6.2
Potentilla simplex	22	1.93	2.2	3.6	5.8
Rubus flagellaris	21	1.06	2.1	2.0	4.1
Panicum vilosissimum	31	0.56	3.0	1.1	4.1
**Poa pratensis*	27	0.60	2.7	1.1	3.8
Sorghastrum nutans	18	1.09	1.8	2.0	3.8
Comandra umbellata	27	0.41	2.7	0.8	3.5
Conyza canadensis	22	0.70	2.2	1.3	3.5
Aster azureus	17	0.82	1.7	1.5	3.2
Phlox bifida	22	0.41	2.2	0.8	3.0
Rubus allegheniensis	8	0.94	0.8	1.8	2.6
Coreopsis palmata	14	0.61	1.4	1.1	2.5
Helianthemum sp.	17	0.43	1.7	0.8	2.5
Tephrosia virginiana	10	0.80	1.0	1.5	2.5
Artemisia campestris	8	0.79	0.8	1.5	2.3
Aster linariifolius	5	0.98	0.5	1.8	2.3
Helianthus occidentalis	6	0.89	0.6	1.7	2.3
Panicum oligosanthes	17	0.29	1.7	0.5	2.2
Ceanothus americanus	4	0.91	0.4	1.7	2.1
Solidago nemoralis	13	0.41	1.3	0.8	2.1
Cyperus filiculmis	18	0.09	1.8	0.2	2.0
Lithospermum caroliniense	13	0.29	1.3	0.6	1.9
Antennaria plantaginifolia	6	0.61	0.6	1.1	1.7
Parthenium integrifolium	7	0.55	0.7	1.0	1.7
Prunus serotina	10	0.30	1.0	0.6	1.6
Rudbeckia hirta	8	0.34	0.8	0.6	1.4
Andropogon gerardii	5	0.39	0.5	0.7	1.2
Fragaria virginiana	7	0.28	0.7	0.5	1.2
Lactuca canadensis	10	0.10	1.0	0.2	1.2
Aster ericoides	7	0.16	0.7	0.3	1.0
Ambrosia artemisiifolia	3	0.31	0.3	0.6	0.9
Ambrosia psilostachya	6	0.18	0.6	0.3	0.9
Koeleria pyramidata	8	0.07	0.8	0.1	0.9
Leptoloma cognatum	8	0.04	0.8	0.1	0.9
Salix humilis	3	0.33	0.3	0.6	0.9
Sisyrinchium albidum	5	0.22	0.5	0.4	0.9
Solanum carolinense	7	0.11	0.7	0.2	0.9
Euthamia gymnospermoides	5	0.15	0.5	0.3	0.8

Physalis virginiana	4	0.19	0.4	0.4	0.8
Stipa spartea	7	0.04	0.7	0.1	0.8
Viola sagittata	6	0.11	0.6	0.2	0.8
Lupinus perennis	4	0.19	0.4	0.3	0.7
Quercus alba	5	0.13	0.5	0.2	0.7
Tradescantia ohiensis	6	0.08	0.6	0.1	0.7
Galium pilosum	5	0.05	0.5	0.1	0.6
Lespedeza capitata	5	0.08	0.5	0.1	0.6
Liatris aspera	5	0.08	0.5	0.1	0.6
Maianthemum stellatum	4	0.10	0.4	0.2	0.6
Scutellaria leonardii	5	0.03	0.5	—	0.5
Solidago gigantea	2	0.18	0.2	0.3	0.5
Tridens flavus	2	0.18	0.2	0.3	0.5
Triplasis purpurea	2	0.16	0.2	0.3	0.5
Amorpha canescens	3	0.07	0.3	0.1	0.4
Amphicarpaea bracteata	3	0.04	0.3	0.1	0.4
Commelina erecta	4	0.02	0.4	—	0.4
**Dacucus carota*	3	0.04	0.3	0.1	0.4
Gnaphalium obtusifolium	3	0.04	0.3	0.1	0.4
Lespedeza hirta	3	0.07	0.3	0.1	0.4
Viola pedata	3	0.07	0.3	0.1	0.4
Asclepias verticillata	3	0.02	0.3	—	0.3
Oenothera biennis	2	0.06	0.2	0.1	0.3
Solidago speciosa	2	0.06	0.2	0.1	0.3
Sporobolus cryptandrus	2	0.04	0.2	0.1	0.3
Aster pilosus	1	0.03	0.1	0.1	0.2
Baptisia lactea	1	0.03	0.1	0.1	0.2
Carex muhlenbergii	2	0.01	0.2	—	0.2
Eragrostis spectabilis	1	0.03	0.1	0.1	0.2
Rubus occidentalis	1	0.03	0.1	0.1	0.2
**Rumex acetosella*	1	0.03	0.1	0.1	0.2
Vitis riparia	1	0.03	0.1	0.1	0.2
Anemone cylindrica	1	0.01	0.1	—	0.1
Cassia fasciculata	1	0.01	0.1	—	0.1
Erigeron strigosus	1	0.01	0.1	—	0.1
Hieracium gronovii	1	0.01	0.1	—	0.1
Oxalis stricta	1	0.01	0.1	—	0.1
Polygala polygama	1	0.01	0.1	—	0.1
Polygonatum biflorum	1	0.01	0.1	—	0.1
Totals		53.56	100.0	100.0	200.0

Average bare ground and litter 51.70

Table 7. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered at Leesville East (Site # 2) at the Pembroke Savanas, Kankakee County, Illinois. (* = exotic species)

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex pensylvanica	88	6.17	9.4	9.3	18.7
Schizachyrium scoparium	64	7.30	6.8	11.0	17.8
Cassia nictitans	62	3.69	6.7	5.6	12.3
Quercus velutina	32	4.43	3.4	6.7	10.1
Rhus copallina	24	4.66	2.6	7.0	9.6
Euphorbia corollata	40	2.97	4.3	4.5	8.8
Lespedeza capitata	42	2.02	4.5	3.0	7.5
Helianthemum sp.	37	1.58	4.0	2.4	6.4
Rosa carolina	36	1.74	3.8	2.6	6.4
Sporobolus cryptandrus	30	2.03	3.2	3.1	6.3
Amorpha canescens	21	2.39	2.2	3.6	5.8
Panicum villosissimum	33	1.53	3.5	2.3	5.8
Viola pedata	32	1.33	3.4	2.0	5.4
Helianthus divaricatus	16	2.35	1.7	3.5	5.2
Rubus hispidus	5	2.63	0.5	4.0	4.5
Solidago nemoralis	20	1.39	2.2	2.1	4.3
Cyperus filiculmis	35	0.40	3.7	0.6	4.3
Tephrosia virginiana	17	1.58	1.8	2.4	4.2
Panicum virgatum	21	0.94	2.2	1.4	3.6
Commelina erecta	24	0.62	2.6	0.9	3.5
Asclepias verticillata	21	0.60	2.2	0.9	3.1
Cassia fasciculata	11	1.27	1.2	1.9	3.1
Rhus glabra	9	1.27	1.0	1.9	2.9
Monarda punctata	10	0.93	1.1	1.4	2.5
Leptoloma cognatum	11	0.74	1.2	1.1	2.3
Hieracium scabrum	12	0.62	1.3	0.9	2.2
Panicum oligosanthes	14	0.42	1.5	0.6	2.1
Conyza canadensis	10	0.56	1.1	0.9	2.0
Quercus alba	4	0.93	0.4	1.4	1.8
Sorghastrum nutans	7	0.57	0.8	0.9	1.7
Stipa spartea	12	0.26	1.3	0.4	1.7
Lithospermum caroliniense	10	0.30	1.1	0.4	1.5
Rubus flagellaris	7	0.40	0.8	0.6	1.4
Tradescantia ohiensis	11	0.13	1.2	0.2	1.4
Andropogon gerardii	4	0.56	0.4	0.9	1.3
Lactuca canadensis	8	0.19	0.9	0.3	1.2
Aster sp.	3	0.45	0.3	0.8	1.1
Quercus palustris	2	0.53	0.2	0.9	1.1
Sporobolus clandestinus	6	0.30	0.6	0.5	1.1
**Poa pratensis*	7	0.14	0.8	0.2	1.0
Antennaria plantaginifolia	4	0.34	0.4	0.5	0.9
Fragaria virginiana	5	0.27	0.5	0.5	0.9
Bouteloua curtipendula	3	0.33	0.3	0.5	0.8
Lechea villosa	5	0.25	0.5	0.8	0.8
Solidago speciosa	3	0.33	0.3	0.5	0.8
Osmunda regalis	1	0.38	0.1	0.6	0.7

Spiraea tomentosa	3	0.21	0.3	0.3	0.6
Carex swanii	4	0.07	0.4	0.1	0.5
Physalis virginiana	4	0.05	0.4	0.1	0.5
Salix humilis	2	0.16	0.2	0.3	0.5
Viola sagittata	4	0.07	0.4	0.1	0.5
Chenopodium desiccatum	3	0.05	0.3	0.1	0.4
Desmodium sessilifolium	3	0.07	0.3	0.1	0.4
Euthamia gymnospermoides	3	0.04	0.3	0.1	0.4
Liatris aspera	3	0.07	0.3	0.1	0.4
Phlox bifida	3	0.04	0.3	0.1	0.4
Polygonum tenue	3	0.04	0.3	0.1	0.4
**Achillea millefolium*	2	0.04	0.2	0.1	0.3
Aureolaria pedicularia	1	0.15	0.1	0.2	0.3
Bartonia virginica	3	0.02	0.3	—	0.3
Erigeron strigosus	2	0.04	0.2	0.1	0.3
Koeleria pyramidata	3	0.02	0.3	—	0.3
Polygala polygama	3	0.02	0.3	—	0.3
Vaccinium angustifolium	1	0.15	0.1	0.2	0.3
Aristida purpurascens	1	0.03	0.1	—	0.1
Carex muhlenbergii	1	0.03	0.1	—	0.1
Erechtites hieracifolia	1	0.03	0.1	—	0.1
Hypericum gentianoides	1	0.01	0.1	—	0.1
Oenothera rhombipetala	1	0.03	0.1	—	0.1
**Mollugo verticillatus*	1	0.03	0.1	—	0.1
Prunus serotina	1	0.01	0.1	—	0.1
Talinum rugospermum	1	0.03	0.1	—	0.1
Toxicodendron radicans	1	0.03	0.1	—	0.1
**Tragopogon dubius*	1	0.03	0.1	—	0.1
Totals		66.39	100.0	100.0	200.0
Average bare ground and litter		38.78			

Table 8. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered at Liebert (Site # 3) at the Pembroke Savanas, Kankakee County, Illinois. (* = exotic species)

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex pensylvanica	98	14.05	10.8	22.7	33.5
Schizachyrium scoparium	77	12.11	8.5	19.6	28.1
Euphorbia corollata	77	3.32	8.5	5.3	13.8
Quercus velutina	42	3.51	4.6	5.7	10.3
Rhus copallina	30	4.13	3.3	6.7	10.0
Rhus glabra	24	4.13	2.6	6.7	9.3
Helianthemum sp.	54	1.53	5.9	2.5	8.4
Panicum villosissimum	47	1.61	5.2	2.6	7.8
Tephrosia virginiana	22	3.31	2.4	5.3	7.7
Rosa carolina	31	2.15	3.4	3.5	6.9
Cassia nictitans	36	1.45	4.0	2.4	6.4
Rubus allegheniensis	25	1.73	2.8	2.8	5.6
Conyza canadensis	29	0.71	3.2	1.2	4.4
**Rumex acetosella*	23	0.83	2.5	1.3	3.8
**Poa pratensis*	26	0.38	2.9	0.6	3.5
Sorghastrum nutans	21	0.69	2.3	1.1	3.4
Aristida purpurascens	12	0.43	1.3	0.7	2.0
Hieracium scabrum	15	0.18	1.7	0.3	2.0
Panicum oligosanthes	16	0.13	1.8	0.2	2.0
Lechea villosa	12	0.33	1.3	0.5	1.8
Gnaphalium obtusifolium	11	0.25	1.2	0.4	1.6
Solidago nemoralis	13	0.12	1.4	0.2	1.6
Cyperus filiculmis	12	0.11	1.3	0.2	1.5
Eragrostis spectabilis	7	0.45	0.8	0.7	1.5
Prunus serotina	12	0.14	1.3	0.2	1.5
Asclepias verticillata	11	0.11	1.2	0.2	1.4
Amorpha canescens	7	0.33	0.8	0.5	1.3
Viola sagittata	8	0.21	0.9	0.3	1.2
Antennaria plantaginifolia	6	0.28	0.7	0.4	1.1
Liatris aspera	7	0.21	0.8	0.3	1.1
Hieracium longipilum	6	0.20	0.7	0.3	1.0
Koeleria pyramidata	8	0.04	0.9	0.1	1.0
Lespedeza virginica	5	0.25	0.6	0.4	1.0
Lespedeza capitata	7	0.06	0.8	0.1	0.9
Panicum virgatum	7	0.06	0.8	0.1	0.9
Andropogon gerardii	3	0.31	0.3	0.5	0.8
Polygonatum biflorum	4	0.22	0.4	0.4	0.8
Viola pedata	6	0.06	0.7	0.1	0.8
Robinia pseudoacacia	2	0.30	0.2	0.5	0.7
Salix humilis	2	0.30	0.2	0.5	0.7
Rubus flagellaris	3	0.21	0.3	0.3	0.6
Antennaria neglecta	2	0.18	0.2	0.3	0.5
Hieracium gronovii	4	0.07	0.4	0.1	0.5
Maianthemum racemosum	2	0.16	0.2	0.3	0.5
Agrostis hyemalis	3	0.04	0.3	0.1	0.4
Lactuca canadensis	3	0.07	0.3	0.1	0.4

Lithospermum caroliniense	1	0.15	0.1	0.3	0.4
Oxalis stricta	4	0.02	0.4	—	0.4
Polygala polygama	4	0.02	0.4	—	0.4
Quercus alba	1	0.15	0.1	0.3	0.4
**Achillea millefolium*	3	0.02	0.3	—	0.3
Cassia fasciculata	3	0.02	0.3	—	0.3
Physalis virginiana	2	0.04	0.2	0.1	0.3
Ambrosia artemisiifolia	2	0.01	0.2	—	0.2
Croton glandulosus	2	0.01	0.2	—	0.2
Apocynum cannabinum	1	0.03	0.1	—	0.1
Asclepias syriaca	1	0.03	0.1	—	0.1
Asclepias tuberosa	1	0.03	0.1	—	0.1
Aster azureus	1	0.03	0.1	—	0.1
Aster pilosus	1	0.03	0.1	—	0.1
Fragaria virginiana	1	0.01	0.1	—	0.1
Monarda punctata	1	0.01	0.1	—	0.1
Oenothera biennis	1	0.01	0.1	—	0.1
Polygonum tneue	1	0.01	0.1	—	0.1
Ribes missouriense	1	0.01	0.1	—	0.1
Tradescantia ohiensis	1	0.01	0.1	—	0.1
Totals		62.10	100.0	100.0	200.0
Average bare ground and litter		35.72			

Table 9. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered at Mt. Fraker (Site # 4) at the Pembroke Savanas, Kankakee County, Illinois. (* = exotic species)

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Schizachyrium scoparium	83	14.34	8.0	26.1	34.1
Carex pensylvanica	99	7.83	9.6	14.2	23.8
Panicum villosissimum	63	4.24	6.1	7.7	13.8
Euphorbia corollata	70	3.42	6.8	6.2	13.0
Viola pedata	44	2.87	4.2	5.2	9.4
Koeleria pyramidata	65	1.65	6.3	3.0	9.3
Cassia fasciculata	45	2.27	4.4	4.1	8.5
Aster linariifolius	16	2.97	1.6	5.4	7.0
Cyperus filiculmis	51	0.46	4.9	0.8	5.7
Asclepias verticillata	45	0.64	4.4	1.2	5.6
Solidago nemoralis	35	1.08	3.4	2.0	5.4
Liatris aspera	31	0.75	3.0	1.4	4.4
Quercus velutina	19	1.20	1.8	2.2	4.0
Stipa spartea	20	1.12	1.9	2.0	3.9
Conyza canadensis	30	0.33	2.9	0.6	3.5
Helianthemum sp.	28	0.36	2.7	0.7	3.4
Panicum oligosanthes	26	0.45	2.5	0.8	3.3
Tephrosia virginiana	8	1.31	0.8	2.4	3.2
Lespedeza capitata	23	0.41	2.2	0.7	2.9
Lactuca canadensis	17	0.62	1.7	1.1	2.8
Rhus copallina	10	1.00	1.0	1.8	2.8
Panicum virgatum	14	0.73	1.4	1.3	2.7
Croton glandulosus	16	0.42	1.5	0.8	2.3
Carex muhlenbergii	21	0.11	2.0	0.2	2.2
Cassia nictitans	13	0.36	1.3	0.7	2.0
Polygonatum biflorum	7	0.60	0.7	1.1	1.8
Monarda punctata	10	0.20	1.0	0.4	1.4
Rhus glabra	4	0.48	0.4	0.9	1.3
Sporobolus clandestinus	6	0.40	0.6	0.7	1.3
Lithospermum caroliniense	9	0.17	0.9	0.3	1.2
Andropogon gerardii	3	0.45	0.3	0.8	1.1
Phlox bifida	9	0.10	0.9	0.2	1.1
Polygonum tenue	10	0.10	1.0	0.1	1.1
Euthamia gymnospermoides	5	0.20	0.5	0.4	0.9
Physalis virginiana	8	0.07	0.8	0.1	0.9
Eragrostis spectabilis	6	0.11	0.6	0.2	0.8
Hieracium longipilum	5	0.17	0.5	0.3	0.8
**Poa pratensis*	6	0.08	0.6	0.1	0.7
Tradescantia ohiensis	6	0.03	0.6	0.1	0.7
Ambrosia artemisiifolia	3	0.19	0.3	0.3	0.6
Leptoloma cognatum	5	0.08	0.5	0.1	0.6
Aureolaria pedicularia	2	0.18	0.2	0.3	0.5
Fragaria virginiana	2	0.18	0.2	0.3	0.5
Talinum rugospermum	4	0.07	0.4	0.1	0.5
Aster azureus	3	0.07	0.3	0.1	0.4
Oenothera rhombipetala	4	0.02	0.4	—	0.4

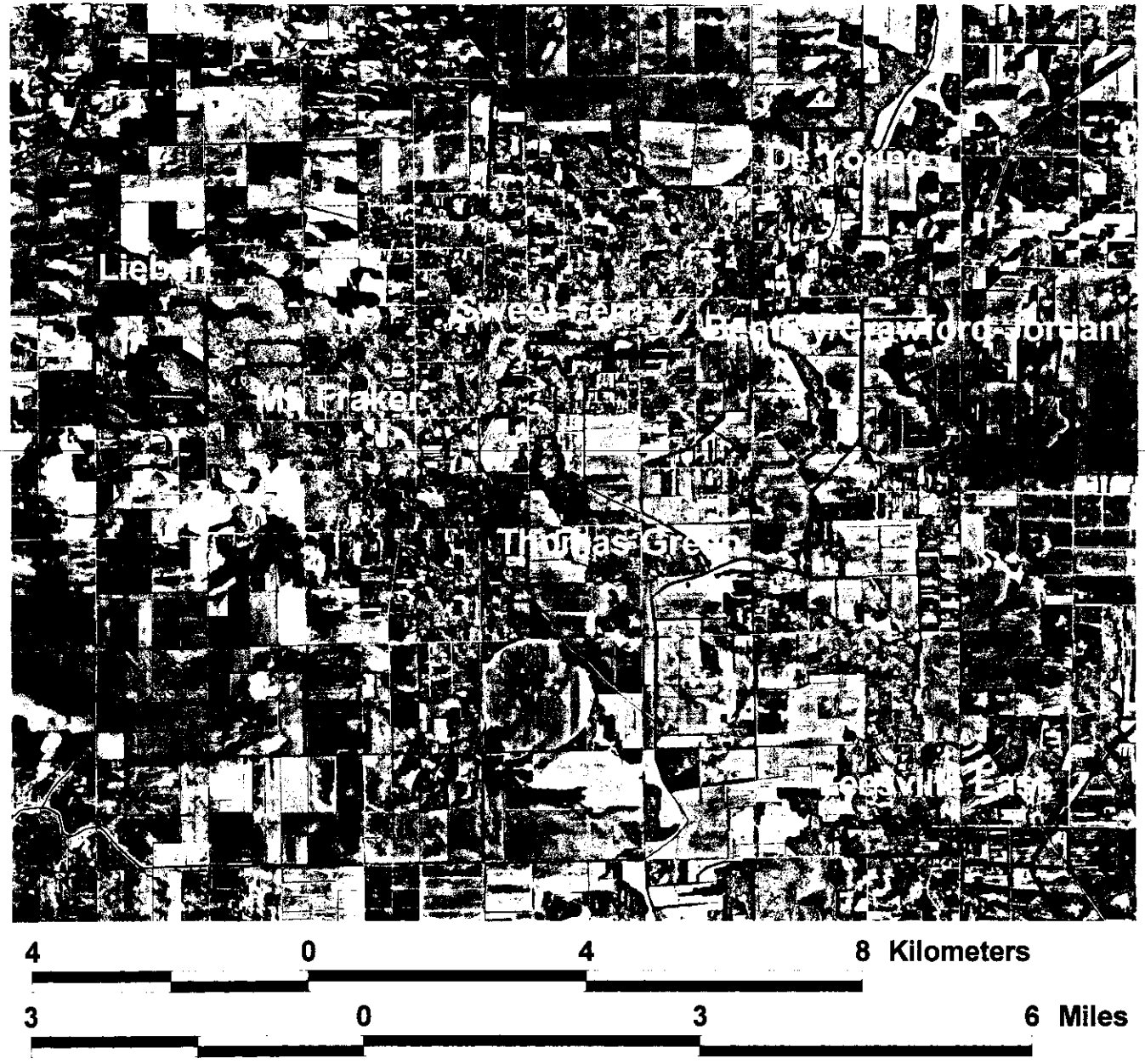
Rosa carolina	3	0.07	0.3	0.1	0.4
Commelina erecta	2	0.04	0.2	0.1	0.3
Agrostis hyemalis	2	0.01	0.2	—	0.2
Erigeron strigosus	2	0.01	0.2	—	0.2
Gnaphalium obtusifolium	1	0.03	0.1	0.1	0.2
Rubus flagellaris	1	0.03	0.1	0.1	0.2
Sassafras albidum	1	0.03	0.1	0.1	0.2
**Achillea millefolium*	1	0.01	0.1	—	0.1
Arabis lyrata	1	0.01	0.1	—	0.1
Aster pilosus	1	0.01	0.1	—	0.1
Chenopodium desiccatum	1	0.01	0.1	—	0.1
Lespedeza virginica	1	0.01	0.1	—	0.1
Prunus serotina	1	0.01	0.1	—	0.1
Sporobolus cryptandrus	1	0.01	0.1	—	0.1
Totals		55.18	100.0	100.0	200.0
Average bare ground and litter		37.85			

Table 10. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered at Sweet Fern (Site # 5) at the Pembroke Savanas, Kankakee County, Illinois. (* = exotic species)

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Schizachyrium scoparium	82	10.16	8.0	16.7	24.7
Carex pensylvanica	95	3.61	9.3	5.9	15.2
Euphorbia corollata	68	2.7	6.7	4.4	11.1
Rosa carolina	50	3.39	4.9	5.6	10.5
Rubus allegheniensis	27	3.90	2.6	6.4	9.0
Quercus velutina	36	2.59	3.5	4.3	7.8
Tephrosia virginiana	17	3.18	1.6	5.2	6.8
Cassia fasciculata	44	1.26	4.3	2.1	6.4
**Poa pratensis*	46	0.58	4.5	1.0	5.5
Sorghastrum nutans	26	1.45	2.5	2.4	4.9
Rhus copallina	15	1.77	1.5	2.9	4.4
Rubus flagellaris	13	1.91	1.3	3.1	4.4
Euthamia gymnospermoides	21	1.32	2.0	2.2	4.2
Andropogon gerardii	11	1.85	1.1	3.0	4.1
Helianthemum sp.	21	0.99	2.0	1.6	3.6
Solidago nemoralis	23	0.88	2.2	1.4	3.6
Helianthus divaricatus	12	1.44	1.2	2.3	3.5
Panicum oligosanthes	25	0.60	2.4	1.0	3.4
Phlox bifida	22	0.80	2.1	1.3	3.4
Stipa spartea	22	0.78	2.1	1.3	3.4
Ceanothus americanus	5	1.68	0.5	2.8	3.3
Sporobolus clandestinus	12	1.20	1.2	2.0	3.2
Conyza canadensis	23	0.56	2.2	0.9	3.1
Lespedeza capitata	24	0.42	2.3	0.7	3.0
Panicum virgatum	16	0.86	1.6	1.4	3.0
Koeleria pyramidata	24	0.35	2.3	0.6	2.9
Fragaria virginiana	7	1.14	0.7	1.9	2.6
Asclepias verticillata	15	0.64	1.5	1.0	2.5
Helianthus mollis	11	0.88	1.1	1.4	2.5
Panicum villosissimum	18	0.46	1.7	0.8	2.5
Aster ericoides	8	0.75	0.8	1.2	2.0
Cassia nictitans	14	0.37	1.4	0.6	2.0
Potentilla simplex	8	0.46	0.8	0.7	1.5
Viola sagittata	12	0.21	1.2	0.3	1.5
Amorpha canescens	7	0.45	0.7	0.7	1.4
Aster azureus	7	0.45	0.7	0.7	1.4
Coreopsis palmata	6	0.40	0.6	0.7	1.3
Cyperus filiculmis	12	0.09	1.2	0.1	1.3
Artemisia campestris	7	0.28	0.7	0.5	1.2
Salix humilis	4	0.46	0.4	0.7	1.1
**Achillea millefolium*	6	0.23	0.6	0.4	1.0
Quercus alba	6	0.25	0.6	0.4	1.0
Lactuca canadensis	7	0.09	0.7	0.1	0.8
Aristida purpurascens	6	0.08	0.6	0.1	0.7
Calamovilfa longifolia	2	0.30	0.2	0.5	0.7
Hieracium gronovii	5	0.10	0.4	0.2	0.7

Physalis virginiana	5	0.13	0.5	0.2	0.7
Rubus hispidus	2	0.30	0.2	0.5	0.7
Antennaria neglecta	3	0.21	0.3	0.3	0.6
Viola pedata	3	0.19	0.3	0.3	0.6
Amphicarpaea bracteata	2	0.18	0.2	0.3	0.5
Chenopodium desiccatum	4	0.07	0.4	0.1	0.5
Eragrostis spectabilis	2	0.18	0.2	0.3	0.5
Gnaphalium obtusifolium	4	0.07	0.4	0.1	0.5
Lithospermum caroliniense	2	0.18	0.2	0.3	0.5
Maiantheumu racemosum	2	0.16	0.2	0.3	0.5
Leptoloma cognatum	3	0.09	0.3	0.1	0.4
Maianthemum stellatum	3	0.09	0.3	0.1	0.4
Tradescantia ohiensis	4	0.02	0.4	—	0.4
Ambrosia artemisiifolia	2	0.06	0.2	0.1	0.3
Anemone cylindrica	2	0.04	0.2	0.1	0.3
Antennaria plantaginifolia	2	0.04	0.2	0.1	0.3
Comandra umbellata	3	0.02	0.3	—	0.3
Monarda punctata	1	0.15	0.1	0.2	0.3
Polygonatum biflorum	2	0.06	0.2	0.1	0.3
**Rumex acetosella*	2	0.06	0.2	0.1	0.3
Scutellaria leonardii	3	0.02	0.3	—	0.3
Veronicastrum virginicum	2	0.06	0.2	0.1	0.3
Apocynum androsaemifolium	1	0.03	0.1	0.1	0.2
Carex bicknellii	2	0.01	0.2	—	0.2
Hieracium longipilum	1	0.03	0.1	0.1	0.2
Hieracium scabrum	1	0.03	0.1	0.1	0.2
Lechea villosa	1	0.03	0.1	0.1	0.2
Oenothera rhombipetala	1	0.03	0.1	0.1	0.2
Physostegia virginiana	1	0.03	0.1	0.1	0.2
Prunus serotina	1	0.03	0.1	0.1	0.2
Rudbeckia hirta	1	0.03	0.1	0.1	0.2
Aster linariifolius	1	0.01	0.1	—	0.1
Bartonia virginica	1	0.01	0.1	—	0.1
Juncus dudleyi	1	0.01	0.1	—	0.1
Liatris aspera	1	0.01	0.1	—	0.1
Polygala polygama	1	0.01	0.1	—	0.1
Sisyrinchium albidum	1	0.01	0.1	—	0.1
Totals		61.01	100.0	100.0	200.0
Average bare ground and litter		38.98			

Figure 1. Location of study sites, Kankakee County, Illinois. Site 1 - Bentley/Crawford-Jordan, Site 2 - Leesville East, Site 3 - Liebert, Site 4 - Mt. Fraker, Site 5 - Sweet Fern. De Young was collected floristically but not quantitatively sampled. Thomas Green was not floristically or quantitatively sampled.



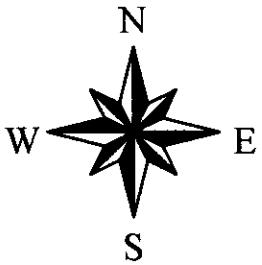


Figure 2. Bentley/Crawford-Jordan (Site #1), rare & notable plants, property boundary, cover types, topographic lines, sampling transects, & ditches

Rare & notable plants
- Carex cumulata
- Lupinus perennis
- Polygonum careyi
- Rubus setosus
- Viola primulifolia

Property boundary

Cover types
- 1 Dry sand savanna
- 2 Dry-mesic sand savanna
- 3 Dry sand prairie
- 6 Shrub prairie
- 7 Cultural

Topographic lines

Sampling Transects

Ditches

Site high point - 210 m
Site low point - 204 m

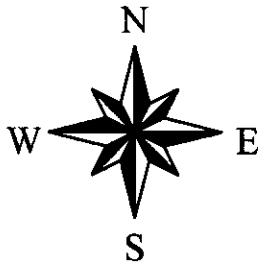
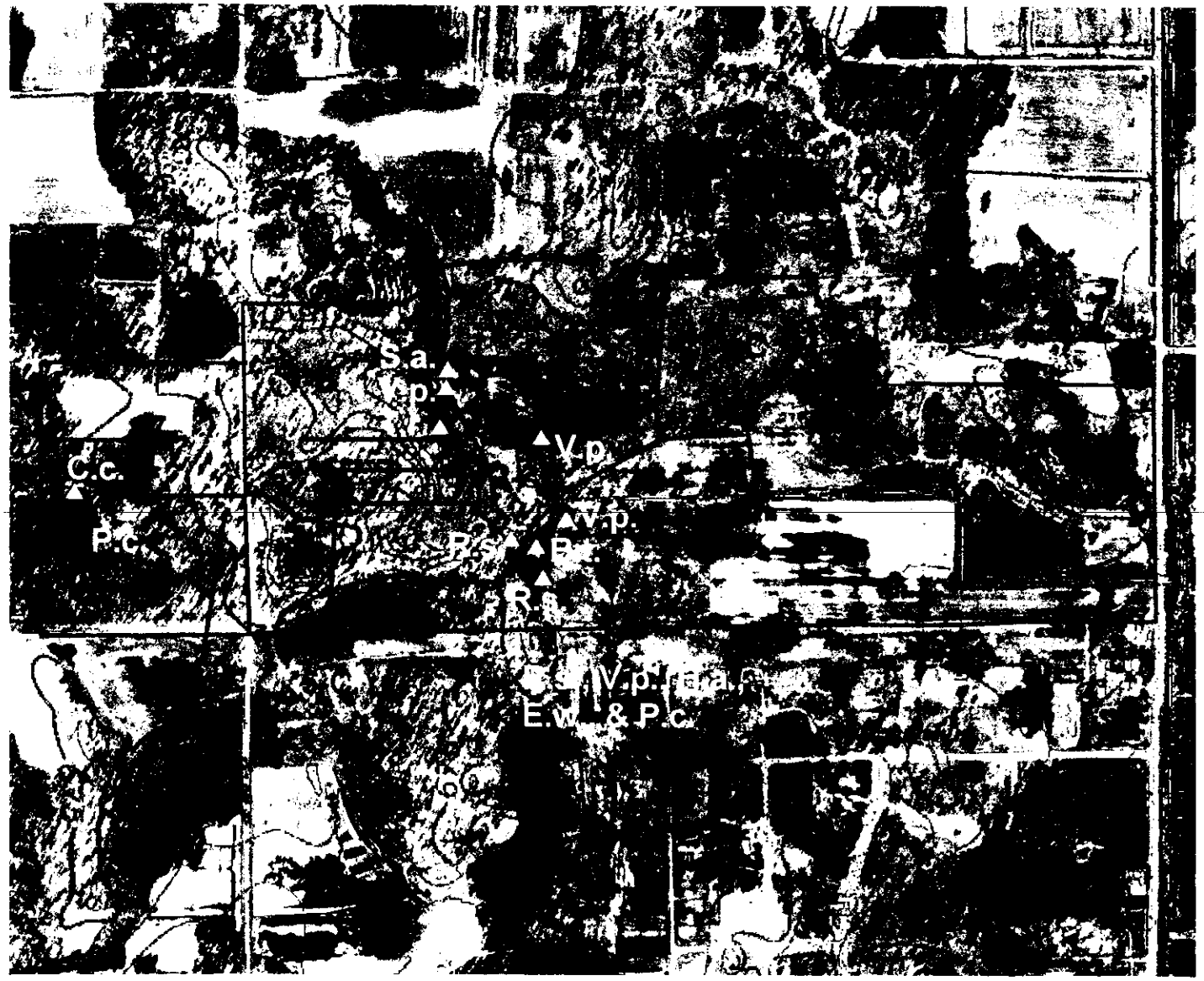


Figure 3. Leesville East (Site #2), rare & notable plants, property boundary, cover types, topographic lines, sampling transects, & ditches



Rare & notable plants
- Baptisia tinctoria
- Carex cumulata
- Eleocharis wolfii
- Hypericum adpressum
- Polygonum careyi
- Rubus setosus
- Sisyrinchium atlanticum
- Viola primulifolia

Property boundary

Cover types
- 1 Dry sand savanna
- 2 Dry-mesic sand savanna
- 5 Sand flatwoods
- 7 Cultural

Topographic lines

Sampling Transects

Ditches

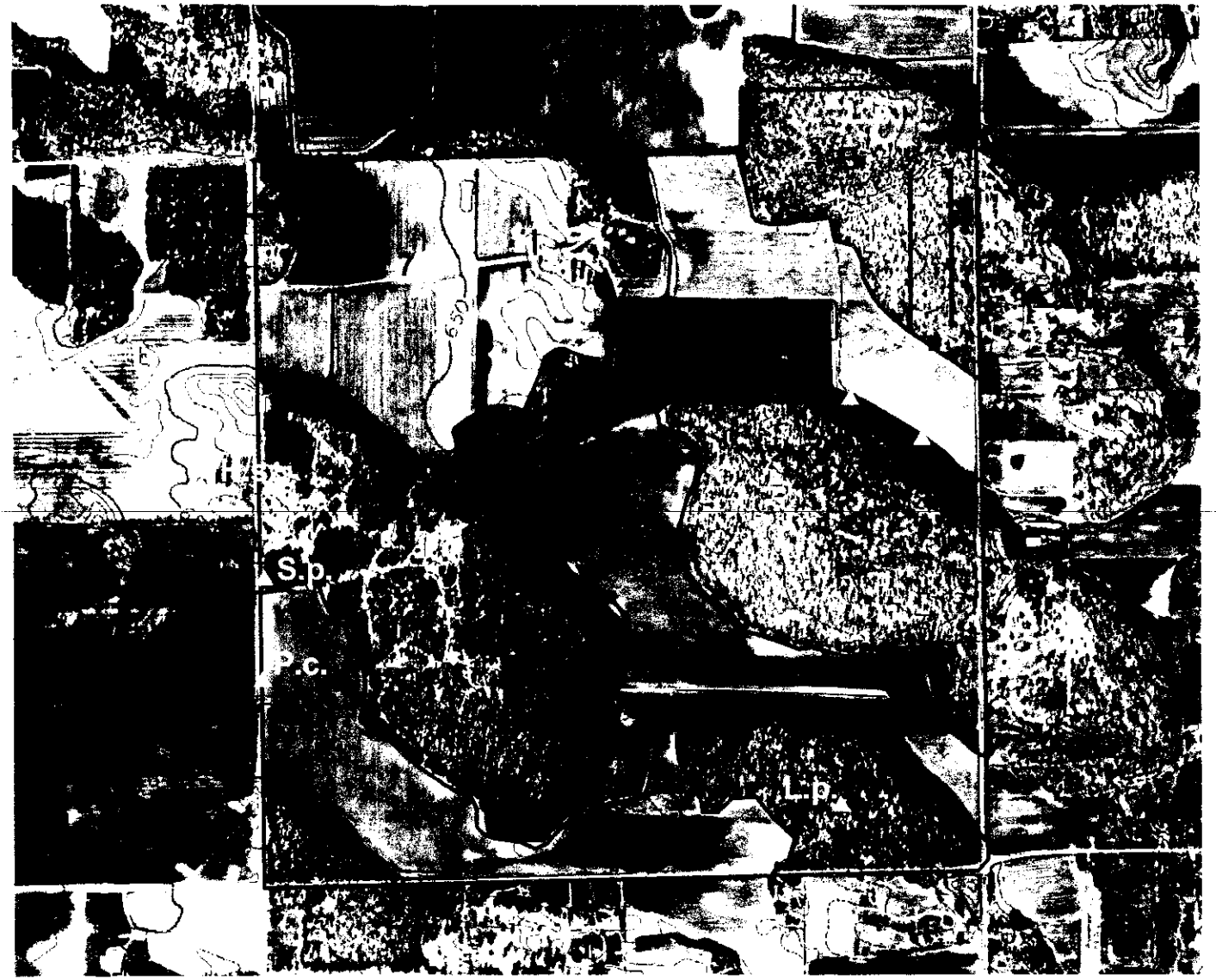
Site high point - 215 m
Site low point - 201 m

N
W E
S

0.3 0 0.3 0.6 Miles

600 0 600 1200 Meters

Figure 4. Liebert (Site #3), rare & notable plants, property boundary, cover types, topographic lines, sampling transects, & ditches



Rare & notable plants
- Hymenopappus scabiosus
- Lupinus perennis
- Polygonum careyi
- Scleria pauciflora var. caroliniana
- Viola primulifolia

Property boundary

Cover types
- 1 Dry sand savanna
- 7 Cultural

Topographic lines

Sampling Transects

Ditches

Site high point - 213 m
Site low point - 195 m

N
W E
S

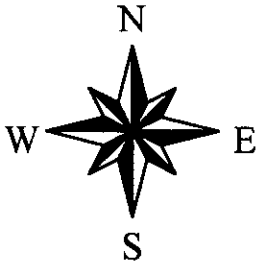
900 0 900 1800 Meters

0.6 0 0.6 1.2 Miles

Figure 5. Mt. Fraker (Site #4), notable plants, property boundary, cover types, topographic lines, & sampling transects

Notable plants
Talinum rugospermum
Property boundary
Cover types
1 Dry sand savanna
7 Cultural
Topographic lines
Sampling Transects
Ditches

Site high point - 223 m
Site low point - 201 m



300 0 300 600 Meters

0.2 0 0.2 0.4 Miles

Figure 6. Sweet Fern (Site #5), rare & notable plants, property boundary, cover types, topographic lines, sampling transects, & ditches

Rare plants
- Rubus setosus
- Scleria muhlenbergii
- Scleria pauciflora var. caroliniana
- Sisyrinchium atlanticum
- Viola primulifolia

Property boundary

Cover types
- 1 Dry sand savanna
- 2 Dry-mesic sand savanna
- 3 Dry sand prairie
- 5 Sand flatwoods
- 7 Cultural

Topographic lines

Sampling Transects

Ditches

Site high point - 207 m
Site low point - 204 m

N
W E
S

500 0 500 1000 Meters

0.4 0 0.4 Miles

Figure 7. Sweet Fern (Site #5), rare plants, property boundary, cover types, topographic lines, sampling transects, & ditches

Rare plants

Comptonia peregrina

- Property boundary
- Cover types
  - 1 Dry sand savanna
  - 2 Dry-mesic sand savanna
  - 3 Dry sand prairie
  - 5 Sand flatwoods
  - 7 Cultural
- Topographic lines
- Sampling Transects
- Ditches

Site high point - 207 m
Site low point - 204 m

N
W E
S

0.4 0 0.4 0.8 Miles

600 0 600 1200 Meters

Figure 8. De Young, rare & notable plants, property boundary, cover types, topographic lines, & ditches

Rare & notable plants
- Carex cumulata
- Polygonum careyi
- Rubus setosus
- Viola primulifolia

Property boundary

Cover types
- 1 Dry sand savanna
- 2 Dry-mesic sand savanna
- 4 Wet sand prairie
- 5 Sand flatwoods
- 7 Cultural

Topographic lines

Ditches

Site high point - 207 m
Site low point - 198 m

N
W E
S

0.3 0 0.3 0.6 Miles

600 0 600 1200 Meters

APPENDIX 1

The vascular taxa encountered and collected at the Pembroke Savannas sites (Bentley/Crawford-Jordan, De Young, Leesville East, Liebert, Mt. Fraker, and Sweet Fern) are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = dry sand savanna, 2 = dry-mesic sand savanna, 3 = dry sand prairie, 4 = wet sand prairie, 5 = sand flatwoods, 6 = shrub prairie, 7 = cultural). Following the community number(s), collecting numbers or date collected (when collecting number not assigned) preceded by the initial of the collector's name are given (B for Daniel T. Busemeyer, C for Connie J. Carroll, F for Mary Ann Feist, M for Paul B. Marcum, and P for Loy R. Phillippe).

PTERIDOPHYTES

ASPLENIACEAE

Asplenium platyneuron (Linnaeus) Britton, Sterns, & Poggenburg: 2, 5; B 917, M 1800, P 35168

DENNSTAEDTIACEAE

Pteridium aquilinum (Linnaeus) Kuhn var. *latisculum* (Desvaux) L. Underwood ex A. Heller:1, 2, 5; B 1142, C 50, F 1685, M 1576, P 34850, P 35181

DRYOPTERIDACEAE

Athyrium filix-femina (Linnaeus) Mertens var. *angustum* (Willdenow) G. Lawson: 5; P 34298
Dryopteris carthusiana (Villars) H.P. Fuchs: 2, 5; F 1548, M 1801, P 34255
Dryopteris cristata (Linnaeus) A. Gray: 5; P 34296
Onoclea sensibilis Linnaeus: 5, 6, 7; B 988, M 1606, P 34547, P 34565

EQUISETACEAE

Equisetum arvense Linnaeus: 5, 7; B 1013, F 1536, M 1796
Equisetum fluviatile Linnaeus: 6, 7; F 1611, P 34236
Equisetum hyemale Linnaeus: 7; F 2004
Equisetum laevigatum A. Braun: 1, 3; C 57, M 1472.2, P 34220

LYCOPODIACEAE

Diphasiastrum digitatum (Dillenius ex A. Braun) Holub: 5; F 1540

OPHIOGLOSSACEAE

Botrychium dissectum Sprengel: 2, 5; M 1786, P 34769
Botrychium virginianum (Linnaeus) Swartz: 2, 5; B 905, F 1533

OSMUNDACEAE

Osmunda cinnamomea Linnaeus: 2, 4, 5, 7; B 847, F 1529, F 1621, M 1787
Osmunda claytoniana Linnaeus: 7; B 849
Osmunda regalis Linnaeus: 2, 4, 5, 7; B 848, F 1597, M 1219, P 34294

THELYPTERIDACEAE

Thelypteris palustris Schott: 5, 6, 7; B 1149, M 1496, M 1532, P 34767, P 34837

SPERMATOPHYTES: GYMNOSPERMS

CUPRESSACEAE

Juniperus virginiana Linnaeus: 4, 7; B 897

PINACEAE

**Pinus pungens* Lambert: 7; B 920
**Pinus resinosa* Aiton: 7; B 931, P 34106
**Pinus strobus* Linnaeus: 7; P 34104

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

ALISMATACEAE

Alisma subcordatum Rafinesque: 6, 7; B 1082, M 1431, P 34662

COMMELINACEAE

**Commelina communis* Linnaeus: 7; B 1088
Commelina erecta Linnaeus: 1, 3; B 1021, C 8, F 1703, M 1553, P 34403
Tradescantia ohiensis Rafinesque: 1, 2, 3; B 867, F 1568, F 1606, M 1261, P 34145

CYPERACEAE

Bulbostylis capillaris (Linnaeus) C.B. Clarke: 2, 7; M 1640, P 34400
Carex bebbii (L.H. Bailey) Fernald: 7; M 1255
Carex bicknellii Britton: 2, 7; M 1209, M 1269, P 34395
Carex brachyglossa Mackenzie: 5; P 34290
Carex conoidea Schkuhr ex Willdenow: 4; P 34261
Carex cumulata (L.H. Bailey) Mackenzie: 1, 4, 7; M 1257, M 1475, M 1529, P 34631, P 34791
Carex emmonsii Dewey ex Torrey: 1, 2, 5, 7; B 855, F 1534, F 1587, M 1168
Carex festucacea Schkuhr: 5; P 34581
Carex foenea Willdenow: 1; B 826, B 871, M 1175, P 34093, P 34268
Carex haydenii Dewey: 2, 4, 5; B 854, F 1525, F 1588, F 1710, M 1221
Carex lacustris Willdenow: 6; P 34229
Carex longii Mackenzie: 2, 4; B 913.1, F 1714
Carex meadii Dewey: 1, 2; B 822, B 857, F 1510, F 1620
Carex muhlenbergii Schkuhr ex Willdenow: 1, 3, 7; B 858, F 1570, F 1614, M 1210, P 34148, P 34272
Carex normalis Mackenzie: 5, 6; P 34235, P 34264
Carex pellita Muhlenberg: 5, 6, 7; B 874, M 1166, P 34159, P 34291
Carex pensylvanica Lamarck: 1, 2, 3, 7; B 809, F 1509, F 1543, F 1602, M 1174, P 34085
Carex scoparia Schkuhr ex Willdenow: 2, 5, 7; B 913.2, M 1246, P 34230, P 34280, P 34636
Carex swanii (Fernald) MacKenzie: 2, 5, 7; B 894, F 1622, M 1276, P 34162, P 34262
Carex tribuloides Wahlenberg: 2; P 34629
Carex umbellata Schkuhr: 1, 3, 7; B 919, M 1167, P 34113
Carex vulpinoidea Michaux: 6, 7; B 971, F 1902, M 1418, P 34231
Cyperus aristatus Rottboll: 7; B 980
Cyperus erythrorhizos Muhlenberg: 7; B 1081
Cyperus esculentus Linnaeus: 7; F 1979
Cyperus filiculmis Vahl var. *macilentus* Fernald: 1, 3, 7; B 979, C 5, F 1726, F 1701, F 2039, M 1275, M 1445, M 1556.2, P 34522, P 34756
Cyperus x mesochorus Geise: 7; B 994, B 1114, M 1556.1
Cyperus schweinitzii Torrey: 1, 3, 7; C 48, P 34528
Cyperus strigosus Linnaeus: 1, 2, 6, 7; B 1110, F 2041, M 1516, P 34633; P 34839
Eleocharis erythropoda Steudel: 6; P 34561
Eleocharis obtusa (Willdenow) Schultes var. *detonsa* Drapalik & Mohlenbrock: 6, 7; M 1250, M 1517, P 34558
Eleocharis obtusa (Willdenow) Schultes var. *obtusa*: 7; M 1505
Eleocharis verrucosa (Svenson) Harms: 5; M 1774
Eleocharis wolfii A. Gray: 7; F 1973
Fimbristylis autumnalis (Linnaeus) Roemer & Schultes: 2, 5, 7; F 1974, F 2046, M 1427, P 34637
Fimbristylis puberula (Michaux) Vahl: 2, 7; M 1523, P 34396
Rhynchospora capitellata (Michaux) Vahl: 4, 7; F 1975, F 1996, M 1468, M 1426, P 34649, P 34788
Scirpus cyperinus (Linnaeus) Kunth: 6, 7; B 1050, M 1447, M 1503, P 34543
Scirpus fluviatilis (Torrey) A. Gray: 7; B 1103
Scleria muhlenbergii Steudel: 7; M 1514
Scleria pauciflora Willdenow var. *caroliniana* (Willdenow) A.W. Wood: 1, 7; B 1018, M 1524
Scleria triglomerata Michaux: 1, 4, 5, 7; B 1019, F 1712, F 1894, F 1901, M 1518

IRIDACEAE

**Iris flavescens* Delile: 7; P 34143
**Iris germanica* Linnaeus: 7; M 1227, P 34169
Iris shrevei Small: 4, 5, 6, 7; F 1630, P 34228
Sisyrinchium albidum Rafinesque: 1, 2, 3, 7; B 835, F 1572, F 1617, M 1173, P 34095, P 34270
Sisyrinchium atlanticum Bicknell: 5, 7; F 1626, M 1201

JUNCACEAE

Juncus acuminatus Michaux: 5, 6, 7; F 1903, M 1251, M 1504, P 34555
Juncus biflorus Elliott: 7; F 1995
Juncus brachycarpus Engelmann: 6; P 34554
Juncus dudleyi Wiegand: 2, 3, 4, 5, 6, 7; F 1713, F 1892, P 34553
Juncus greenei Oakes & Tuckerman: 2, 7; M 1279, M 1459, M 1519, P 34624, P 34591
Juncus interior Wiegand: 2, 6, 7; M 1245, P 34397, P 34551
Juncus marginatus Rostkovius: 2, 4, 6, 7; B 1077, F 1896, M 1252, M 1425, M 1465, P 34556
Juncus tenuis Willdenow: 7; B 952, F 1987
Luzula bulbosa (A. Wood) B.B. Smyth & L.C.R. Smyth: 1, 2, 5; F 1446, F 1595, M 1222, P 34241

LEMNACEAE

Lemna gibba Linnaeus: 7; B 875
Lemna minor Linnaeus: 7; B 970
Spirodela polyrhiza (Linnaeus) Schleiden: 7; M 1777

LILIACEAE

Aletris farinosa Linnaeus: 2, 4, 5, 7; F 1722, P 34587
**Allium vineale* Linnaeus: 7; B 1054
**Asparagus officinalis* Linnaeus: 1, 2, 7; B 845, M 1581, P 34831
**Convallaria majalis* Linnaeus: 7; P 34240
**Hemerocallis fulva* (Linnaeus) Linnaeus: 2, 7; M 1286, P 34239
Hypoxis hirsuta (Linnaeus) Coville: 5; F 1631
**Lilium dauricum* Ker: 7; P 34193
Lilium michiganense Farwell: 4, 7; F 1917, P 34263
Maianthemum racemosum (Linnaeus) Link: 1, 2; B 880, F 1539, F 1684, F 1910, M 1571, P 34170
Maianthemum stellatum (Linnaeus) Link: 1, 2, 7; B 814, F, 1518, F 1542, F 1713, P 34097
Polygonatum biflorum (Walter) Elliott: 1, 2, 7; F 1576, M 1591, P 34184, P 34204
**Yucca filamentosa* Linnaeus: 1, 7; B 1027, P 34407

ORCHIDACEAE

Platanthera lacera (Michaux) G. Don: 5, 6; P 34286, P 34299
Spirathes vernalis Engelmann & A. Gray: 5, 7; F 2032

POACEAE

Agrostis gigantea Roth: 2, 6, 7; B 1015, F 1909, M 1256, M 1482, M 1527, P 34545
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg var. *hyemalis*: 1, 2, 6, 7; F 1678, M 1253, P 34175, P 34200, P 34233
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg var. *scabra* (Willdenow) Blomquist: 1; B 1096, M 1610
Agrostis perennans (Walter) Tuckerman: 1, 2, 5; P 34595
Alopecurus carolinianus Walter: 6, 7; B 940, M 1207, P 34157
Andropogon gerardii Vitman: 1, 2, 3, 4, 5, 7; B 1074, F 1977, F 2116, M 1542, P 34737, P 34777, P 34808, P 35015
Andropogon virginicus Linnaeus: 4, 7; M 1762, P 34853, P 35171
Aristata basiramea Engelmann: 1; B 1127
Aristida longespica Poiret var. *geniculata* (Rafinesque) Fernald: 1, 2, 7; M 1550, P 34800; P 34822
Aristata oligantha Michaux: 1, 7; B 1104, B 1128
Aristida purpurascens Poiret: 1, 2, 3, 7; B 1130, F 2022, M 1613, P 34745, P 34806
Bouteloua curtipendula (Michaux) Torrey: 1; B 1144, M 1507, P 34562
**Bromus commutatus* Schrader: 7; F 1637.1, P 34166
**Bromus inermis* Leysser: 7; B 898, P 34167, P 34282
**Bromus japonicus* Thunberg: 7; B 893
**Bromus tectorum* Linnaues: 1, 7; B 833, F 1637.2, F 1664, F 1665, M 1228, P 34202
Calamagrostis canadensis (Michaux) P. Beauvois: 2, 4, 5, 7; B 1023, F 1707, M 1526, P 34593
Calamagrostis stricta (Timm) Koeler: 1, 6; P 34234, P 34987
Calmovilfa longifolia (Hooker) Scribner: 1, 2; B 998, C 47, M 1304.1, M 1593
Cenchrus longispinus (Hackel) Fernald: 7; B 996.1, C 36, F 1928, M 1407, P 34782, P 34669
**Dactylis glomerata* Linnaeus: 7; B 832
Danthonia spicata (Linnaeus) P. Beauvois: 1; B 918
**Digitaria ischaemum* (Schreber) Muhlenberg: 1, 2, 7; B 1123, M 1756, P 34802, P 34821
**Digitaria sanguinalis* (Linnaeus) Scopoli: 1, 2, 7; B 996.2, B 1067, B 1125, C 45, M 1587, P 34530
Echinochloa muricata (P. Beauvois) Fernald var. *muricata*: 6, 7; M 1539, P 34847
**Eleusine indica* (Linnaeus) J. Gaertner: 7; B 986
Elymus canadensis Linnaeus: 1, 7; B 999, F 1686, M 1290, P 34392
Elymus virginicus Linnaeus: 2; B 1028
**Elytrigia repens* (Linnaeus) Nevski: 7; F 1907, M 1293, P 34614
**Eragrostis cilianensis* (Allioni) Janchen: 7; B 984, B 1066,
Eragrostis pectinacea (Michaux) Nees: 7; B 1070, M 1620, P 34673
Eragrostis spectabilis (Pursh) Steudel: 1, 2, 3, 7; B 1075, B1122, C 55, F 2017, M 1520, P 34734, P 34750
**Festuca pratensis* Hudson: 7; M 1229
Glyceria septentrionalis Hitchcock: 7; B 941
Glyceria striata (Lamarck) A. Hitchcock: 5 P 34256
Koeleria pyramidata (Lamarck) P. Beauvois: 1, 2, 3; B 944, F 1566, F 1609, M 1274, P 34149, P 34714
Leersia oryzoides (Linnaeus) Swartz: 6, 7; B 1116, F 1983, M 1631, P 34834
Leptoloma cognatum (Schultes) Chase: 1, 3; B 1120, C 32, M 1560, P 34625, P 35177
**Lolium perenne* Linnaeus: 7; B 915, B 968
Muhlenbergia frondosa (Poiret) Fernald: 7; M 1622, P 34740
Muhlenbergia mexicana (Linnaeus) Trinius: 2, 4, 5, 6, 7; B 1118, B 1143, P 34764, P 34856
Muhlenbergia schreberi J.F. Gmelin: 2; M 1790
Panicum capillare Linnaeus: 1, 2, 7; B 1113, P 34746
Panicum depauperatum Muhlenberg: 1,3; F 1569, P 34172

Panicum dichotomiflorum Michaux: 7; B 1080, F 1988, M 1537, P 34820
Panicum lanuginosum Elliott var. *lindheimeri* (Nash) Fernald: 1, 2, 3, 7; B 916, F 1980, F 2040, M 1254, M 1280, M 1565, P 34244
Panicum leucothrix Nash: 1, 2; P 34748
**Panicum miliaceum* Linnaeus: 7; B 1042
Panicum oligosanthes Schultes: 1, 2, 3; B 928, B 1095, F 1666, F 1721, M 1270, P 34164, P 34177, P 34747
Panicum perlongum Nash: 1; B 927
Panicum rigidulum Nees: 7; F 2042, M 1528, M 1612
Panicum villosissimum Nash: 1, 2, 3, 4, 7; B 891, F 1565, F 1604, M 1271, P 34147, P 34174, P 34238, P 34284, P 34583
Panicum virgatum Linnaeus: 1, 2, 3, 4, 5, 7; B 1002, C 18, C 58, F 1893, F 2118, M 1304.2, M 1430, M 1540, M 1567, P 34535, P 34708
Paspalum laeve Michaux: 7; F 1978
Paspalum setaceum Michaux var. *stramineum* (Nash) D.J. Banks: 1, 3, 7; B 995, C 52, M 1409, M 1488, P 34620
**Phalaris arundinacea* Linnaeus: 7; M 1608
**Phleum pratense* Linnaeus: 1; F 1667
**Poa compressa* Linnaeus: 1, 3; F 1674, M 1596, P 34180, P 34757
**Poa pratensis* Linnaeus: 1, 2, 3, 5, 6, 7; B 813, F 1508, F 1527, F 1586, F 1593, M 1206, P 34117
Schizachyrium scoparium (Michaux) Nash: 1, 2, 3, 4, 7; B 1097, F 2029, F 2107, M 1569, P 34805, P 35013, P 35170
**Secale cereale* Linnaeus: 7; B 837, P 34118
**Setaria faberi* R.A.W. Herrmann: 1, 3, 7; B 983, C 33, M 1551, P 34632, P 35017
**Setaria glauca* (Linnaeus) P. Beauvois: 1, 7; B 1043, B 1086, C 35, M 1617, P 34654
**Setaria viridis* (Linnaeus) P Beauvois: 1, 7; B 1056, C 34, P 34860, P 35016
Sorghastrum nutans (Linnaeus) Nash: 1, 2, 3, 4, 5, 7; B 1119, F 2028, F 2113, M 1595, P 34779, P 34803, P 35014
Spartina pectinata Link: 6, 7; B 1022, F 1984, P 34859
Sphenopholis obtusata (Michaux) Scribner var. *major* (Torrey) K.S. Erdman: 2, 5, 6, 7; P34208, P 34297, P 34232
Sporobolus clandestinus (Biehler) A. Hitchcock: 1, 2, 3; B 1126, F 2127, M 1597, P 34816, P 35176
Sporobolus cryptandrus (Torrey) A. Gray: 1, 3, 7; B, 1146, M 1585, P 34618
Sporobolus heterolepis A. Gray: 1, 2; F 2037, M 1770, P 34827
Stipa spartea Trinius: 1, 2, 3; B 868, F 1567, F 1704, M 1273, P 34146
Tridens flavus (Linnaeus) A. Hitchcock: 1, 2, 3, 4, 7; B, 1115, F 2030, P 34619, P 34716
Triplasis purpurea (Walter) Chapman: 1, 2, 3, 7; B 992, C 42, F 2021, P 34733
Vulpia octoflora (Walter) Rydberg: 1, 3, 7; B 866, F 1633, M 1213, P 34171

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Smilax lasioneuron Hooker: 2, 5; B 908, P 34247

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Sparganium androcladum (Engelmann) Morong?: 7; B 1100

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Typha angustifolia Linnaeus: 7; B 1147, M 1778
Typha latifolia Linnaeus: 6, 7; B 1053, M 1779, P 34994

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Xyris torta J.E. Smith: 2, 7; M 1460, M 1588

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Acer negundo Linnaeus: 5, 7; B 937, F 1550
Acer saccharinum Linnaeus: 7; B 1236, M 1776

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Amaranthus hybridus Linnaeus: 7; B 1044, M 1619
Amaranthus retroflexus Linnaeus: 7; B 1068
Froelichia floridana (Nuttall) Moquin-Tandon: 1, 2, 3, 7; B 1046, C 49, M 1453, M 1490, P 34615
**Froelichia gracilis* (Hooker) Moquin-Tandon: 1, 7; B 974, B1045, C 25, P 34861

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Rhus copallina Linnaeus: 1, 2, 3, 4, 7; B 1026, F 1887, M 1441, M 1472.1, P 34597, P 34627
Rhus glabra Linnaeus: 1, 2, 3, 7; B 947, C 29, F 1732, F 2023, M 1278, P 34404
Rhus typhina Linnaeus: 1, 2, 3, 6, 7; B 958, F 1670, F 1696, M 1795, P 34214
Toxicodendron radicans (Linnaeus) Kuntze: 1, 7; B 907, P 35002, P 35174

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Cicuta maculata Linnaeus: 6, 7; B 1010, F 1916, M 1448, P 34546
Cryptotaenia canadensis (Linnaeus) de Candolle: 5; P 34249
**Daucus carota* Linnaeus: 7; B 1041, B 1073, M 1649, P 34639
Eryngium yuccifolium Michaux: 2, 7; F 1976, M 1568, P 34628
Osmorhiza claytonii (Michaux) Clarke: 5; P 34248
Osmorhiza longistylis (Torrey) de Candolle: 2, 5; B 841, F 1538
Oxypolis rigidior (Linnaeus) Rafinesque: 7; M 1498
**Pastinaca sativa* Linnaeus: 7; B 1051
Sanicula canadensis Linnaeus: 1, 2, 4, 5, 7; M 1579, M 1639, P 34251
Sanicula odorata (Rafinesque) Pryer & Phillippe: 5; F 1547
Thaspium barbinode (Michaux) Nuttall: 2, 7; P 34168
**Torilis japonica* (Houttuyn) de Candolle: 4, 5, 7; P 34572

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Apocynum androsaemifolium Linnaeus: 1; Site Record only
Apocynum cannabinum Linnaeus: 2, 6, 7; B 965, F 1904, P 34858

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Ilex verticillata (Linnaeus) A. Gray: 2, 4, 5; B 900, M 1644, P 34253P 34739

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Asclepias amplexicaulis J.E. Smith: 1, 3; F 1682, M 1299, P 34196, P 34245, P 34713
Asclepias hirtella (Pennell) Woodson: 2; F 2014
Asclepias syriaca Linnaeus: 1, 6, 7; B 951, F 1918, M 1558, P, 34409, 34752
Asclepias tuberosa Linnaeus: 1, 3; B 950, C 16, F 1669, F 1697, P 34266, P 34393, 35167
Asclepias verticillata Linnaeus: 1, 2, 3, 4, 7; B 975, C 6, F 1725, F 1728, M 1442, M 1484, P 34539, P 34720

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**Achillea millefolium* Linnaeus: 1, 2, 4, 3, 5, 7; B 964, C 40, F 1618, F 1675, M 1302, P 34187, P 34198, P 34273
Ambrosia artemisiifolia Linnaeus: 1, 2, 4, 7; B 1055, C 9, F 1989, M 1543, P 34774, P 34801
Ambrosia psilostachya de Candolle: 1; P 34798
Ambrosia trifida Linnaeus: 1, 7; B 1111, C 61, M 1621, P 34730
Antennaria neglecta Greene: 1, 2; Site Record only
Antennaria plantaginifolia (Linnaeus) Richardson: 1, 2, 3, 7; B 811, F 1514, F1526, F 1573, F 1605, M 1177, P 34096
**Arctium minus* Schkuhr: 7; P 34566
**Artemisia absinthium* Linnaeus: 7; P 34995
Artemisia campestris Linnaeus: 1, 2, 3; B 1062, M 1508, M 1541, P 34617
Aster azureus Lindley: 1, 2, 3; B 1145, B 1229, B 1235, F 2049, F 2104, M 1765, P 34979, P 35006, P 35169
Aster borealis (Torrey & A. Gray) Provancher: 2, 6; P 34844
Aster dumosus Linnaeus: 1; M 1773
Aster ericoides Linnaeus: 1, 2; F 2027, F 2120, M 1764, P 34980, P 35009
Aster lateriflorus (Linnaeus) Britton: 7; M 1792
Aster linariifolius Linnaeus: 1, 2, 3; F 2109, F 2034, M 1769, P 34988, P 35007
Aster novae-angliae Linnaeus: 7; P 34998
Aster pilosus Willdenow: 1, 2, 7; B 1134, B 1233, M 1768, P 34981, P 35018, P 35164
Aster sericeus Ventenat: 1; B 1133, P 34817
Aster simplex Willdenow: 5, 6, 7; M 1794, P 34991, P 35158
Aster umbellatus Miller: 2, 4, 5, 6, 7; B 1141, F 2031, M 1473, M 1531, P 34765, P 34845
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Bidens bipinnata Linnaeus: 1, 5, 7; B 1093, P 34770
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Bidens coronata (Linnaeus) Britton: 6, 7; M 1590, P 34823
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**Cichorium intybus* Linnaeus: 7; B 1052
Cirsium altissimum (Linnaeus) Sprengel: 1, 7; B 1136, P 34814
Cirsium discolor (Muhlenberg) Sprengel: 4, 5, 7; F 2009, M 1626, M 1797, P 34707

Conyza canadensis (Linnaeus) Cronquist: 1, 2, 3, 4, 5, 7; B 1012, C 10, M 1483, M 1557, P 34731, P 34772
Coreopsis lanceolata Linnaeus: 1; B 943, F 1677
Coreopsis palmata Nuttall: 1, 2, 7; B 1064, F 1699, M 1263, M 1477, P 34406
Coreopsis tripteris Linnaeus: 1, 2; B 1091, M 1502, M 1566, P 34736
Erechtites hieracifolia (Linnaeus) Rafinesque: 1, 2, 5, 6, 7; B 1099, F 2048, M 1637, P 34758, P 34824
Erigeron annuus (Linnaeus) Persoon: 1, 2, 7; B 896, M 1248, M 1630, P 34221, P 34289
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Eupatorium perfoliatum Linnaeus: 6, 7; F 1968, M 1574, P 34838
Eupatorium rugosum Houttuyn: 2, 5; M 1799, P 34793
Eupatorium serotinum Michaux: 2, 5, 6, 7; B 1094, C 60, M 1564, P 34706, P 34825
Euthamia graminifolia (Linnaeus) Nuttall: 1, 4, 7; B 1129, P 35178
Euthamia gymnospermoides Greene: 1, 2, 3, 5, 7; F 2031, F 2114, M 1757, P 34983, P 35012, P 35165
Gnaphalium obtusifolium Linnaeus: 1, 2, 7; B 1057, C 7, F 1972, F 2106, M 1547, P 34722, P 34813, P 35008
**Helianthus annuus* Linnaeus: 7; B 1112
Helianthus divaricatus Linnaeus: 1, 2, 3, 7; B 1033, B 977, C 27, F 1885, M 1443, M 1489, P 34536, P 34671, P 34717
Helianthus grosseserratus M. Martens: 1, 5, 6, 7; B 1117, P 34661, P 34741
Helianthus hirsutus Rafinesque: 1; B 1105
Helianthus x laetiflorus Persoon: 1; M 1440
Helianthus mollis Lamarck: 1, 2, 7; B 1152, C 41, M 1422, M 1456, P 34672
Helianthus occidentalis Riddell: 1, 2, 3; C 30, M 1509, M 1521, P 34622
Helianthus rigidus (Cassini) Desfontaines: 1, 7; B 1124, F 2126
Hieracium gronovii Linnaeus: 1, 2, 7; B 973, B 1029, F 1897, F 2131, M 1548, P 34531, P 34711, P 34795.2
Hieracium longipillum Torrey: 1; B 1063, C 3, M 1439,
Hieracium scabrum Michaux: 1, 2, 7; F 2001, F 2117, M 1455, M 1582, P 34762, P 34795.2
Hymenopappus scabiosaeus L'Her: 1; P 34197
Krigia biflora (Walter) Blake: 1, 2, 6; F 1579, F 1607, P 34160, P 34287
Krigia virginica (Linnaeus) Willdenow: 1, 2, 3, 7; B 805, B 886, F 1511, F 1601, M 1181, P 34088
Lactuca biennis (Moench) Fernald: 5; P 34742
Lactuca canadensis Linnaeus: 1, 7; B 1058, C 54, M 1411, M 1480, P 34753, P 34819
Lactuca floridana (Linnaeus) Gaertner: 5; P 34776
**Lactuca serriola* Linnaeus: 7; B 989, M 1410, P 34857
Liatris aspera Michaux: 1, 2, 3, 7; B 1121, F 2035, F 2105, M 1592, P 34751, P 34804
Liatris spicata (Linnaeus) Willdenow: 2, 4, 5; F 1895, M 1474, M 1634, M 1783, P 34630, P 34778
**Matricaria matricarioides* (Lessing) Porter: 7; B 953
Parthenium integrifolium Linnaeus: 1, 2, 5; F 1888, M 1476, M 1782, P 34401
Prenanthes aspera Michaux: 2; M 1632, P 34809, P 35011
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Senecio plattensis Nuttall: 1, 7; B 879, P 34084; P 34189
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Solidago gigantea Aiton: 1, 2, 4, 5, 7; B 1109, F 1969, M 1609, P 34703, P 34818
Solidago juncea Aiton: 1, 2, 7; B 1090, C 22, F 1926, M 1534, P 34635, P 34709
Solidago missouriensis Nuttall: 2; M 1457
Solidago nemoralis Aiton: 1, 2, 3, 7; B 1132, F 2016, F 2051, F 2108, M 1570, P 34749,

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Solidago rugosa Miller: 2, 5; M 1784, P 34765, P 34828
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**Tragopogon dubius* Scopoli: 1, 2, 3, 7; B 1034, F 1583, M 1277, P 34144, P 34176, P 34275
Vernonia gigantea (Walter) Trelease: 2, 4, 5, 7; B 1025, M 1495, M 1793, P 34702, P 34712
Vernonia missurica Rafinesque: 7; F 1967, M 1533
Xanthium strumarium Linnaeus: 7; B 1089

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Betula nigra Linnaeus: 7; B 888, M 1759

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**Catalpa speciosa* (Warder) Engelmann: 7; B 959, P 34205, P 34642

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Hackelia virginiana (Linnaeus) I.M. Johnston: 1, 2, 3, 5, 7; B 1036, M 1636, P 34564, P 34659
Lithospermum caroliniense (J.F. Gmelin) MacMillan: 1, 2, 3; B 810, B 1039, F 1505, F 1605, F 2110, M 1211, M 1594, P 34182, P 34267
Myosotis verna Nuttall: 1, 2, 3; P 34161

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**Alliaria petiolata* (Bieberstein) Cavara & Grande: 1, 7; B 876
**Arabidopsis thaliana* (Linnaeus) Heynhold: 7; B 819, M 1169
Arabis lyrata Linnaeus: 1; B 869, F 1504, F 1599, M 1178, P 34112
**Barbarea vulgaris* R. Brown: 7; B 844
**Capsella bursa-pastoris* (Linnaeus) Medikus: 7; B 938
Cardamine bulbosa (Schreber) Britton, Sterns, & Poggenburg: 5; F 1531
Cardamine parviflora Linnaeus var. *arenicola* (Britton) O.E. Schultz: 7; B 836, B 873, M 1183
Cardamine pensylvanica Willdenow: 2, 6, 7; P 34092
Descurainia pinnata (Walter) Britton: 2, 7; B 889, M 1189, P 34242
Draba reptans (Lamarck) Fernald: 1; B 865, P 34115
**Eriophila verna* (Linnaeus) Chevalier: 1; P 34116
**Lepidium densiflorum* Schrader: 1, 3, 7; F 1582, F 1634, P 34186
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**Nasturtium officinale* R. Brown: 6, 7; P 34300
Rorippa islandica (Oeder) Borbas var. *fernaldiana* Butters & Abbe: 6, 7; B 1008, P 34550
Rorippa sessiliflora (Nuttall) A. Hitchcock: 7; B 872
**Thlaspi arvense* Linnaeus: 7; B 831

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Opuntia humifusa (Rafinesque) Rafinesque: 1; B 997

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Cassia fasciculata Michaux: 1, 2, 3, 7; B 1001, C 4, F 1886, M 1414, M 1525, P 34524, P 34754
Cassia nictitans Linnaeus: 1, 2; B 1060, C 21, M 1572, P 34542, P 34718

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Campanula americana Linnaeus: 5; P 34592
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Lobelia siphilitica Linnaeus: 6, 7; F 2003, M 1604, P 34832
Lobelia spicata Lamarck: 1, 7; M 1478
Triodanis perfoliata (Linnaeus) Nieuwland var. *perfoliata*: 1, 2, 3, 7; B 925, F 1618, F 1635, P 34188

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**Cannabis sativa* Linnaeus: 1, 7; B 1032, M 1454, M 1487, M 1623

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**Lonicera x bella* Zabel: 7; P 34108
**Lonicera maackii* (Ruprecht) C.J. Maximowicz: 7; B 862
**Lonicera morrowii* A. Gray: 1, 7; B 818, P 34295
**Lonicera x muendenensis* Rehder: 2, 7; B 882
**Lonicera sempervirens* Linnaeus: 1; B 921
Sambucus canadensis Linnaeus: 2, 5, 6, 7; B 912, M 1292, P 34224, P 35173

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**Arenaria serpyllifolia* Linnaeus: 7; B 864, P 34181
**Cerastium vulgatum* Linnaeus: 7; M 1203, M 1417, P 34101
**Dianthus armeria* Linnaeus: 1, 6, 7; B 1020, P 34210, P 34656
**Holosteum umbellatum* Linnaeus: 2, 7; B 881
**Lychnis alba* Miller: 7; B 1083, F 1552, M 1225
Paronychia canadensis (Linnaeus) A.W. Wood: 1, 2; B 923, P 34293, P 34830
**Saponaria officinalis* Linnaeus: 7; B 955, B 991, C 63, F 1729, M 1283, P 34394
Silene antirrhina Linnaeus: 1, 7; B 933, F 1673, P 34218
**Silene dichotoma* Ehrhart: 7; B 890
Silene stellata (Linnaeus) Aiton f.: 2, 7; B 1230, F 1925, M 1789, P 34541, P 34580
**Stellaria media* (Linnaeus) D. Villars: 2, 7; B 834, B 904

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Celastrus scandens Linnaeus: 1, 2; B 1239, M 1804

CHENOPODIACEAE

Chenopodium desiccatum A. Nelson: 1, 2, 3, 7; C 12, F 1927, F 2111, M 1600, P 34760, P 34849
**Chenopodium album* Linnaeus: 7; B 1069
Cycloloma atriplicifolium (Sprengel) J.M. Coulter: 1, 7; B 1000, C 44, M 1295, M 1510, P 34389

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Helianthemum bicknellii Fernald: 1; C 56, F 1564, M 1552
Helianthemum canadense (Linnaeus) Michaux: 1, 2, 3; F 1603, P 34743, P 34989
Lechea minor Linnaeus: 2, 5; M 1545, M 1546
Lechea pulchella Rafinesque: 1, 2, 4, 5; F 1890, M 1452, M 1544
Lechea villosa Elliott: 1, 2, 3, 7; B 1059, C 31, F 1705, M 1444, M 1500, M 1615, P 34626

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Calystegia sepium (Linnaeus) R. Brown: 6, 7; F 1986, M 1249, P 34855
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Acalypha rhomboidea Rafinesque: 5, 6, 7; B 1150, F 2043, M 1589, P 34768, P 34841
Chamaesyce nutans (Lagasca y Segura) Small: 1, 7; C 67, M 1618
Chamaesyce supina (Rafinesque) Moldenke: 7; B 982, B 1087, M 1511
Croton glandulosus Linnaeus: 1, 2, 3, 7; B 993, C 17, M 1296, M 1405, M 1486, P 34520

Crotonopsis linearis Michaux: 2; P 34589
Euphorbia corollata Linnaeus: 1, 2, 3, 7; B 828, B 949, C 2, F 1700, M 1438, P 34521, P 34719
Poinsettia dentata (Michaux) Klotzsch & Garcke var. *dentata*: 1, 7; B 1003, C 38, M 1586, P 34668

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Apios americana Medikus: 1, 6; P 34640
Baptisia x deamii Larisey: 7; F 1898
Baptisia lactea (Rafinesque) Thieret: 1, 2, 4, 5, 7; B 963, F 1906, F 1711, M 1303, P 34399
Baptisia leucophaea Nuttall: 1, 2; M 1224, M 1297, P 34178, P 34386
Baptisia tinctoria (Linnaeus) R. Brown: 7; F 1900
Dalea candida (Michaux) Willdenow: 1, 2; M 1300
Desmodium illinoense A. Gray: 1, 3; M 1601, P 34525
Desmodium nudiflorum (Linnaeus) de Candolle: 2; P 34665
Desmodium paniculatum (Linnaeus) de Candolle: 7; F 1998
Desmodium sessilifolium (Torrey) Torrey & Gray: 1, 3; C 1, F 2019, M 1555, P 34621, P 34744
Galactia regularis (Linnaeus) Britton, Sterns, & Poggenburg: 1, 7; C 39
**Kummerowia stipulacea* (Maximowicz) Makino: 7; P 343670
**Lathyrus latifolius* Linnaeus: 7; B 1049
Lathyrus palustris Linnaeus: 5, 6; P 34222, P 34292
Lespedeza capitata Michaux: 1, 2, 3; B 1107, B 1127, C 46, F 2038, F 2112, M 1554, P 34735, P 34755
Lespedeza hirta (Linnaeus) Hornemann: 2, 7; B 1138, B1232, F 1999, M 1638, P 34710, P 34810
Lespedeza virginica (Linnaeus) Britton: 1, 2; B 1231, M 1501, M 1577, P 34797, P 34799
Lupinus perennis Linnaeus: 1, 2; B 976, P 34385
**Medicago lupulina* Linnaeus: 7; B 926, B 1106, P 34190
**Melilotus alba* Medikus: 1, 7; B 932, F 1690, M 1408, P 34391
**Melilotus officinalis* (Linnaeus) Pallas: 7; F 1689
**Robinia pseudo-acacia* Linnaeus: 1, 7; B 883
Strophostyles helvola (Linnaeus) Elliott: 1, 7; P 34388
Tephrosia virginiana (Linnaeus) Persoon: 1, 2, 3; B 942, C 26, F 1683, F 1695, M 1260, P 34526
**Trifolium pratense* Linnaeus: 7; M 1559, P 34216
**Vicia villosa* Roth: 1, 7; B 957, P 34194

FAGACEAE

Quercus alba Linnaeus: 1, 2, 5, 7; B 1137, F 1520, F 1905, M 1767, P 34091, P 34650, P 35172
Quercus palustris Müenchhausen: 2, 5, 7; M 1761, P 34986, P 35162
Quercus velutina Lamarck: 1, 2, 5, 7; B 1076, C 51, M 1771, P 35001, P 35166

GENTIANACEAE

Bartonia virginica (Linnaeus) Britton, Sterns, & Poggenburg: 2, 5, 7; F 1889, M 1522, P 34787
Gentiana puberulenta J. Pringle: 1, 2; B 1228, P 34982
Gentiana saponaria Linnaeus: 1; F 2115, M 1760, M 1781, P 34985, P 35160

GROSSULARIACEAE

Ribes missouriense Nuttall: 1; B 922

HYPERICACEAE

Hypericum adpressum Barton: 7; F 1994, M 1435
Hypericum canadense Linnaeus: 4, 7; M 1424, M 1471
Hypericum gentianoides (Linneus) Britton, Sterns, & Poggenburg: 1, 2, 4, 7; B 1065, C 24, M 1464, M 1549, P 34533, P 34590
Hypericum gymnanthum Engelmann & A. Gray: 4; M 1469
Hypericum majus (A. Gray) Britton: 6, 7; M 1420.2, M 1614, P 34645
Hypericum mutilum Linnaeus: 4, 6, 7; B 1011, M 1420.1, M 1470, P 34549
**Hypericum perforatum* Linnaeus: 7; C 65, M 1481, P 34212
Hypericum punctatum Lamarck: 7; F 2006
Hypericum sphaerocarpum Michaux: 5; P 34257

JUGLANDACEAE

Juglans nigra Linnaeus: 7; B 835

LAMIACEAE

**Glechoma hederacea* Linnaeus: 7; B 839, B 936
**Leonurus cardiaca* Linnaeus: 5, 7; B 961, P 34203, P 34246
Lycopus americanus Muhlenberg: 5, 6, 7; B 1079, F 1914, M 1583, P 34548, P 34783
Lycopus rubellus Moench: 5; P 34792
Lycopus uniflorus Michaux: 7; F 2011.1, M 1629
Lycopus virginicus Linnaeus: 6, 7; B 1101, F 1985, M 1575, P 34552
Monarda fistulosa Linnaeus: 1, 4, 5, 7; B 1005, F 1720, M 1298, P 34408, P 34575
Monarda punctata Linnaeus: 1, 2, 3, 7; B 978, C 14, F 1929, M 1294, P 34523, P 34715
**Nepeta cataria* Linnaeus: 7; B 966, M 1434
Physostegia virginiana (Linnaeus) Bentham: 1, 2, 7; B 1131, F 2036, M 1599, P 34807
Prunella vulgaris Linnaeus: 6, 7; M 1791, P 34644
Pycnanthemum virginianum (Linnaeus) T. Durand & B.D. Jackson: 4, 5, 7; F 1915, F 2007, M 1446, P 34655, P 34578
Scutellaria galericulata Linnaeus: 7; F 2010
Scutellaria leonardii Epling: 1, 3; B 1030, F 1562, F 1594, M 1449, P 34411
Stachys palustris Linnaeus var. *homotricha* Fernald: 6; P 34664
Stachys tenuifolia Willdenow var. *hispida* (Pursh) Fernald: 5, 6, 7; D 1014, B 1048, F 1971, M 1449, P 34223, P 34585, P 34666
Teucrium canadense Linnaeus var. *virginicum* (Linnaeus) Eaton: 1, 6; P 34616

LAURACEAE

Sassafras albidum (Nuttall) Nees: 1, 2, 5, 7; B 820, F 1519, M 1191, P 34105, P 34771

LINACEAE

Linum medium (Planchon) Britton var. texanum (Planchon) Fernald: 2, 7; F 2013, M1493
Linum usitatissimum Linnaeus: 1; B 807

LYTHRACEAE

Lythrum alatum Pursh: 6, 7; F 1912, M 1607, P 34410
Rotala ramosior (Linnaeus) Koehne: 5, 6, 7; F 2045, M 1437, P 34993

MALVACEAE

**Abutilon theophrasti* Medikus: 7; B 1016

MELASTOMATACEAE

Rhexia virginica Linnaeus: 2, 7; M 1436, M 1461, P 34529, P 34586

MOLLUGINACEAE

**Mollugo verticillatus* Linnaeus: 1, 2, 3, 7; B 981, C 15, M 1603, M 1772, P 34527

MORACEAE

**Morus alba* Linnaeus: 7; B 933, P 34103

MYRICACEAE

Comptonia peregrina (Linnaeus) J.M. Coulter: 2, 5, 7; M 1220

NYCTAGINACEAE

**Mirabilis nyctaginea* (Michaux) MacMillan: 7; C 66, M 1616, P 34209

NYSSACEAE

Nyssa sylvatica Marshall: 2, 5; B 878, B 1135, M 1647, P 34209, P 35000

OLEACEAE

Fraxinus pennsylvanica Marshall: 5, 7; F 1549, P 34567, P 34997

ONAGRACEAE

Circaea lutetiana Linnaeus: 5; P 34252
Epilobium coloratum Muhlenberg: 6, 7; B 1085, P 34840

Epilobium x wisconsinense Ugent: 7; M 1584
Ludwigia alternifolia Linnaeus: 6, 7; F 1981, M 1419, P 34560
Ludwigia palustris (Linnaeus) Elliott var. *americana* (de Candolle) Fernald & Griscom: 7; M 1643
Oenothera biennis Linnaeus: 1, 2, 7; B 945, B 1040, M 1412, P 34540
Oenothera laciniata Hill: 1, 7; P 34207
Oenothera pilosella Rafinesque: 5; P 34258
Oenothera rhombipetala Nuttall: 1, 2, 3, 7; B 967, C 11, F 1693, F 1723, M 1413, P 34390

OXALIDACEAE

Oxalis fontana Bunge: 7; C 58
Oxalis stricta Linnaeus: 1, 7; B 870, F 1584, M1513, P 34648

PHYTOLACCACEAE

Phytolacca americana Linnaeus: 1, 2, 5, 7; B 960, M 1291, P 34568

PLANTAGINACEAE

Plantago aristata Michaux: 1, 7; B 946
**Plantago lanceolata* Linnaeus: 7; B 935, F 1730, M 1289
Plantago patagonica Jacquin: 1; B 924, M 1287
**Plantago rugelii* Decaisne: 1, 2, 7; B 962, M 1288, P 34641
Plantago virginica Linnaeus: 7; M 1231, P 34165

POLEMONIACEAE

Phlox bifida L.C. Beck: 1, 2, 3; B 808, F 1507, M 1170, P 34086
Phlox glaberrima Linnaeus: 4, 7; F 1923, P 34259
Phlox pilosa Linnaeus: 2; P 34119

POLYGALACEAE

Polygala cruciata Linnaeus var. *aquilonia* Fernald: 4, 5; F 2052, M 1467
Polygala polygama Walter: 1, 2, 3; F 1678, M 1272, P 34199, P 34243, P 34274
Polygala sanguinea Linnaeus: 1, 2, 4, 5, 6, 7; B 1024, C 23, F 1709, F 1891, M 1258, P 34398, P 34573

POLYGONACEAE

Polygonella articulata (Linnaeus) Meisner: 1; P 35010
Polygonum amphibium Linnaeus: 6, 7; F 2013, P 34836
Polygonum careyi Olney: 2, 5, 7; B 1092, F 1992, M 1428, M 1462
**Polygonum cespitosum* Blume: 5, 7; P 343781
**Polygonum convolvulus* Linnaeus: 1, 7; B 1004, B 1148, C 62, P 34387
**Polygonum hydropiper* Linnaeus: 5, 6, 7; F 1981, M 1605, P 34785, P 34848
Polygonum hydropiperoides Michaux: 5; F 2044

Polygonum lapathifolium Linnaeus: 7; B 1084, F 1996
Polygonum opelousanum Riddell: 5, 7; M 1429, M 1506, P 34784
Polygonum pensylvanicum Linnaeus: 6, 7; B 1078, M 1421, M 1466, M 1515, P 34638
**Polygonum persecaria* Linnaeus: 2; B 1108
Polygonum punctatum Elliott: 6, 7; B 1098, M 1530, P 34663
Polygonum ramosissimum Michaux: 2, 7; P 34732
Polygonum sagittatum Linnaeus: 6, 7; F 2001, P 34835
Polygonum scandens Linnaeus: 1, 2, 7; B 956, F 2000, M 1578, P 34833
Polygonum tenue Michaux: 1, 2, 3; B 1061, C 13, F 2020, P 34623, P 35005
**Rumex acetosella* Linnaeus: 1, 2, 3, 7; B 816, F 1544, F 1612, M 1185
**Rumex crispus* Linnaeus: 7; B 910, M 1247, P 34192

PORTULACACEAE

Claytonia virginica Linnaeus: 1, 2; B 806, F 1610, M 1176, P 34098
Talinum rugospermum Holzinger: 1; C 43, F 1668, F 2128

PRIMULACEAE

Lysimachia lanceolata Walter: 2, 5, 7; F 1715, M 1281, M 1633, P 34651
**Lysimachia nummularia* Linnaeus: 6, 7; P 34301
Lysimachia terrestris (Linnaeus) Britton, Sterns, & Poggenburg: 7; M 1433

RANUNCULACEAE

Anemone cylindrica A. Gray: 1, 2, 7; B 1038, C 59, F 1671, F 1719, M 1262, P 34213
Anemone quinquefolia Linnaeus: 2, 5; F 1535, F 1632, M 1216
Ranunculus abortivus Linnaeus: 2, 5, 7; B 856, B 985, F 1551, P 34099
Ranunculus pensylvanicus Linnaeus f.: 6, 7; F 2012, P 34559
Thalictrum dasycarpum Fischer & Avé-Lallemant: 6; P 34225

RHAMNACEAE

Ceanothus americanus Linnaeus: 1, 2, 7; F 1702, M 1265, M 1485, P 34537, P 34723

ROSACEAE

Agrimonia parviflora Aiton: 2, 4, 5, 6, 7; F 2005, M 1780, P 34667, P 34704
Amelanchier arborea (Michaux f.) Fernald: 1; B 877
Aronia melanocarpa (Michaux) Elliottt: 2, 5; B 850, F 1623
Aronia prunifolia (Marshall) Rehder: 2, 4, 5, 7; M 1187, P 34283, P 34738
Crataegus pruinosa (H. Wendland) K. Koch: 7; P 34211
Fragaria virginiana Duchesne: 1, 2, 7; B 821, F 1512, F 1613, M 1171, P 34094
Geum canadense Jacquin: 2, 5, 7; B 934, M 1788, P 34250
Geum laciniatum Murray: 5, 6; P 34598, P 34660
Malus coronaria (Linnaeus) P. Miller var. dasycalyx Rehder: 2; B 825
Malus ioensis (Wood) Britton: 1; B 1031
Potentilla norvegica Linnaeus: 6, 7; B 914, F 1997, M 1415, P 34652
**Potentilla recta* Linnaeus: 7; P 34206

Potentilla simplex Michaux: 1, 2, 5, 6, 7; B 838, F 1528, F 1577, F 1592, M 1202, P 34152
Prunus americana Marshall: 7; C 64
Prunus serotina Ehrhart: 1, 2, 3,4, 5, 7; B 823, F 1687, F 1924, M 1763, P 34780, P 35004
Rosa carolina Linnaeus: 1, 2, 3; C 20, F 1663, M 1264, P 34173, P 34183; P 34195, P 34269, P 34812
**Rosa multiflora* Thunberg: 1, 5, 6, 7; B 909, F 1616, P 34163, P 34570
Rosa palustris Marshall: 2; M 1806
Rosa setigera Michaux: 4, 5, 6; P 34302, P 34582
Rubus allegheniensis Porter: 1, 2, 3, 7; B 852, F 1530, F 1575, F 1591, M 1212, P 34155
Rubus enslenii Trattinnick: 1, 2; B 851
Rubus flagellaris Willdenow: 1, 2, 3, 6, 7; B 892, F 1578, M 1223, P 34154
Rubus hispidus Linnaeus: 1, 2, 4, 5, 6, 7; F 1708, M 1266, P 34237, P 34260
Rubus occidentalis Linnaeus: 1, 2, 6, 7; B 853, B 840, F 1672, M 1230, P 34156
Rubus pensylvanicus Poiret: 5; F 1628, F 1716
Rubus schneideri Bailey: 5, 6, 7; F 1966, F 1920, F 1991, M 1432, P 34158, P 34276
Spiraea alba Du Roi: 2, 4, 5, 7; B 969, F 1970, M 1450, M 1494, P 34576, P 34657
Spiraea tomentosa Linnaeus: 2, 5, 7; M 1423, M 1463, P 34577, P 34634

RUBIACEAE

Diodia teres Walter var. *setifera* Fernald & Griscom: 1, 7; F 2119, M 1406, M 1512
Galium aparine Linnaeus: 1, 2, 5, 6, 7; B 842, F 1532, F 1580, F 1589, M 1205, P 34151
Galium boreale Linnaeus: 7; F 1922
Galium obtusum Bigelow: 5, 6, 7; M 1642, P 34544, P 34584
Galium pilosum Aiton: 1, 2, 3, 7; B 1035, F 1911, M 1580, P 34538, P 34594, P 34761
Galium tinctorium Linnaeus: 7; B 1102, F 2011.2
Galium triflorum Michaux: 2; B 906
Hedyotis caerulea (Linnaeus) Hooker: 4, 5, 7; F 1524, F 1629, M 1208

SALICACEAE

Populus deltoides Marshall: 4, 5, 7; B 885, M 1803, P 34851, P 35163
Populus grandidentata Michaux: 2, 5; M 1648
Populus tremuloides Michaux: 2, 4, 5, 7; F 1706, M 1646, P 34826
Salix discolor Muhlenberg: 6, 7; M 1190, P 34089
Salix exigua Nuttall: 6, 7; B 817, F 1919, P 34090
Salix humilis Marshall: 1, 2, 3, 5; B 861, F 1515, F 1574, F 1590, M 1179, P 34114, P 35182
Salix nigra Marshall: 7; B 887

SANTALACEAE

Comandra umbellata (Linnaeus) Nuttall: 1, 2, 3, 7; B 887, F 1563, F 1636, M 1218, P 34121, P 35180

SCROPHULARIACEAE

Agalinus purpurea (Linnaeus) Pennell: 7; F 1990, M 1602
Agalinis tenuifolia (Vahl) Rafinesque: 6, 7; M 1563, P 34843
Aureolaria pedicularia Linnaeus: 1, 2; B 1072, C 19, F 2018, M 1451, M 1499, P 34829
Gratiola neglecta Torrey: 6; P 34226

Gratiola virginiana Linnaeus: 7; M 1536, M 1641
Linaria canadensis (Linnaeus) Dumont Courset: 1, 2, 3, 7; F 1521, F 1608, M 1182, P 34087
**Linaria vulgaris* Hill: 7; F 2125
Lindernia dubia (Linnaeus) Pennell var. *anagallidea* (Michaux) Cooperrider: 7; B 939, M 1535
Mimulus ringens Linnaeus: 7; B 1151
Pedicularis canadensis Linnaeus: 4; P 34285
Pedicularis lanceolata Michaux: 6; F 2008
Penstomen digitalis Nuttall: 7; F 1921
Scrophularia lanceolata Pursh: 1, 2; B 901, F 1545, F 1596, F 1688, M 1217, P 34219
**Verbascum thapsus* Linnaeus: 1, 5, 7; B 1006, P 34643, P 34775
**Veronica arvensis* Linnaeus: 6, 7; B 829, 859, P 34100
Veronica peregrina Linnaeus var. peregrina: 7; M 1188
Veronicastrum virginicum (Linnaeus) Farwell: 2, 4, 5; F 2014, M 1301, P 34534, P 34579

SOLANACEAE

Physalis heterophylla Nees: 5, 6, 7; M 1628, P 34653, P 34790
Physalis virginiana Miller: 1, 2, 3, 7; B 929, F 1581, F 1727, M 1573, P 34217
Solanum carolinense Linnaeus: 1, 3, 7; B 895, B 954, B 990, M 1285, P 34405
**Solanum dulcamara* Linnaeus: 5, 6, 7; B 911, P 34153, P 34279
Solanum ptycanthum Dunal: 1, 2, 5, 7; B 1071, M 1766, P 34773

ULMACEAE

Celtis occidentalis Linnaeus: 5, 7; B 1237, P 34569
Ulmus americana Linnaeus: 5; P 34265
**Ulmus pumila* Linnaeus: 7; F 1692, P 34996

URTICACEAE

Boehmeria cylindrica (Linnaeus) Swartz: 5, 6, 7; B 1009, P 34789, P 34855
Parietaria pensylvanica Muhlenberg: 2, 5, 6; B 902, P 34227, P 34281
Pilea pumila (Linnaeus) A. Gray: 5, 6; P 34992, P 35159
Urtica dioica Linnaeus: 5, 7; M 1627, P 34563

VERBENACEAE

Verbena bracteata Lagasca & Rodríguez: 7; M 1232
Verbena hastata Linnaeus: 5, 6, 7; B 987, F 1913, M 1416, P 34646
Verbena stricta Ventenat: 1, 7; B 972, M 1284
Verbena urticifolia Linnaeus: 7; M 1624

VIOLACEAE

Viola lanceolata Linnaeus: 5, 6, 7; F 1627, M 1184, P 34102
Viola pedata Linnaeus: 1, 2, 3; B 804, F 1506, F 1600, M 1172, P 34111
Viola pratincola Greene: 5, 7; B 884, P 34107, P 34278

Viola primulifolia Linnaeus: 2, 5, 6, 7; M 1164, M 1458, M 1645, P 34277, P 34557, P 34588, P 34596, P 34647
**Viola rafinesquii* Greene: 2, 7; B 827, M 1226
Viola sagittata Aiton: 1, 2, 3, 4, 5, 7; F 1513, M 1165, M 1458, P 34288, P 34110
Viola sororia Willdenow: 7; B 843

VITACEAE

Parthenocissus quinquefolia (Linnaeus) Planchon: 7; P 35003
Vitis riparia Michaux: 1, 2, 3, 6, 7; B 1238, M 1802, P 34846

APPENDIX 1 (continued)

The vascular taxa encountered and collected at the Bentley/Crawford-Jordan site are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = dry sand savanna, 2 = dry-mesic sand savanna, 3 = dry sand prairie, 4 = wet sand prairie, 5 = sand flatwoods, 6 = shrub prairie, 7 = cultural). Following the community number(s), collecting numbers or date collected (when collecting number not assigned) preceded by the initial of the collector's name are given (P for Loy R. Phillippe).

PTERIDOPHYTES

DENNSTAEDTIACEAE

Pteridium aquilinum (Linnaeus) Kuhn var. *latisculum* (Desvaux) L. Underwood ex A. Heller: 2; P 34850

DRYOPTERIDACEAE

Onoclea sensibilis Linnaeus: 6; P 34547

EQUISETACEAE

Equisetum fluviatile Linnaeus: 6; P 34236
Equisetum laevigatum A. Braun: 1, 3; P 34220

THELYPTERIDACEAE

Thelypteris palustris Schott: 6; P 34837

SPERMATOPHYTES: GYMNOSPERMS

PINACEAE

**Pinus resinosa* Aiton: 7; P 34106
**Pinus strobus* Linnaeus: 7; P 34104

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

ALISMATACEAE

Alisma subcordatum Rafinesque: 6; P 34662

COMMELINACEAE

Commelina erecta Linnaeus: 1, 3; P 34403
Tradescantia ohiensis Rafinesque: 1, 3; P 34145

CYPERACEAE

Bulbostylis capillaris (Linnaeus) C.B. Clarke: 2, 7; P 34400
Carex bicknellii Britton: 2; P 34395
Carex cumulata (L.H. Bailey) Mackenzie: 7; P 34631
Carex foenea Willdenow: 1; P 34093
Carex lacustris Willdenow: 6; P 34229
Carex muhlenbergii Schkuhr ex Willdenow: 1, 3; P 34148
Carex normalis Mackenzie: 6; P 34235
Carex pellita Muhlenberg: 6; P 34159
Carex pensylvanica Lamarck: 1, 2, 3; P 34085
Carex scoparia Schkuhr ex Willdenow: 2; P 34230, P 34636
Carex swanii (Fernald) Mackenzie: 2; P 34162
Carex tribuloides Wahlenberg: 2; P 34629
Carex umbellata Schkuhr: 1, 3; P 34113
Carex vulpinoidea Michaux: 6; P 34231
Cyperus filiculmis Vahl var. macilentus: 1, 3, 7; P 34522
Cyperus schweinitzii Torrey: 1, 3, 7; P 34528
Cyperus strigosus Linnaeus: 6, 7; P 34633; P 34839
Eleocharis erythropoda Steudel: 6; P 34561
Eleocharis obtusa (Willdenow) Schultes var. *detonsa* Drapalik & Mohlenbrock: 6; P 34558
Fimbristylis autumnalis (Linnaeus) Roemer & Schultes: 2, 7; P 34637
Fimbristylis puberula (Michaux) Vahl: 2, 7; P 34396
Rhynchospora capitellata (Michaux) Vahl: 7; P 34649
Scirpus cyperinus (Linnaeus) Kunth: 6, 7; P 34543

IRIDACEAE

**Iris flavescens* Delile: 7; P 34143
**Iris germanica* Linnaeus: 7; P 34169
Iris shrevei Small: 6, 7; P 34228
Sisyrinchium albidum Rafinesque: 1, 3; P 34095

JUNCACEAE

Juncus acuminatus Michaux: 6; P 34555
Juncus brachycarpus Engelmann: 6; P 34554
Juncus dudleyi Wiegand: 3, 6, 7; P 34553
Juncus greenei Oakes & Tuckerman: 2; P 34624
Juncus interior Wiegand: 2, 6; P 34397, P 34551
Juncus marginatus Rostkovius: 2, 6; P 34556
Luzula bulbosa (A. Wood) B.B. Smyth & L.C.R. Smyth: 2; P 34241

LILIACEAE

**Asparagus officinalis* Linnaeus: 1, 7; P 34831
**Convallaria majalis* Linnaeus: 7; P 34240
**Hemerocallis fulva* (Linnaeus) Linnaeus: 2, 7; P 34239
**Lilium dauricum* Ker: 7; P 34193
Maianthemum racemosum (Linnaeus) Link: 1, 2; P 34170
Maianthemum stellatum (Linnaeus) Link: 1, 2; P 34097
Polygonatum biflorum (Walter) Elliott: 1, 2; P 34184
**Yucca filamentosa* Linnaeus: 7; P 34407

ORCHIDACEAE

Platanthera lacera (Michaux) G. Don: 6; P 34299

POACEAE

Agrostis gigantea Roth: 2, 6; P 34545
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg: 6, 7; P 34233
Alopecurus carolinianus Walter: 6, 7; P 34157
Andropogon gerardii Vitman: 1, 2, 3; P 34737; P 34808
Andropogon virginicus Linnaeus: 7; P 34853
Aristida longespica Poiret var. *geniculata* (Rafinesque) Fernald: 1, 2, 7; P 34822
Aristida purpurascens Poiret: 1, 2, 3, 7; P 34806
Bouteloua curtipendula (Michaux) Torrey: 1; P 34562
**Bromus commutatus* Schrader: 7; P 34166
**Bromus inermis* Leysser: 7; P 34167
Calamagrostis stricta (Timm) Koeler: 1, 6; P 34234, P 34987
Cenchrus longispinus (Hackel) Fernald: 7; P 34669
**Digitaria ischaemum* (Schreber) Muhlenberg: 1, 2, 7; P 34802, P 34821
**Digitaria sanguinalis* (Linnaeus) Scopoli: 1, 2, 7; P 34530
Echinochloa muricata (P. Beauvois) Fernald var. *muricata*: 6; P 34847
Elymus canadensis Linnaeus: 1; P 34392
**Elytrigia repens* (Linnaeus) Nevski: 7; P 34614
Eragrostis pectinacea (Michaux) Nees: 7; P 34673
Eragrostis spectabilis (Pursh) Steudel: 1, 2, 3; P 34734
Koeleria pyramidata (Lamarck) P. Beauvois: 1, 3; P 34149
Leersia oryzoides (Linnaeus) Swartz: 6; P 34834
Leptoloma cognatum (Schultes) Chase: 1, 3; P 34625
Muhlenbergia mexicana (Linnaeus) Trinius: 6; P 34856
Panicum depauperatum Muhlenberg: 1,3; P 34172

Panicum dichotomiflorum Michaux: 7; P 34820
Panicum lanuginosum Elliott var. *lindheimeri* (Nash) Fernald: 1, 2, 3, 7; P 34244
Panicum oligosanthes Schultes: 1, 3; P 34164
Panicum villosissimum Nash: 1, 2, 3, 7; P 34147, P 34238
Panicum virgatum Linnaeus: 1, 2, 3, 7; P 34535
Paspalum setaceum Michaux var. *stramineum* (Nash) D.J. Banks: 1, 3, 7; P 34620
**Poa compressa* Linnaeus: 1, 3; P 34180
**Poa pratensis* Linnaeus: 1, 2, 3, 6, 7; P 34117
Schizachyrium scoparium (Michaux) Nash: 1, 2, 3; P 34805
**Secale cereale* Linnaeus: 7; P 34118
**Setaria faberi* R.A.W. Herrmann: 1, 7; P 34632
**Setaria glauca* (Linnaeus) P. Beauvois: 7; P 34654
**Setaria viridis* (Linnaeus) P. Beauvois: 7; P 34860
Sorghastrum nutans (Linnaeus) Nash: 1, 2, 3, 7; P 34803
Spartina pectinata Link: 6, 7; P 34859
Sphenopholis obtusata (Michaux) Scribner var. *major* (Torrey) K.S. Erdman: 6; P 34232
Sporobolus clandestinus (Biehler) A. Hitchcock: 1, 3; P 34816
Sporobolus cryptandrus (Torrey) A. Gray: 1, 3; P 34618
Sporobolus heterolepis A. Gray: 2; P 34827
Stipa spartea Trinius: 1, 3; P 34146
Tridens flavus (Linnaeus) A. Hitchcock: 1, 3, 7; P 34619
Triplasis purpurea (Walter) Chapman: 1, 2, 3; P 34733
Vulpia octoflora (Walter) Rydberg: 1, 3, 7; P 34171

TYPHACEAE

Typha latifolia Linnaeus: 6; P 34994

DICOTS

AMARANTHACEAE

Froelichia floridana (Nuttall) Moquin-Tandon: 1, 3; P 34615
**Froelichia gracilis* (Hooker) Moquin-Tandon: 7; P 34861

ANACARDIACEAE

Rhus copallina Linnaeus: 1, 2, 3; P 34627
Rhus glabra Linnaeus: 1, 2, 3, 7; P 34404
Rhus typhina Linnaeus: 1, 2, 3, 6; P 34214
Toxicodendron radicans (Linnaeus) Kuntze: 1; P 35002

APIACEAE

Cicuta maculata Linnaeus: 6; P 34546
**Daucus carota* Linnaeus: 7; P 34639
Eryngium yuccifolium Michaux: 2; P 34628
Thaspium barbinode (Michaux) Nuttall: 2, 7; P 34168

APOCYNACEAE

Apocynum cannabinum Linnaeus: 6; P 34858

AQUIFOLIACEAE

Ilex verticillata (Linnaeus) A. Gray: 2; P 34739

ASCLEPIADACEAE

Asclepias amplexicaulis J.E. Smith: 1, 3; P 34245
Asclepias syriaca Linnaeus: 6, 7; P 34409
Asclepias tuberosa Linnaeus: 1, 3; P 34393
Asclepias verticillata Linnaeus: 1, 2, 3, 7; P 34539

ASTERACEAE

**Achillea millefolium* Linnaeus: 1, 2, 3, 7; P 34187
Ambrosia artemisiifolia Linnaeus: 1, 7; P 34801
Ambrosia psilostachya de Candolle: 1; P 34798
Ambrosia trifida Linnaeus: 7; P 34730
Antennaria plantaginifolia (Linnaeus) Richardson: 1, 2, 3, 7; P 34096
**Artemisia absinthium* Linnaeus: 7; P 34995
Artemisia campestris Linnaeus: 1, 2, 3; P 34617
Aster azureus Lindley: 1, 2, 3; P 34979
Aster borealis (Torrey & A. Gray) Provancher: 2, 6; P 34844
Aster ericoides Linnaeus: 1, 2; P 34980
Aster linariifolius Linnaeus: 1, 2, 3; P 34988
Aster novae-angliae Linnaeus: 7; P 34998
Aster pilosus Willdenow: 1, 2, 7; P 34981
Aster sericeus Ventenat: 1; P 34817
Aster simplex Willdenow: 6, 7; P 34991
Aster umbellatus Miller: 6; P 34845
Bidens coronata (Linnaeus) Britton: 6; P 34823
Bidens frondosa Linnaeus: 6; P 34842
Cirsium altissimum (Linnaeus) Sprengel: 1; P 34814
Conyza canadensis (Linnaeus) Cronquist: 1, 2, 3, 7; P 34731
Coreopsis palmata Nuttall: 1, 2; P 34406
Coreopsis tripteris Linnaeus: 1; P 34736
Erechtites hieracifolia (Linnaeus) Rafinesque: 2, 6, 7; P 34824
Erigeron annuus (Linnaeus) Persoon: 1, 7; P 34221
Erigeron strigosus Muhlenberg: 1, 2; P 34185
Eupatorium perfoliatum Linnaeus: 6, 7; P 34838
Eupatorium serotinum Michaux: 2, 6, 7; P 34825
Euthamia gymnospermoides Greene: 1, 2, 3, 7; P 34983
Gnaphalium obtusifolium Linnaeus: 1, 2, 7; P 34813
Helianthus divaricatus Linnaeus: 1, 2, 3, 7; P 34536, P 34671
Helianthus grosseserratus M. Martens: 6; P 34661
Helianthus mollis Lamarck: 2; P 34672
Helianthus occidentalis Riddell: 1, 2, 3; P 34622
Hieracium gronovii Linnaeus: 1, 2; P 34531

Krigia biflora (Walter) Blake: 2, 6; P 34160
Krigia virginica (Linnaeus) Willdenow: 1, 2, 3; P 34088
Lactuca canadensis Linnaeus: 1, 7; P 34819
**Lactuca serriola* Linnaeus: 7; P 34857
Liatris aspera Michaux: 1, 2, 3; P 34804
Liatris spicata (Linnaeus) Willdenow: 2; P 34630
Parthenium integrifolium Linnaeus: 2; P 34401
Prenanthes aspera Michaux: 2; P 34809
Rudbeckia hirta Linnaeus: 2; P 34215
Senecio plattensis Nuttall: 1, 7; P 34084; P 34189
Solidago canadensis Linnaeus: 6, 7; P 34811
Solidago gigantea Aiton: 1, 2; P 34818
Solidago juncea Aiton: 1, 2, 7; P 34635
Solidago nemoralis Aiton: 1, 2, 3; P 34815, P 34984
Solidago rugosa Miller: 2; P 34828
Solidago speciosa Nuttall: 1, 2, 3; P 34978
**Tragopogon dubius* Scopoli: 1, 2, 3, 7; P 34144

BIGNONIACEAE

**Catalpa speciosa* (Warder) Engelmann: 7; P 34642

BORAGINACEAE

Hackelia virginiana (Linnaeus) I.M. Johnston: 1, 3, 7; P 34659
Lithospermum caroliniense (J.F. Gmelin) MacMillan: 1, 2, 3; P 34182
Myosotis verna Nuttall: 1, 2, 3; P 34161

BRASSICACEAE

Arabis lyrata Linnaeus: 1; P 34112
Cardamine pensylvanica Willdenow: 2, 6, 7; P 34092
Descurainia pinnata (Walter) Britton: 2; P 34242
Draba reptans (Lamarck) Fernald: 1; P 34115
**Eriophila verna* (Linnaeus) Chevalier: 1; P 34116
**Lepidium densiflorum* Schrader: 1, 3; P 34186
Lepidium virginicum Linnaeus: 1, 3; P 34150
**Nasturtium officinale* R. Brown: 6, 7; P 34300
Rorippa islandica (Oeder) Borbas var. *fernaldiana* Butters & Abbe: 6; P 34550

CAESALPINACEAE

Cassia fasciculata Michaux: 1, 2, 3, 7; P 34524
Cassia nictitans Linnaeus: 1, 2; P 34542

CAMPANULACEAE

Campanula aparinoides Pursh: 6; P 34658
Lobelia siphilitica Linnaeus: 6, 7; P 34832
Triodanis perfoliata (Linnaeus) Nieuwland var. *perfoliata*: 1, 2, 3, 7; P 34188

CAPRIFOLIACEAE

Diervilla lonicera Miller: 2; P 34999
**Lonicera x bella* Zabel: 7; P 34108
Sambucus canadensis Linnaeus: 6; P 34224

CARYOPHYLLACEAE

**Arenaria serpyllifolia* Linnaeus: 7; P 34181
**Cerastium vulgatum* Linnaeus: 7; P 34101
**Dianthus armeria* Linnaeus: 6, 7; P 34656
Paronychia canadensis (Linnaeus) A.W. Wood: 2; P 34830
**Saponaria officinalis* Linnaeus: 7; P 34394
Silene antirrhina Linnaeus: 7; P 34218
Silene stellata (Linnaeus) Aiton f.: 2; P 34541

CHENOPODIACEAE

Chenopodium desiccatum A. Nelson: 1, 2, 3; P 34849
Cycloloma atriplicifolium (Sprengel) J.M. Coulter: 1, 7; P 34389

CISTACEAE

Helianthemum canadense (Linnaeus) Michaux: 1, 2, 3; P 34989
Lechea villosa Elliott: 1, 2, 3; P 34626

CONVOLVULACEAE

Calystegia sepium (Linnaeus) R. Brown: 6; P 34855

CORNACEAE

Cornus obliqua Rafinesque: 6; P 34191

ERICACEAE

Gaylussacia baccata (Wangenheim) K. Koch: 2; P 34120
Vaccinium angustifolium Aiton: 2; P 34109

EUPHORBIACEAE

Acalypha gracilens A. Gray: 7; P 34852
Acalypha rhomboidea Rafinesque: 6; P 34841
Croton glandulosus Linnaeus: 1, 2, 3, 7; P 34520
Euphorbia corollata Linnaeus: 1, 2, 3; P 34521
Poinsettia dentata (Michaux) Klotzsch & Garcke var. dentata: 7; P 34668

FABACEAE

Amorpha canescens Pursh: 1, 2, 3; P 34402
Amphicarpaea bracteata (Linnaeus) Fernald: 1; P 34990
Apios americana Medikus: 1, 6; P 34640
Baptisia lactea (Rafinesque) Thieret: 2; P 34399
Baptisia leucophaea Nuttall: 1, 2; P 34386
Desmodium illinoense A. Gray: 1, 3; P 34525
Desmodium nudiflorum (Linnaeus) de Candolle: 2; P 34665
Desmodium sessilifolium (Torrey) Torrey & Gray: 1; P 34621
**Kummerowia stipulacea* (Maximowicz) Makino: 7; P 343670
Lathyrus palustris Linnaeus: 6; P 34222
Lespedeza capitata Michaux: 1, 2, 3; P 34735
Lespedeza hirta (Linnaeus) Hornemann: 2; P 34810
Lupinus perennis Linnaeus: 2; P 34385
**Medicago lupulina* Linnaeus: 7; P 34190
**Melilotus alba* Medikus: 1, 7; P 34391
Strophostyles helvola (Linnaeus) Elliott: 1, 7; P 34388
Tephrosia virginiana (Linnaeus) Persoon: 1, 2, 3; P 34526
**Trifolium pratense* Linnaeus: 7; P 34216

FAGACEAE

Quercus alba Linnaeus: 1, 2, 7; P 34091, P 34650
Quercus palustris Müenchhausen: 2; P 34986
Quercus velutina Lamarck: 1, 2, 7; P 35001

GENTIANACEAE

Gentiana puberulenta J. Pringle: 2; P 34982
Gentiana saponaria Linnaeus: 2; P 34985

HYPERICACEAE

Hypericum gentianoides (Linneus) Britton, Sterns, & Poggenburg: 2, 7; P 34533
Hypericum majus (A. Gray) Britton: 6; P 34645
Hypericum mutilum Linnaeus: 6, 7; P 34549
**Hypericum perforatum* Linnaeus: 7; P 34212

LAMIACEAE

Lycopus americanus Muhlenberg: 6, 7; P 34548
Lycopus virginicus Linnaeus: 6, 7; P 34552
Monarda fistulosa Linnaeus: 7; P 34408
Monarda punctata Linnaeus: 1, 2, 3; P 34523
Physostegia virginiana (Linnaeus) Bentham: 2; P 34807
Prunella vulgaris Linnaeus: 6, 7; P 34644
Pycnanthemum virginianum (Linnaeus) T. Durand & B.D. Jackson: 7; P 34655
Scutellaria leonardii Epling: 1, 3; P 34411
Stachys palustris Linnaeus var. *homotricha* Fernald: 6; P 34664
Stachys tenuifolia Willdenow var. *hispida* (Pursh) Fernald: 6; P 34223, P 34666
Teucrium canadense Linnaeus var. *virginicum* (Linnaeus) Eaton: 1, 6; P 34616

LAURACEAE

Sassafras albidum (Nuttall) Nees: 1, 2, 7; P 34105

LYTHRACEAE

Lythrum alatum Pursh: 6, 7; P 34410
Rotala ramosior (Linnaeus) Koehne: 6; P 34993

MELASTOMATACEAE

Rhexia virginica Linnaeus: 7; P 34529

MOLLUGINACEAE

**Mollugo verticillatus* Linnaeus: 1, 2, 3, 7; P 34527

MORACEAE

**Morus alba* Linnaeus: 7; P 34103

NYSSACEAE

Nyssa sylvatica Marshall: 2; P 35000

OLEACEAE

Fraxinus pennsylvanica Marshall: 7; P 34997

ONAGRACEAE

Epilobium coloratum Muhlenberg: 6; P 34840
Ludwigia alternifolia Linnaeus: 6, 7; P 34560

Oenothera biennis Linnaeus: 1, 2, 7; P 34540
Oenothera rhombipetala Nuttall: 1, 2, 3; P 34390

OXALIDACEAE

Oxalis stricta Linnaeus: 7; P 34648

PLANTAGINACEAE

**Plantago rugelii* Decaisne: 7; P 34641
Plantago virginica Linnaeus: 7; P 34165

POLEMONIACEAE

Phlox bifida L.C. Beck: 1, 2, 3; P 34086
Phlox pilosa Linnaeus: 2; P 34119

POLYGALACEAE

Polygala polygama Walter: 1, 2, 3; P 34243
Polygala sanguinea Linnaeus: 2, 6, 7; P 34398

POLYGONACEAE

Polygonum amphibium Linnaeus: 6, 7; P 34836
Polygonum careyi Olney: 2; Site Record only
**Polygonum convolvulus* Linnaeus: 1, 7; P 34387
**Polygonum hydropiper* Linnaeus: 6; P 34848
Polygonum pensylvanicum Linnaeus: 6, 7; P 34638
Polygonum punctatum Elliott: 6, 7; P 34663
Polygonum ramosissimum Michaux: 2, 7; P 34732
Polygonum sagittatum Linnaeus: 6; P 34835
Polygonum scandens Linnaeus: 1; P 34833
Polygonum tenue Michaux: 1, 2, 3; P 34623
**Rumex acetosella* Linnaeus: 1, 2, 3, 7: Site Record only
**Rumex crispus* Linnaeus: 7; P 34192

PORTULACACEAE

Claytonia virginica Linnaeus: 1, 2; P 34098

PRIMULACEAE

Lysimachia lanceolata Walter: 2; P 34651
**Lysimachia nummularia* Linnaeus: 6, 7; P 34301

RANUNCULACEAE

Anemone cylindrica A. Gray: 1, 2; P 34213
Ranunculus abortivus Linnaeus: 7; P 34099
Ranunculus pensylvanicus Linnaeus f.: 6; P 34559
Thalictrum dasycarpum Fischer & Avé-Lallemant: 6; P 34225

RHAMNACEAE

Ceanothus americanus Linnaeus: 1, 2; P 34537

ROSACEAE

Agrimonia parviflora Aiton: 6, 7; P 34667
Aronia prunifolia (Marshall) Rehder: 2; P 34738
Fragaria virginiana Duchesne: 1, 2, 7; P 34094
Geum laciniatum Murray: 6; P 34660
Potentilla norvegica Linnaeus: 6; P 34652
Potentilla simplex Michaux: 1, 2, 6, 7; P 34152
Prunus serotina Ehrhart: 1, 2, 3, 7; P 35004
Rosa carolina Linnaeus: 1, 2, 3; P 34183; P 34812
**Rosa multiflora* Thunberg: 1, 6, 7; P 34163
Rosa setigera Michaux: 6; P 34302
Rubus allegheniensis Porter: 1, 2, 3; P 34155
Rubus flagellaris Willdenow: 1, 2, 3, 6, 7; P 34154
Rubus hispidus Linnaeus: 1, 2, 6, 7; P 34237
Rubus occidentalis Linnaeus: 1, 2, 6, 7; P 34156
Rubus schneideri Bailey: 6; P 34158
Spiraea alba Du Roi: 2; P 34657
Spiraea tomentosa Linnaeus: 2; P 34634

RUBIACEAE

Galium aparine Linnaeus: 1, 2, 6, 7; P 34151
Galium obtusum Bigelow: 6, 7; P 34544
Galium pilosum Aiton: 1, 2, 3; P 34538

SALICACEAE

Populus deltoides Marshall: 7; P 34851
Populus tremuloides Michaux: 2, 7; P 34826
Salix discolor Muhlenberg: 6; P 34089
Salix exigua Nuttall: 6, 7; P 34090
Salix humilis Marshall: 1, 2, 3; P 34114

SANTALACEAE

Comandra umbellata (Linnaeus) Nuttall: 1, 2, 3; P 34121

SCROPHULARIACEAE

Agalinis tenuifolia (Vahl) Rafinesque: 6; P 34843
Aureolaria pedicularia Linnaeus: 1, 2; P 34829
Gratiola neglecta Torrey: 6; P 34226
Linaria canadensis (Linnaeus) Dumont Courset: 1, 2, 3, 7; P 34087
Pedicularis lanceolata Michaux: 6; Site record only
Scrophularia lanceolata Pursh: 1; P 34219
**Verbascum thapsus* Linnaeus: 1, 7; P 34643
**Veronica arvensis* Linnaeus: 6, 7; P 34100
Veronicastrum virginicum (Linnaeus) Farwell: 2; P 34534

SOLANACEAE

Physalis heterophylla Nees: 6; P 34653
Physalis virginiana Miller: 1, 2, 3, 7; P 34217
Solanum carolinense Linnaeus: 1, 3, 7; P 34405
**Solanum dulcamara* Linnaeus: 6; P 34153

ULMACEAE

**Ulmus pumila* Linnaeus: 7; P 34996

URTICACEAE

Boehmeria cylindrica (Linnaeus) Swartz: 6; P 34855
Parietaria pensylvanica Muhlenberg: 6; P 34227
Pilea pumila (Linnaeus) A. Gray: 6; P 34992

VERBENACEAE

Verbena hastata Linnaeus: 6; P 34646

VIOLACEAE

Viola lanceolata Linnaeus: 6, 7; P 34102
Viola pedata Linnaeus: 1, 2, 3; P 34111
Viola pratincola Greene: 7; P 34107
Viola primulifolia Linnaeus: 6, 7; P 34557, P 34647
Viola sagittata Aiton: 1, 2, 3, 7; P 34110

VITACEAE

Parthenocissus quinquefolia (Linnaeus) Planchon: 7; P 35003
Vitis riparia Michaux: 1, 2, 3, 6; P 34846

APPENDIX 1

The vascular taxa encountered and collected at the Leesville East site are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = dry sand savanna, 2 = dry-mesic sand savanna, 3 = dry sand prairie, 4 = wet sand prairie, 5 = sand flatwoods, 6 = shrub prairie, 7 = cultural). Following the community number(s), collecting numbers or date collected (when collecting number not assigned) preceded by the initial of the collector's name are given (F for Mary Ann Feist, M for Paul B. Marcum, and P for Loy R. Phillippe).

PTERIDOPHYTES

EQUISETACEAE

Equisetum fluviatile Linnaeus: 7; F 1611
Equisetum hyemale Linnaeus: 7; F 2004
Equisetum laevigatum A. Braun: 1: M 1472.2

OSMUNDACEAE

Osmunda cinnamomea Linnaeus: 5; F 1621
Osmunda regalis Linnaeus var. *spectabilis* (Willdenow) A. Gray: 5; F 1597

THELYPTERIDACEAE

Thelypteris palustris Schott var. *pubescens* (Lawson) Fernald: 7; M 1496

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

COMMELINACEAE

Commelina erecta Linnaeus: 1; F 1703
Tradescantia ohiensis Rafinesque: 1; F 1606

CYPERACEAE

Carex cumulata (L.H. Bailey) Mackenzie: 4; M 1475
Carex emmonsii Dewey ex Torrey: 7; F 1587
Carex haydenii Dewey: 5, 7; F 1588, F 1710
Carex longii Mackenzie: 4; F 1714
Carex meadii Dewey: 1; F 1620
Carex muhlenbergii Schkur ex Willdenow: 1; F 1614
Carex pensylvanica Lamarck: 1; F 1602
Carex swanii (Fernald) Mackenzie: 5; F 1622
Carex vulpinoidea Michaux: 7; F 1902
Cyperus esculentus Linnaeus: 7; F 1979
Cyperus filliculmis Vahl var. *macilentus* Fernald: 1, 2, 7; F 1701, F 2039
Cyperus strigosus Linnaeus: 1; F 2041
Eleocharis obtusa (Willdenow) Schultes var. *obtusa*: 7; M 1505
Eleocharis wolfii A. Gray: 7; F 1973
Fimbristylous autumnalis (Linnaeus) Roemer & Schultes: 5, 7; F 1974, F 2046
Rhynchospora capitellata (Michaux) Vahl: 4, 7; F 1975, F 1996.2, M 1468
Scirpus cyperinus (Linnaeus) Kunth: 7; M 1503
Scleria triglomerata Michaux: 4, 5, 7; F 1712, F 1894, F 1901

IRIDACEA

Iris shrevei Small: 4, 5; F 1630
Sisyrinchium albidum Rafinesque: 1; F 1617
Sisyrinchium atlanticum Bicknell: 5; F 1626

JUNCACEAE

Juncus acuminatus Michaux: 5, 7; F 1717, F 1903, M 1504
Juncus biflorus Elliott: 7; F 1995
Juncus dudleyi Wiegand: 4, 5; F 1713, F 1892
Juncus greenei Oakes & Tuckerman: 2; M 1459
Juncus marginatus Rostkovius: 4; F 1896, M 1465
Juncus tenuis Willdenow: 7; F 1987
Luzula bulbosa (A. Wood) B.B. Smyth & L.C.R. Smyth: 1; F 1595

LILIACEAE

Aletris farinosa Linnaeus: 4, 5, 7; F 1722
Hypoxis hirsuta (Linnaeus) Coville: 5; F 1631
Lilium michiganense Farwell: 7; F 1917
Maianthemum racemosa (Linnaeus) Link: 1; F 1910
Maianthemum stellata (Linnaeus) Link: 1, 7; F 1731

ORCHIDACEAE

Spirathes vernalis Engelmann & A. Gray: 5, 7; F 2032

POACEAE

Agrostis gigantea Roth: 7; F 1908, F 1909, M 1482
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg: 1; P 34175
Andropogon gerardii Vitman: 7; F 1977
Aristida purpurascens Poiret: 1; F 2022
Bouteloua curtipendula (Michaux) Torrey: 1; M 1507
**Bromus commutatus* Schrader: 1; F 1637.1
**Bromus tectorum* Linnaeus: 1; F 1637.2
Calamagrostis canadensis (Michaux) P. Beauvois: 5; F 1707
Cenchrus longispinus (Hackel) Fernald: 7; F 1928
**Elytrigia repens* (Linnaeus) Nevski: 7; F 1907
Eragrostis spectabilis (Pursh) Steuedel: 2; F 2017
Koeleria pyrimidata (Lamarck) P. Beauvois: 1; F 1609
Leersia oryzoides (Linnaeus) Swartz: 7; F 1983
Leptoloma cognatum (Schultes) Chase: 1; Site Record only
Panicum dichotomiflorum Michaux: 7; F 1988
Panicum lanuginosum Elliott var. *lindheimeri* (Nash) Fernald: 7; F 1980, F2040
Panicum oligosanthes Schultes: 1; F 1721, P 34177
Panicum villosissimum Nash: 1; F 1604, P 34174
Panicum rigidulum Nees: 4; F 2042
Panicum virgatum Linnaeus: 4; F 1893
Paspalum laeve Michaux: 7; F 1978
Paspalum setaceum Michaux var. *stramineum* (Nash) D.J. Banks: 7; M 1488
**Poa pratensis* Linnaeus: 1, 7; F 1593
Schizachyrium scoparium (Michaux) Nash: 1; F 2029
Sorghastrum nutans (Linnaeus) Nash: 1; F 2028
Spartina pectinata Link: 7; F 1984
Sporobolus clandestinus (Biehler) A. Hitchcock: 1; Site Record only
Sporobolus cryptandrus (Torrey) A. Gray; 1; Site Record only
Sporobolus heterolepsis A. Gray: 1; F 2037
Stipa spartea Trinius: 1; F 1704
Tridens flavus (Linnaeus) A. Hitchcock: 1; 2030
Triplasis purpurea (Walter) Chapman: 1; F 2021
Vulpia octoflora (Walter) Rydberg: 7; F 1633

XYRIDACEAE

Xyris torta J.E. Smith: 2; M 1460

DICOTS

AMARANTHACEAE

Froelichia floridana (Nuttall) Moquin-Tandon var. *campestris* (Small) Fernald: 2; M 1490

ANACARDIACEAE

Rhus copallina Linnaeus: 1, 2, 4; F 1887, M 1472.1
Rhus glabra Linnaeus: 1, 7; F 1732, F 2023
Rhus typhina Linnaeus: 1; F 1696

Toxicodendron radicans (Linnaeus) Kuntze: 1; Site Record only

APIACEAE

Cicuta maculata Linnaeus: 7; F 1916
Eringium yuccifolium Michaux: 2, 7; F 1976
Oxypolis rigidior (Linnaeus) Rafinesque: 7; M 1498

APOCYNACEAE

Apocynum cannabinum Linnaeus: 7; F 1904

ASCLEPIADACEAE

Asclepias hirtella (Pennell) Woodson: 2; F 2014
Asclepias syriaca Linnaeus: 7; F 1918
Asclepias tuberosa Linnaeus: 1; F 1697
Asclepias verticillata Linnaeus: 1, 7; F 1728, M 1484

ASTERACEAE

**Achillea millefolium* Linnaeus: 1; F 1618
Ambrosia artemesiifolia Linnaeus: 7; F 1989
Antennaria plataginifolia (Linnaeus) Richardson: 1; F 1605
Artemesia campestris Linnaeus: 1, 2; M 1508
Aster azureus Lindley: 2; F 2049
Aster ericoides Linnaeus: 1; F 2027
Aster linariifolius Linnaeus: 2; F 2034
Aster umbellatus Miller: 4; F 2031, M 1473
Bidens frondosa Linnaeus: 5; F 2047
Circium discolor (Muhlenberg) Sprengel: 7; F 2009
Conyza canadensis (Linnaeus) Cronquist: 7; M 1483
Coreopsis palmata Nuttall: 1, 7; F 1699, M 1477
Coreopsis tripteris Linnaeus: 1; M 1502
Erechtites hieracifolia (Linnaeus) Rafinesque: 5; F 2048
Erigeron strigosus Muhlenberg: 1; F 1619, P34179
Eupatorium perfoliatum Linnaeus: 7; F 1968
Euthamia gymnospermoides Greene; 1; F 2031
Gnaphalium obtusifolium Linnaeus: 7; F 1972
Helianthus divaricatus Linnaeus: 1; F 1885, M 1489
Helianthus mollis Lamarck: 2: M 1456
Helianthus occidentalis Riddell: 1, 2; M 1509
Hieracium gronovii Linnaeus: 1, 7; F 1897, F 2131, P 34795.2
Hieracium scabrum Michaux: 1, 2, 7; F 2001, M 1455, P 34795.1
Krigia biflora (Walter) Blake: 1; F 1607
Krigia virginica (Linnaeus) Willdenow: 1; F 1601
Lactuca canadensis Linnaeus: 7; M 1480
Liatrus aspera Michaux: 7; F 2035
Liatrus spicata (Linnaeus) Willdenow: 4; F 1895, M 1474
Parthenium integrifolium Linnaeus: 1, 2; F 1888, M 1476

Rudbeckia hirta Linnaeus: 2; F 1698
Solidago gigantea Aiton: 7; F 1969
Solidago juncea Aiton: 7; F 1926
Solidago missouriensis Nuttall: 2; M 1457
Solidago nemoralis Aiton: 2; F 2016, F 2051
Solidago speciosa Nuttall: 2; F 2050
**Tragopogon dubius* Scopoli: 1; P 34176
Vernonia gigantea (Walter) Trelease: 7; M 1495
Vernonia missurica Rafinesque: 7; F 1967

BORAGINACEAE

Lithospermum caroliniense (J.F. Gmelin) MacMillan: 1, 2; F 1605

BRASSICACEAE

Arabis lyrata Linnaeus: 1; F 1599
**Lepidium densiflorum* Schrader: 7; F 1634

CAESALPINACEAE

Cassia fasiculata Michaux: 1; F 1886
Cassia nictitans Linnaeus: 2; C 21

CAMPANULACEAE

Campanula aparinoides Pursh: 7; M 1497
Lobelia siphilitica Linnaeus: 7; F 2003
Lobelia spicata Lamarck: 1, 7; M 1478
Triodanis perfoliata (Linnaeus) Nieuwland: 7; F 1635

CANNABACEAE

**Cannabis sativa* Linnaeus: 7; M 1487

CARYOPHYLLACEAE

**Saponaria officinalis* Linnaeus: 7; F 1729
Silene stellata (Linnaeus) Aiton f.: 7; F 1925

CHENOPODIACEAE

Chenopodium desiccatum A. Nelson: 7; F 1927
Cycloloma atriplicifolium (Sprengel) J.M. Coulter: 7; M 1510

CISTACEAE

Helianthemum canadense (Linnaeus) Michaux: 1; F 1603
Lechea pulchella Rafinesque: 2; F 1890
Lechea villosa Elliott: 1; F 1705, M 1500

CONVOLVULACEAE

Calystegia sepium (Linnaeus) R. Brown: 7; F 1986

ERICACEA

Gaylussacia baccata (Wangenheim) K. Koch: 5, 7; F 1598, P34794
Vaccinium angustifolium Aiton: 5, 7; F 1625

EUPHORBIACEAE

Acalypha rhomboidea Rafinesque: 5; F 2043
Chamaesyce supina (Rafinesque) Moldenke: 7; M 1511
Croton glandulosus Linnaeus var. *septentrionalis* Mueller-Argoviensis: 7; M 1486
Euphorbia corollata Linnaeus: 2; F 1700

FABACEAE

Amorpha canescens Pursh: 1; F 1694
Baptisia x deamii Larisey: 7; F 1898
Baptisia lactea (Rafinesque) Thieret: 4, 5, 7; F 1906, F 1711
Baptisia leucophaea Nuttall: 1; P 34178
Baptisia tinctoria (Linnaeus) R. Brown: 7; F 1900
Desmodium paniculatum (Linnaeus) de Candolle: 7; F 1998
Desmodium sessilifolium (Torrey) Torrey & Gray: 1; F 2019
Lespedeza capitata Michaux: 1; F 2038
Lespedeza hirta (Linnaeus) Hornemann: 2, 7; F 1999, P 34796
Lespedeza virginica (Linnaeus) Britton: 1, 2; M 1501, P 34797
Tephrosia virginiana (Linnaeus) Persoon: 1, 2; F 1695

FAGACEAE

Quercus alba Linnaeus: 2, 7; F 1905
Quercus palustris Müenchhausen: 5; Site Record only
Quercus velutina Lamarck: 1, 2; Site Record only

GENTIANACEAE

Bartonia virginica (Linnaeus) Britton, Sterns, & Poggenburg: 2, 5; F 1889

HYPERICACEAE

Hypericum adpressum Barton: 7; F 1994
Hypericum canadense Linnaeus: 4; M 1471
Hypericum gentianoides (Linnaeus) Britton, Sterns, & Poggenburg: 7; M 1464
Hypericum gymnanthum Engelmann & A. Gray: 4; M 1469
Hypericum mutilum Linnaeus: 4; M 1470
**Hypericum perforatum* Linnaeus: 7; M 1481
Hypericum punctatum Lamarck: 7; F 2006

LAMIACEAE

Lycopus americanus Muhlenberg: 7; F 1914
Lycopus uniflorus Michaux: 7; F 2011.1
Lycopus virginicus Linnaeus: 7; F 1985
Monarda fistulosa Linnaeus: 1; F 1720
Monarda punctata Linnaeus var. *villicaulis* (Pennell) Shinners: 1, 7; F 1929
Physostegia virginiana (Linnaeus) Bentham: 7; F 2036
Pycnanthemum virginianum (Linnaeus) T. Durand & B.D. Jackson: 7; F 1915, F 2007
Scutellaria galericulata Linnaeus: 7; F 2010
Scutellaria leonardii Epling: 1; F 1594
Stachys tenuifolia Willdenow var. *hispida* (Pursh) Fernald: 7; F 1971

LINACEAE

Linum medium (Planchon) Britton var. *texanum* (Planchon) Fernald: 2, 7; F 2013, M 1493

LYTHRACEAE

Lythrun alatum Pursh: 7; F 1912
Rotala ramosier (Linnaeus) Koehne: 5; F 2045

MELASTOMATACEAE

Rhexia virginica Linnaeus: 2, 7: M 1461

MOLLUGINACEAE

**Mollugo verticilatus* Linnaeus: 1, 2; Site Record only

ONAGRACEAE

Ludwigia alternifolia Linnaeus; 7: F 1981
Oenothera rhombipetala Nuttall; 1: F 1693

OXALIDACEAE

Oxalis stricta Linnaeus: 7; M 1513

PLANTAGINACEAE

**Plantago lanceolata* Linnaeus: 7; F 1730

POLEMONIACEAE

Phlox bifida L.C. Beck: 1, 2; Site Record only
Phlox glaberrima Linnaeus ssp. *interior* (Wherry) Wherry: 7; F 1923

POLYGALACEAE

Polygala cruciata Linnaeus var. *aquilonia* Fernald: 4, 5; F 2052, M 1467
Polygala polygama Walter: 1, 2; Site Record only
Polygala sanguinea Linnaeus: 4; F 1709, F 1891

POLYGONACEAE

Polygonum amphibium Linnaeus var. *emersum* Michaux: 7; F 2013
Polygonum careyi Olney: 7; F 1992, M 1462
**Polygonum hydropiper* Linnaeus: 7; F 1981
Polygonum hydropiperoides Michaux: 5; F 2044
Polygonum lapathifolium Linnaeus: 7; F 1996.1
Polygonum opelousanum Riddell: 7; M 1506
Polygonum pensylvanicum Linnaeus: 7; M 1466
Polygonum sagittatum Linnaeus: 7; F 2001
Polygonum scandens Linnaeus: 7; F 2000
Polygonum tenue Linnaeus: 1; F 2020
**Rumex acetosella* Linnaeus: 1, 7; F 1612

PORTULACACEAE

Claytonia virginica Linnaeus: 1; F 1610
Talinum rugospermum Holzinger: 1; F 2128

PRIMULACEAE

Lysimachia lanceolata Walter: 5; F 1715

RANUNCULACEAE

Anemone cylindrica A. Gray: 1, 7; F 1719, M 1479
Anemone quinquefolia Linnaeus: 5; F 1632
Ranunculus pensylvanicus Linnaeus: 7; F 2012

RHAMNACEAE

Ceonothus americanus Linnaeus: 1, 2, 7; F 1702, M 1485

ROSACEAE

Agrimonia parviflora Aiton: 7; F 2005
Aronia melanocarpa (Michaux) Elliott: 5; F 1623
Fragaria virginiana Duchesne: 1; F 1613
Potentilla norvegica Linnaeus: 7; F 1997
Potentilla simplex Michaux: 1; F 1592
Prunus serotina Ehrhart: 7; F 1924
Rosa carolina Linnaeus: 1, 2; P 34173
**Rosa multiflora* Thunberg: 1; F 1616
Rubus allegheniensis Porter: 7; F 1591
Rubus flagellaris Willdenow: 1, 2; Site Record only
Rubus hispidus Linnaeus: 4, 5; F 1708
Rubus pensylvanicus Poiret: 5; F 1628, F 1716
Rubus schneideri Bailey: 5, 7; F 1966, F 1920, F 1991
Spiraea alba Du Roi: 7; F 1970, M 1494
Spiraea tomentosa Linnaeus: 2; M 1463

RUBIACEAE

Diodia teres Walter: 7; M 1512
Galium aparine Linnaeus: 7; F 1589
Galium boreale Linnaeus: 7; F 1922
Galium pilosum Aiton: 7; F 1911
Galium tinctorium Linnaeus: 7; F 2011.2
Hedyotis caerulea (Linnaeus) Hooker: 5; F 1629

SALICACEAE

Populus tremuloides Michaux: 4; F 1706
Salix exigua Nuttall: 7; F 1919
Salix humulis Marshall: 5; F 1590

SANTALACEAE

Comandra umbellata (Linnaeus) Nuttall: 1, 7; F 1636

SCROPHULARIACEAE

Agalinis purpurea (Linnaeus) Pennell: 7; F 1990
Aureolaria pedicularia Linnaeus: 2; F 2018, M 1499
Linaria canadensis (Linnaeus) Dumont-Courset: 1; F 1608
Pedicularis lanceolata Michaux: 7; F 2008
Penstomen digitalis Nuttall: 7; F 1921
Scrophularia lanceolata Pursh: 1; F 1596

Veronicastrum virginicum (Linnaeus) Farwell: 2; F 2014

SOLANACEAE

Physalis virginiana Miller: 1; F 1727

VERBENACEAE

Verbena hastata Linnaeus: 7; F 1913

VIOLACEAE

Viola lanceolata Linnaeus: 5; F 1627
Viola pedata Linnaeus: 1; F 1600
Viola primulifolia Linnaeus: 5, 7; F 1624, F 1993, M 1492
Viola sagittata Aiton: 2; M 1458

APPENDIX 1

The vascular taxa encountered and collected at the Liebert site are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = dry sand savanna, 2 = dry-mesic sand savanna, 3 = dry sand prairie, 4 = wet sand prairie, 5 = sand flatwoods, 6 = shrub prairie, 7 = cultural). Following the community number(s), collecting numbers or date collected (when collecting number not assigned) preceded by the initial of the collector's name are given (B for Daniel T. Busemeyer, and P for Loy R. Phillippe).

PTERIDOPHYTES

ASPLENIACEAE

Asplenium platyneuron (Linnaeus) Britton, Sterns, & Poggenburg: 2; B 917

DENNSTAEDTIACEAE

Pteridium aquilinum (Linnaeus) Kuhn var. *latisculum* (Desvaux) Underwood ex A. Heller: 2; B 1142

DRYOPTERIDACEAE

Onoclea sensibilis Linnaeus: 7; B 988

EQUISETACEAE

Equisetum arvense Linnaeus: 7; B 1013
Equisetum hyemale Linnaeus var. *affine* (Engelmann) A.A. Eaton: 1; B 930

OPHIOGLOSSACEAE

Botrychium virginianum (Linnaeus) Swartz: 2; B 905

OSMUNDACEAE

Osmunda cinnamomea Linnaeus: 7; B 847
Osmunda claytoniana Linnaeus: 7; B 849
Osmunda regalis Linnaeus: 7; B 848

THELYPTERIDACEAE

Thelypteris palustris Schott: 7; B 1149

SPERMATOPHYTES: GYMNOSPERMS

CUPRESSACEAE

Juniperus virginiana Linnaeus: 7; B 897

PINACEAE

**Pinus pungens* Lambert: 7; B 920
**Pinus resinosa* Aiton: 7; B 931

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

ALISMATACEAE

Alisma subcordatum Rafinesque: 7; B 1082

COMMELINACEAE

**Commelina communis* Linnaeus: 7; B 1088
Commelina erecta Linnaeus: 1; B 1021
Tradescantia ohiensis Rafinesque: 1; B 867

CYPERACEAE

Carex emmonsii Dewey ex Torrey: 2; B 855
Carex foenea Willdenow: 1; B 826, B 871
Carex haydenii Dewey: 2; B 854
Carex longii Mackenzie: 2; B 913.1
Carex meadii Dewey: 2; B 822, B 857
Carex muhlenbergii Schkuhr ex Willdenow: 1, 7; B 858
Carex pellita Muhlenberg: 7; B 874
Carex pensylvanica Lamarck: 1, 2; B 809
Carex scoparia Schkuhr ex Willdenow: 2; B 913.2
Carex swanii (Fernald) Mackenzie: 7; B 894
Carex umbellata Schkuhr ex Willdenow: 1; B 919

Carex vulpinoidea Michaux: 7; B 971
Cyperus aristatus Rottbøll: 7; B 980
Cyperus erythrorhizos Muhlenberg: 7; B 1081
Cyperus filiculmis Vahl var. *macilentus* Fernald: 1, 7; B 979
Cyperus x mesochorus Geise: 7; B 994, B 1114
Cyperus strigosus Linnaeus: 2; B 1110
Scirpus cyperinus (Linnaeus) Kunth: 7; B 1050
Scirpus fluviatilis (Torrey) A. Gray: 7; B 1103
Scleria pauciflora Willdenow var. *caroliniana* (Willdenow) A.W. Wood: 1, 2; B 1018
Scleria triglomerata Michaux: 1; B 1019

IRIDACEAE

Sisyrinchium albidum Rafinesque: 1, 7; B 835

JUNCACEAE

Juncus marginatus Rostkovius: 7; B 1077
Juncus tenuis Willdenow: 7; B 952

LEMNACEAE

Lemna gibba Linnaeus: 7; B 875
Lemna minor Linnaeus: 7; B 970

LILIACEAE

**Allium vineale* Linnaeus: 7; B 1054
**Asparagus officinalis* Linnaeus: 7; B 845
Maianthemum racemosum (Linnaeus) Link: 2; B 880
Maianthemum stellatum (Linnaeus) Link: 1; B 814
Polygonatum biflorum (Walter) Elliot: 1, 7; P 34204
**Yucca filamentosa* Linnaeus: 1; B 1027

POACEAE

Agrostis gigantea Roth: 7; B 1015
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg var. *hyemalis*: 2, 7; P 34200
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg var. *scabra* (Willdenow) Blomquist: 1; B 1096
Alopecurus carolinianus Walter: 7; B 940
Andropogon gerardii Vitman: 1, 7; B 1074
Aristata basiramea Engelmann: 1; B 1127
Aristata longespica Poiret var. *geniculata* (Rafinesque) Fernald: 1; P 34800
Aristata oligantha Michaux: 1, 7; B 1104, B 1128
Aristata purpurescens Poiret: 1; B 1130
Bouteloua curtipendula (Michaux) Torrey: 1; B 1144
**Bromus inermis* Leysser: 7; B 898
**Bromus japonicus* Thunberg: 7; B 893

**Bromus tectorum* Linnaues: 7; B 833, P 34202
Calamagrostis canadensis (Michaux) P. Beauvois: 2, 7; B 1023
Calmovilfa longifolia (Hooker) Scribner: 1; B 998
Cenchris longispinus (Hackel) Fernald: 7; B 996.1
**Dactylis glomerata* Linnaeus: 7; B 832
Danthonia spicata (Linnaeus) P. Beauvois: 1; B 918
**Digitaria ischaemum* (Schreber) Muhlenberg: 1, 7; B 1123
**Digitaria sanguinalis* (Linnaeus) Scopoli: 1, 7; B 996.2, B 1067, B 1125
**Eleusine indica* (Linnaeus) J. Gaertner: 7; B 986
Elymus canadensis Linnaeus: 1; B 999
Elymus virginicus Linnaeus: 2; B 1028
**Eragrostis cilianensis* (Allioni) Janchen: 7; B 984, B 1066,
Eragrostis pectinacea (Michaux) Nees: 7; B 1070
Eragrostis spectabilis (Pursh) Steudel: 1, 7; B 1075, B 1122
Glyceria septentrionalis Hitchcock: 7; B 941
Koeleria pyramidata (Lamarck) P. Beauvois: 1; B 944
Leersia oryzoides (Linnaeus) Swartz: 7; B 1116
Leptoloma cognatum (Schultes) Chase: 1; B 1120
**Lolium perenne* Linnaeus: 7; B 915, B 968
Muhlenbergia mexicana (Linnaeus) Trinius: 2, 7; B 1118, B 1143
Panicum capillare Linnaeus: 7; B 1113
Panicum dichotomiflorum Michaux: 7; B 1080
Panicum lanuginosum Elliott var. *lindheimeri* (Nash) Fernald: 2; B 916
**Panicum miliaceum* Linnaeus: 7; B 1042
Panicum oligosanthes Schultes: 1; B 928, B 1095
Panicum perlongum Nash: 1; B 927
Panicum villosissimum Nash: 1, 7; B 891
Panicum virgatum Linnaeus: 1, 7; B 1002
Paspalum setaceum Michaux var. *stramineum* (Nash) D.J. Banks: 1; B 995
**Poa pratensis* Linnaeus: 1, 2, 7; B 813
Schizachyrium scoparium (Michaux) Nash: 1; B 1097
**Secale cereale* Linnaeus: 7; B 837
**Setaria faberi* R.A.W. Herrmann: 7; B 983
**Setaria glauca* (Linnaeus) P. Beauvois: 7; B 1043, B 1086
**Setaria viridis* (Linnaeus) P. Beauvois: 7; B 1056
Sorghastrum nutans (Linnaeus) Nash: 1; B 1119
Spartina pectinata Link: 2, 7; B 1022
Sphenopholis obtusata (Michaux) Scribner var. *major* (Torrey) Erdman: 7; P 34208
Sporobolus clandestinus (Biehler) Hitchcock: 1; B 1126
Sporobolus cryptandrus (Torrey) A. Gray: 1; B 1146
Stipa spartea Trinius: 1; B 868
Tridens flavus (Linnaeus) A. Hitchcock: 1, 7; B 1115
Triplasis purpurea (Walter) Chapman: 1, 7; B 992
Vulpia octoflora (Walter) Rydberg: 1; B 866

SPARGANIACEAE

Sparganium androcladum (Engelmann) Morong?: 7; B 1100

SMILICACEAE

Smilax lasioneuron Hooker: 2; B 908

TYPHACEAE

**Typha angustifolia* Linnaeus: 7; B 1147
Typha latifolia Linnaeus: 7; B 1053

DICOTS

ACERACEAE

Acer negundo Linnaeus: 7; B 937
Acer saccharinum Linnaeus: 7; B 1236

AMARANTHACEAE

Amaranthus hybridus Linnaeus: 7; B 1044
Amaranthus retroflexus Linnaeus: 7; B 1068
Froelichia floridana (Nuttall) Moquin-Tandon: 1; B 1046
**Froelichia gracilis* (Hooker) Moquin-Tandon: 7; B 974, B 1045

ANACARDIACEAE

Rhus copallina Linnaeus: 1; B 1026
Rhus glabra Linnaeus: 1; B 947
Rhus typhina Linnaeus: 1; B 958
Toxicodendron radicans (Linnaeus) Kunze: 1, 7; B 907

APIACEAE

Cicuta maculata Linnaeus: 7; B 1010
**Daucus carota* Linnaeus: 7; B 1041, B 1073
Osmorhiza longistylis (Torrey) de Candolle: 2; B 841
**Pastinaca sativa* Linnaeus: 7; B 1051

APOCYNACEAE

Apocynum cannabinum Linnaeus: 2, 7; B 965

AQUIFOLIACEAE

Ilex verticillata (Linnaeus) A. Gray: 2; B 900

ASCLEPIADACEAE

Asclepias amplexicaulis J.E. Smith: 1; P 34196
Asclepias syriaca Linnaeus: 7; B 951
Asclepias tuberosa Linnaeus: 1; B 950
Asclepias verticillata Linnaeus: 1; B 975

ASTERACEAE

Achillea millefolium Linnaeus: 1, 7; B 964, P 34198
Ambrosia artemisiifolia Linnaeus: 1, 7; B 1055
Ambrosia trifida Linnaeus: 7; B 1111
Antennaria neglecta Greene: 1; Site Record only
Antennaria plantaginifolia (Linnaeus) Richardson: 1; B 811
Artemisia campestris Linnaeus: 1; B 1062
Aster azureus Lindley: 1; B 1145, B 1229, B 1235
Aster pilosus Willdenow: 1, 7; B 1134, B 1233
Aster sericeus Ventenat: 1; B 1133
Aster umbellatus P. Miller: 7; B 1141
Bidens bipinnata Linnaeus: 1, 7; B 1093
**Cichorium intybus* Linnaeus: 7; B 1052
Cirsium altissimum (Linnaeus) Sprengel: 1, 7; B 1136
Conyza canadensis (Linnaeus) Cronquist: 1, 7; B 1012
Coreopsis lanceolata Linnaeus: 1; B 943
Coreopsis palmata Nuttall: 1; B 1064
Coreopsis tripteris Linnaeus: 1; B 1091
Erechtites hieracifolia (Linnaeus) Rafinesque: 1, 7; B 1099
Erigeron annuus (Linnaeus) Persoon: 7; B 896
Erigeron strigosus Muhlenberg: 1, 7; P 34201
Eupatorium serotina Michaux: 2, 7; B 1094
Euthamia graminifolia (Linnaeus) Nuttall: 1, 7; B 1129
Euthamia gymnospermoides Greene: 1, 7; Site Record only
Gnaphalium obtusifolium (Linnaeus): 1, 7; B 1057
**Helianthus annuus* Linnaeus: 7; B 1112
Helianthus divaricatus Linnaeus: 1; B 1033, B 977
Helianthus grossesseratus M. Martens: 1, 7; B 1117
Helianthus hirsutus Rafinesque: 1; B 1105
Helianthus mollis Lamarck: 1, 2; B 1152
Helianthus rigidus (Cassini) Desfontaines: 7; B 1124
Hieracium gronovii Linnaeus: 1; B 973, B 1029
Hieracium longipillum Torrey: 1; B 1063
Hieracium scabrum Michaux: 1; Site Record only
Hymenopappus scabiosaeus L'Her: 1; P 34197
Krigia virginica (Linnaeus) Willdenow: 1; B 805, B 886
Lactuca canadensis Linnaeus: 1, 7; B1058
**Lactuca serriola* Linnaeus: 7; B 989
Liatris aspera Michaux: 1; B 1121
**Matricaria matricarioides* (Lessing) Porter: 7; B 953
Rudbeckia hirta Linnaeus: 2; B 1047
Senecio plattensis Nuttall: 1, 7; B 879
Solidago canadensis Linnaeus: 1, 2, 7; B 1140
Solidago gigantea Aiton: 2, 7; B 1109
Solidago juncea Aiton: 2; B 1090
Solidago nemoralis Aiton: 1, 2; B 1132
Solidago speciosa Nuttall: 1; B 1234
**Tragopogon dubius* Scopoli: 1, 7; B 1034
Vernonia gigantea (Walter) Trelease: 2, 7; B 1025
Xanthium strumarium Linnaeus: 7; B 1089

BETULACEAE

Betula nigra Linnaeus: 7; B 888

BIGNONIACEAE

**Catalpa speciosa* (Warder) Englemann: 7; B 959, P 34205

BORAGINACEAE

Hackelia virginiana (Linnaeus) I.M. Johnston: 1, 7; B 1036
Lithospermum caroliniense (J.F. Gmelin) MacMillan: 1; B 810, B 1039

BRASSICACEAE

**Alliaria petiolata* (Bieberstein) Cavara & Grande: 1, 7; B 876
**Arabidopsis thaliana* (Linnaeus) Heynhold: 7; B 819
Arabis lyrata Linnaeus: 1; B 869
**Barbarea vulgaris* R. Brown: 7; B 844
**Capsella bursa-pastoris* (Linnaeus) Medikus: 7; B 938
Cardamine parviflora Linnaeus var. *arenicola* (Britton) O.E. Schultz: 7; B 836, B 873
Descurainia pinnata (Walter) Britton: 7; B 889
Draba reptans (Lamarck) Fernald: 1; B 865
Lepidium virginicum Linnaeus: 1, 7; B 812, B 899
Rorippa islandica (Oeder) Borbas var. *fernaldiana* Butters & Abbe: 7; B 1008
Rorippa sessiliflora (Nuttall) A. Hitchcock: 7; B 872
**Thlaspi arvense* Linnaeus: 7; B 831

CACTACEAE

Opuntia humifusa (Rafinesque) Rafinesque: 1; B 997

CAESALPINIACEAE

Cassia fasciculata Michaux: 1, 7; B 1001
Cassia nictitans Linnaeus: 1; B 1060

CAMPANULACEAE

Triodanis perfoliata (Linnaeus) Nieuwland: 1, 7; B 925

CANNABACEAE

**Cannabis sativa* Linnaeus: 1, 7; B 1032, M 1454

CAPRIFOLIACEAE

**Lonicera maackii* (Ruprecht) C.J. Maximowicz: 7; B 862
**Lonicera morrowii* A. Gray: 1, 7; B 818
**Lonicera x muendenensis* Rehder: 2, 7; B 882
**Lonicera sempervirens* Linnaeus: 1; B 921
Sambucus canadensis Linnaeus: 2, 7; B 912

CARYOPHYLLACEAE

**Arenaria serpyllifolia* Linnaeus: 7; B 864
**Dianthus armeria* Linnaeus: 1, 7; B 1020
**Holosteum umbellatum* Linnaeus: 2, 7; B 881
**Lychnis alba* Miller: 7; B 1083
Paronychia canadensis (Linnaeus) A.W. Wood: 1; B 923
**Saponaria officinalis* Linnaeus: 7; B 955, B 991
Silene antirrhina Linnaeus: 7; B 933.1
**Silene dichotoma* Ehrhart: 7; B 890
Silene stellata (Linnaeus) Aiton f.: 2, 7; B 1230
**Stellaria media* (Linnaeus) D. Villars: 2, 7; B 834, B 904

CELASTRACEAE

Celastrus scandens Linnaeus: 1; B 1239

CHENOPODIACEAE

**Chenopodium album* Linnaeus: 7; B 1069
Cycloloma atriplicifolium (Sprengel) J.M. Coulter: 1, 7; B 1000

CISTACEAE

Helianthemum sp.: 1; Site Record only
Lechea villosa Elliott: 1; B 1059

CONVOLVULACEAE

**Ipomoea hederacea* (Linnaeus) Joaquin: 7; B 1017

CORYLACEAE

Corylus americana Walter: 1; B 1037

ERICACEAE

Gaylussacia baccata (Wangenheim) K. Koch: 2; B 846
Vaccinium angustifolium Aiton: 2; B 824

EUPHORBIACEAE

Acalypha gracilens A. Gray: 1; B 1139
Acalypha rhomboidea Rafinesque: 7; B 1150
Chamaesyce supina (Rafinesque) Moldenke: 7; B 982, B 1087
Croton glandulosus Linnaeus var. septentrionalis Mueller-Argoviensis: 1; B 993
Euphorbia corollata Linnaeus: 1, 2; B 828, B 949
Poinsettia dentata (Michaux) Klotzsch & Garcke var. dentata: 1; B 1003

FABACEAE

Amorpha canescens Pursh: 1; B 948
Baptisia lactea (Rafinesque) Thieret: 1; B 963
**Lathyrus latifolius* Linnaeus: 7; B 1049
Lespedeza capitata Michaux: 1; B 1107, B 1227
Lespedeza hirta (Linnaeus) Hornemann: 2; B 1138, B 1232
Lespedeza virginica (Linnaeus) Britton: 2; B 1231, P 34799
Lupinus perennis Linnaeus: 1; B 976
**Medicago lupulina* Linnaeus: 7; B 926, B 1106
**Melilotus alba* Medikus: 7; B 932
**Robinia pseudo-acacia* Linnaeus: 1, 7; B 883
Tephrosia virginiana (Linnaeus) Persoon: 1; B 942
**Vicia villosa* Roth: 1, 7; B 957, P 34194

FAGACEAE

Quercus alba Linnaeus: 2; B 1137
Quercus velutina Lamarck: 1, 2; B 1076

GENTIANACEAE

Gentiana puberulenta J. Pringle: 1; B 1228

GROSSULARIACEAE

Ribes missouriense Nuttall: 1; B 922

HYPERICACEAE

Hypericum gentianoides (Linnaeus) Britton, Sterns, & Poggenburg: 2, 7; B 1065
Hypericum mutilum Linnaeus: 7; B 1011

JUGLANDACEAE

Juglans nigra Linnaeus: 7; B 835

Oenothera rhombipetala Nuttall: 1; B 967

OXALIDACEAE

Oxalis stricta Linnaeus: 1, 7; B 870

PHYTOLACCACEAE

Phytolacca americana Linnaeus: 1, 7; B 960

PLANTAGINACEAE

Plantago aristata Michaux: 1, 7; B 946
**Plantago lanceolata* Linnaeus: 7; B 935
Plantago patagonica Jacquin: 1; B 924
**Plantago rugelii* Duchesne: 1, 7; B 962

POLEMONIACEAE

Phlox bifida L.C. Beck: 1; B 808

POLYGALACEAE

Polygala polygama Walter: 1; P 34199
Polygala sanguinea Linnaeus: 2; B 1024

POLYGONACEAE

Polygonum careyi Olney: 2, 7; B 1092
**Polygonum convolvulus* Linnaeus: 1, 7; B 1004, B 1148
Polygonum lapathifolium Linnaeus: 7; B 1084
Polygonum pensylvanicum Linnaeus: 7; B 1078
**Polygonum persecaria* Linnaeus: 2; B 1108
Polygonum punctatum Elliott: 7; B 1098
Polygonum scandens Linnaeus: 7; B 956
Polygonum tenue Michaux: 1; B 1061
**Rumex acetosella* Linnaeus: 1, 7; B 816
**Rumex crispus* Linnaeus: 7; B 910

PORTULACCACEAE

Claytonia virginica Linnaeus: 1; B 806

RANUNCULACEAE

Anemone cylindrica A. Gray: 1; B 1038
Ranunculus abortivus Linnaeus: 2, 7; B 856, B 985

ROSACEAE

Amelanchier arborea (Michaux f.) Fernald: 1; B 877
Aronia melanocarpa (Michaux) Elliottt: 2; B 850
Fragaria virginiana Duchesne: 1; B 821
Geum canadense Jacquin: 7; B 934
Malus coronaria (Linnaeus) P. Miller var. *dasycalyx* Rehder: 2; B 825
Malus ioensis (Wood) Britton: 1; B 1031
Potentilla norvegica Linnaeus: 7; B 914
**Potentilla recta* Linnaeus: 7; P 34206
Potentilla simplex Michaux: 1, 2, 7; B 838
Prunus serotina Ehrhart: 1, 2, 7; B 823
Rosa carolina Linnaeus: 1, 2; P 34195
**Rosa multiflora* Thunberg: 7; B 909
Rubus allegheniensis Porter: 1, 2, 7; B 852
Rubus enslenii Trattinnick: 1, 2; B 851
Rubus flagellaris Willdenow: 1, 2, 7; B 892
Rubus occidentalis Linnaeus: 1, 2, 7; B 853, B 840
Spiraea alba Du Roi: 7; B 969

RUBIACEAE

Galium aparine Linnaeus: 7; B 842
Galium pilosum Aiton: 1; B 1035
Galium tinctorium Linnaeus: 7; B 1102
Galium triflorum Michaux: 2; B 906

SALICACEAE

Populus deltoides Marshall: 7; B 885
Salix exigua Nuttall: 7; B 817
Salix humilis Marshall: 1; B 861
Salix nigra Marshall: 7; B 887

SANTALACEAE

Comandra umbellata (Linnaeus) Nuttall: 1; B 887

SCROPHULARIACEAE

Aureolaria pedicularia (Linnaeus) Rafinesque: 1, 2; B 1072
Lindernia dubia (Linnaeus) Pennell var. *anagallidea* (Michaux) Cooperrider: 7; B 939
Mimulus ringens Linnaeus: 7; B 1151
Scrophularia lanceolata Pursh: 1; B 901

**Verbascum thapsus* Linnaeus: 1, 7; B 1006
**Veronica arvensis* Linnaeus: 7; B 829, B 859

SOLANACEAE

Physalis virginiana Miller: 1; B 929
Solanum carolinense Linnaeus: 1, 7; B 895, B 954, B 990
**Solanum dulcamara* Linnaeus: 7; B 911
Solanum ptycanthum Dunal: 1, 7; B 1071

ULMACEAE

Celtis occidentalis Linnaeus: 7; B 1237

URTICACEAE

Boehmeria cylindrica (Linnaeus) Swartz: 7; B 1009
Parietaria pensylvanica Muhlenberg: 2; B 902

VERBENACEAE

Verbena hastata Linnaeus: 7; B 987
Verbena stricta Ventenat: 1; B 972

VIOLACEAE

Viola pedata Linnaeus: 1; B 804
Viola primulifolia Linnaeus: 7; B 884
**Viola rafinesquii* Greene: 2; B 827
Viola sagittata Aiton: 1, 2; B 815
Viola sororia Willdenow: 7; B 843

VITACEAE

Vitis riparia Michaux: 1, 7; B 1238

APPENDIX 1

The vascular taxa encountered and collected at the Mt. Fraker site are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = dry sand savanna, 2 = dry-mesic sand savanna, 3 = dry sand prairie, 4 = wet sand prairie, 5 = sand flatwoods, 6 = shrub prairie, 7 = cultural). Following the community number(s), collecting numbers or date collected (when collecting number not assigned) preceded by the initial of the collector's name are given (C for Connie J. Carroll, F for Mary Ann Feist, and P for Loy R. Phillippe).

PTERIDOPHYTES

DENNSTAEDTIACEAE

Pteridium aquilinum (Linnaeus) Kuhn var. *latiusculum* (Desvaux) Linnaeus Underwood ex A. Heller: 1: C 50, F 1685

EQUISETACEAE

Equisetum laevigatum A. Braun: 1; C 57

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

COMMELINACEAE

Commelina erecta Linnaeus: 1: C 8
Tradescantia ohiensis Rafinesque: 1; F 1568

CYPERACEAE

Carex meadii Dewey: 1; F 1510
Carex muhlbergii Schkuhr ex Willdenow: 1; F 1570
Carex pensylvanica Lamarck: 1: F 1509
Cyperus filiculmis Vahl var. macilentus Fernald: 1; C 5, F 1726
Cyperus schweinitzii Torrey: 1: C 48

IRIDACEAE

Sisyrinchium albidum Rafinesque: 1; F 1572

LILIACEAE

Maianthemum racemosa (Linnaeus) Link: 1; F 1684
Maianthemum stellata (Linnaeus) Link: 1; F 1518
Polygnatum biflorum (Walter) Elliott: 1; F 1576

POACEAE

Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg: 1: F 1678
Andropogon gerardii Vitman: 1; F 2116, P 35015
**Bromus tectorum* Linnaeus: 1; F 1664, F 1665
Calamovilfa longifolia (Hooker) Scribner: 1; C 47
Cenchrus longispinus (Hackel) Fernald: 7; C 36
**Digitaria sanguinalis* (Linnaeus) Scopoli: 7; C 45
Elymus canadensis Linnaeus: 1; F 1686
Eragrostis spectabilis (Pursh) Steudel: 1; C 55
Koeleria pyramidata (Lamark) P. Beauvois: 1; F 1566
Leptoloma cognatum (Schultes) Chase: 1; C 32
Panicum depauperatum Muhlenberg: 1; F 1569
Panicum oligosanthes Schultes: 1; F 1666
Panicum villosissimum Nash: 1; F 1565
Panicum virgatum Linnaeus: 1, 7; C 18, C 58, F 2118
Paspalum setaceum Michaux var. *stramineum* (Nash) D.J. Banks: 1, 7; C 52
**Phleum pratense* Linnaeus: 1; F 1667
**Poa compressa* Linnaeus: 1; F 1674
**Poa pratensis* Linnaeus: 1, 7; F 1508, F 1586
Schizachyrium scoparium (Michaux) Nash: 1; F 2107, P 35013
**Setaria faberi* R.A.W. Herrmann: 1, 7; C 33, P 35017
**Setaria glauca* (Linnaeus) P. Beauvois: 1, 7; C 35
**Setaria viridis* (Linnaeus) P. Beauvois: 1, 7; C 34, P 35016
Sorghastrum nutans (Linnaeus) Nash: 1; F 2113, P 35014
Sporobolus clandestinus (Biehler) A. Hitchcock: 1; F 2127
Sporobolus cryptandrus (Torrey) A. Gray: 1; Site Record only
Stipa spartea Trinius: 1; F 1567
Triplasis purpurea (Walter) Chapman: 1, 7; C 42

DICOTS

AMARANTHACEAE

Froelichia floridana (Nuttall) Moquin-Tandon: 1; C 49
Froelichia gracilis (Hooker) Moquin-Tandon: 1; C 25

ANACARDIACEAE

Rhus copallina Linnaeus: 1; Site Record only
Rhus glabra Linnaeus: 1: C 29
Rhus typhina Linnaeus: 1, 7: F 1670

ASCLEPIADACEAE

Asclepias amplexicaulis J.E. Smith; 1: F 1682
Asclepias tuberosa Linnaeus: 1; C 16, F 1669
Asclepias verticillata Linnaeus: 1; C 6, F 1725

ASTERACEAE

**Achillea millefolium* Linnaeus: 1, 7; C 40, F 1675
Ambrosia artemisiifolia Linnaeus: 7; C 9
Ambrosia trifida Linnaeus: 7; C 61
Antennaria plantaginifolia (Linnaeus) Richardson: 1; F 1514, F 1573
Aster azureus Lindley: 1; F 2104, P 35006
Aster ericoides Linnaeus: 1; F 2120, P 35009
Aster linariifolius Linnaeus: 1; F 2109, P 35007
Aster pilosus Willdenow: 7; P 35018
Conyza canadensis (Linnaeus) Cronquist: 1; C 10
Coreopsis lanceolata Linnaeus: 1; F 1677
Erigeron strigosus Muhlenberg: 1; F 1571
Eupatorium serotinum Michaux: 7; C 60
Euthamia gymnospermoides Greene: 1; F 2114, P 35012
Gnaphalium obtusifolium Linnaeus: 1; C 7, F 2106, P 35008
Helianthus divaricatus Linnaeus: 1; C 27
Helianthus mollis Lamarck: 7; C 41
Helianthus occidentalis Riddell: 1; C 30
Helianthus rigidus (Cassini) Desfontaines: 1, F 2126
Hieracium longipilum Torrey: 1; C 3
Hieracium scabrum Michaux: 1; F 2117
Krigia biflora(Walter) Blake: 1; F 1579
Krigia virginica (Linnaeus) Willdenow: 1; F 1511
Lactuca canadensis Linnaeus: 1; C 54
Liatris aspera Michaux: 1; F 2105
Prenanthes aspera Michaux: 2; P 35011
Rudebeckia hirta Linnaeus: 1; F 1676
Senecio pauperculus Michaux: 1; F 1585
Solidago canadensis Linnaeus: 7; P 35014
Solidago juncea Aiton: 1; C 22
Solidago nemoralis Aiton: 1; F 2108
**Tragopogon dubius* Scopoli: 1, 7; F 1583

BORAGINACEAE

Lithospermum caroliniense (J.F. Gmelin) MacMillan: 1; F 1505, F 2110

BRASSICACEAE

Arabis lyrata Linnaeus: 1; F 1504
**Lepidium densiflorum* Schrader: 1; F 1582

CAESALPINACEAE

Cassia fasciculata Michaux: 1; C 4
Cassia nictitans Linnaeus: 1; C 21

CAMPANULACEAE

Triodanis perfoliata (Linnaeus) Nieuwland: 1, 7; F 1681

CARYOPHYLLACEAE

**Saponaria officinalis* Linnaeus: 1; C 63
Silene antirrhina Linnaeus: 1; F 1673

CHENOPODIACEAE

Chenopodium desiccatum A. Nelson: 1; C 12, F 2111
Cycloloma atriplicifolium (Sprengel) J.M. Coulter: 1, 7; C 44

CISTACEAE

Helianthemum bicknellii Fernald: 1; C 56, F 1564
Lechea villosa Elliott: 1; C 31

ELAEAGNACEAE

**Elaeagnus umbellata* Thunberg: 1; F 1517

ERICACEAE

Gaylussacia baccata (Wangenheim) K. Koch: 2; F 1516
Vaccinium angustifolium Aiton: 2; F 1680

EUPHORBIACEAE

Chamaesyce nutans (Lagasca y Segura) Small: 1; C 67
Croton glandulosus Linnaeus: 1; C 17
Euphorbia corollata Linnaeus: 1; C 2

RUBIACEAE

Diodia teres Walter var. *setifera* Fernald & Griscom: 1; F 2119
Galium aparine Linnaeus: 7; F 1580

SALICACEAE

Salix humilis Marshall: 1; F 1515, F 1574

SANTALACEAE

Comandra umbellata (Linnaeus) Nuttall: 1; F 1563

SCROPHULARIACEAE

Aureolaria pedicularia Linnaeus: 1; C 19
Linaria canadensis (Linnaeus) Dumont-Courset: 1; F 1521
**Linaria vulgaris* Hill: 7; F 2125
Scrophularia lanceolata Pursh: 7; F 1688

SOLANACEAE

Physalis virginiana Miller: 1; F 1581

ULMACEAE

**Ulmus pumila* Linnaeus: 7; F 1692

VIOLACEAE

Viola pedata Linnaeus: 1; F 1506
Viola sagittata Aiton: 1; F 1513

APPENDIX 1

The vascular taxa encountered and collected at the Sweet Fern Sand Savanna site are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphalbetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = dry san savanna, 2 = dry-mesic sand savanna, 3 = dry sand prairie, 4 = wet sand prairie, 5 = sand flatwoods, 6 = shrub prairie, 7 = cultural). Following the community number(s), collecting numbers or date collected (when collecting number is not assigned) preceded by the initial of the collector's name are given (M for Paul B. Marcum, and P for Loy R. Phillippe).

PTERIDOPHYTES

ASPLENIACEAE

Asplenium platyneuron (Linnaeus) Britton, Sterns, & Poggenburg: 2; M 1800

DENNSTAEDTIACEAE

Pteridium aquilinum (Linnaeus) Kunth var. *latiusculum* (Desvaux) Underwood ex A. Heller: 2, 5; M 1576

DRYOPTERIDACEAE

Dryopteris carthusiana (Villars) H.P. Fuchs: 2; M 1801
Onoclea sensibilis Linnaeus: 7; M 1606

EQUISETACEAE

Equisetum arvense Linnaeus: 7; M 1796

OPHIOGLOSSACEAE

Botrychium dissectum Sprengel: 2; M 1786

OSMUNDACEAE

Osmunda cinnamomea Linnaeus: 2, 5; M 1787
Osmunda regalis Linnaeus var. *spectabilis* (Willdenow) A. Gray: 2, 5; M 1219

THELYPTERIDACEAE

Thelypteris palustris Schott var. *pubescens* (Lawson) Fernald: 7; M 1532

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

ALISMATACEAE

Alisma subcordatum Rafinesque: 7; M 1431

COMMELINACEAE

Commelina erecta Linnaeus: 1, 3; M 1553
Tradescantia ohiensis Rafinesque: 1, 2; M 1261

CYPERACEAE

Bulbostylis capillaris (Linnaeus) C.B. Clarke: 7; M 1640
Carex bebbii (L.H. Bailey) Fernald: 7; M 1255
Carex bicknellii Britton: 2, 7; M 1209, M 1269
Carex cumulata (L.H. Bailey) Mackenzie: 7; M 1257, M 1529
Carex emmonsii Dewey ex Torrey: 1, 2, 7; M 1168
Carex foenea Willdenow: 1; M 1175
Carex haydenii Dewey: 5; M 1221
Carex muhlenbergii Schkuhr ex Willdenow: 1, 3; M 1210
Carex pellita Muhlenberg: 7; M 1166
Carex pensylvanica Lamarck: 1, 2, 3, 7; M 1174
Carex scoparia Schkuhr ex Willdenow: 7; M 1246
Carex swanii (Fernald) Mackenzie: 2, 5; M 1276
Carex umbellata Schkuhr: 1, 7; M 1167
Carex vulpinoidea Michaux: 7; M 1418
Cyperus filiculmis Vahl var. *macilentus* Fernald: 1, 3; M 1275, M 1445, M 1556.2
Cyperus x mesochorus Geise: 1, 3; M 1556.1
Cyperus strigosus Linnaeus: 7; M 1516
Eleocharis obtusa (Willdenow) Schultes var. *detonsa* (A. Gray) Drapalik & Mohlenbrock: 7; M 1250, M 1517
Eleocharis verrucosa (Svenson) Harms: 5; M 1774
Fimbristylis autumnalis (Linnaeus) Roemer & Schultes: 7; M 1427
Fimbristylis puberula (Michaux) Vahl: 2, 7; M 1523
Rhynchospora capitellata (Michaux) Vahl: 7; M 1426
Scirpus cyperinus (Linnaeus) Kunth: 7; M 1447
Scleria muhlenbergii Steudel: 7; M 1514
Scleria pauciflora Willdenow var. *caroliniana* (Willdenow) A.W. Wood: 7; M 1524

Scleria triglomerata Michaux: 7; M 1518

IRIDACEAE

**Iris germanica* Linnaeus: 7; M 1227
Sisyrinchium albidum Rafinesque: 1, 2, 3, 7; M 1173
Sisyrinchium atlanticum Bicknell: 7; M 1201

JUNCACEAE

Juncus acuminatus Michaux: 7; M 1251
Juncus dudleyi Wiegand: 2; Site Record only
Juncus greenei Oakes & Tuckerman: 2, 7; M 1279, M 1519
Juncus interior Wiegand: 7; M 1245
Juncus marginatus Rostkovius: 7; M 1252, M 1425
Luzula bulbosa (A. Wood) B.B. Smyth & L.C.R. Smyth: 2, 5; M 1222

LEMNACEAE

Spirodela polyrhiza (Linnaeus) Schleiden: 7; M 1777

LILIACEAE

**Asparagus officinalis* Linnaeus: 2, 7; M 1581
**Hemerocallis fulva* (Linnaeus) Linnaeus: 7; M 1286
Polygonatum biflorum (Walter) Elliott: 1, 2; M 1591
Maianthemum racemosum (Linnaeus) Link: 1, 2; M 1571
Maianthemum stellatum (Linnaeus) Link: 1, 2; Site Record only

POACEAE

Agrostis gigantea Roth: 7; M 1256, M 1527
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg var. *hyemalis*: 7; M 1253
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg var. *scabra* (Willdenow) Blomquist: 7; M 1610
Alopecurus carolinianus Walter: 7; M 1207
Andropogon gerardii Vitman: 1, 2, 3, 7; M 1542
Andropogon virginicus Linnaeus: 7; M 1762
Aristida longespica Poiret var. *geniculata* (Rafinesque) Fernald: 7; M 1550
Aristida purpurascens Poiret: 2, 7; M 1613
**Bromus tectorum* Linnaeus: 7; M 1228
Calamagrostis canadensis (Michaux) P. Beauvois: 7; M 1526
Calamovilfa longifolia (Hooker) Scribner var. *magna* Scribner & Merrill: 1, 2; M 1304.1, M 1593
Cenchrus longispinus (Hackel) Fernald: 7; M 1407
**Digitaria ischaemum* (Schreber) Muhlenberg: 7; M 1756
**Digitaria sanguinalis* (Linnaeus) Scopoli:7 ; M 1587
Echinochloa muricata (P. Beauvois) Fernald var. muricata: 7; M 1539
Elymus canadensis Linnaeus: 7; M 1290

**Elytrigia repens* (Linnaeus) Nevski: 7; M 1293
Eragrostis pectinacea (Michaux) Nees: 7; M 1620
Eragrostis spectabilis (Pursh) Steudel: 7; M 1520
**Festuca pratensis* Hudson: 7; M 1229
Koeleria pyramidata (Lamarck) P. Beauvois: 1, 2; M 1274
Leersia oryzoides (Linnaeus) Swartz: 7; M 1631
Leptoloma cognatum (Schultes) Chase: 1, 3, 7; M 1560
Muhlenbergia frondosa (Poiret) Fernald: 7; M 1622
Muhlenbergia schreberi J.F. Gmelin: 2; M 1790
Panicum dichotomiflorum Michaux: 7; M 1537
Panicum lanuginosum Elliott var. *lindheimeri* (Nash) Fernald: 1, 2, 7; M 1254, M 1280, M 1565
Panicum oligosanthes Schultes var. *scribnerianum* (Nash) Fernald: 1, 2, 3; M 1270
Panicum rigidulum Nees: 7; M 1528, M 1612
Panicum villosissimum Nash: 1, 2, 3; M 1271
Panicum virgatum Linnaeus: 1, 2, 3, 7; M 1304.2, M 1430, M 1540, M 1567
Paspalum setaceum Michaux var. *stramineum* (Nash) D.J. Banks: 7; M 1409
**Phalaris arundinacea* Linnaeus: 7; M 1608
**Poa compressa* Linnaeus: 1, 2, 7; M 1596
**Poa pratensis* Linnaeus: 1, 2, 3, 7; M, 1206
Schizachyrium scoparium (Michaux) Nash: 1, 2, 3, 7; M 1569
**Setaria faberi* R.A.W. Herrmann: 3, 7; M 1538, M 1551
**Setaria glauca* (Linnaeus) P. Beauvois: 7; M 1617
Sorghastrum nutans (Linnaeus) Nash: 1, 2, 3, 7; M 1595
Sporobolis clandestinus (Biehler) A. Hitchcock: 1, 2; M 1597
Sporobolis cryptandrus (Torrey) A. Gray: 7; M 1585
Sporobolis heterolepis A. Gray: 2; M 1770
Stipa spartea Trinius: 1, 2; M 1273
Vulpia octoflora (Walter) Rydberg: 1, 3; M 1213

TYPHACEAE

**Typha angustifolia* Linnaeus: 7; M 1778
Typha latifolia Linnaeus: 7; M 1779

XYRIDACEAE

Xyris torta J.E. Smith: 7; M 1588

DICOTS

ACERACEAE

Acer saccharinum Linnaeus: 7; M 1776

AMARANTHACEAE

Amaranthus hybridus Linnaeus: 7; M 1619
Froelichia floridana (Nuttall) Moquin-Tandon var. *campestris* (Small) Fernald: 1, 3, 7; M 1453

ANACARDIACEAE

Rhus copallina Linnaeus: 1, 2, 7; M 1441
Rhus glabra Linnaeus: 1, 2, 7; M 1278
Rhus typhina Linnaeus: 1, 2; M 1795
Toxicodendron radicans (Linnaeus) Kuntze: 1, 7; Site Record only

APIACEAE

Cicuta maculata Linnaeus: 7; M 1448
**Daucus carota* Linnaeus: 7; M 1649
Eryngium yuccifolium Michaux: 2; M 1568
Sanicula canadensis Linnaeus: 1, 2; M 1579, M 1639

APOCYNACEAE

Apocynum androsaemifolium Linnaeus: 1; Site Record only

AQUIFOLIACEAE

Ilex verticillata (Linnaeus) A. Gray: 2, 5; M 1644

ASCLEPIADACEAE

Asclepias amplexicaulis J.E. Smith: 1; M 1299
Asclepias syriaca Linnaeus: 7; M 1558
Asclepias tuberosa Linnaeus: 1; Site Record only
Asclepias verticillata Linnaeus: 1, 2, 3, 7; M 1442

ASTERACEAE

**Achillea millefolium* Linnaeus: 1, 2, 7; M 1302
Ambrosia artemesiifolia Linnaeus: 1, 2, 7; M 1543
Ambrosia trifida Linnaeus: 7; M 1621
Antennaria neglecta Greene: 1, 2: Site Record only
Antennaria plantaginifolia (Linnaeus) Richardson: 1, 2; M 1177
Artemesia campestris Linnaeus: 1, 2, 3; M 1541
Aster azureus Lindley: 1, 2; M 1765
Aster dumosus Linnaeus: 1; M 1773
Aster ericoides Linnaeus: 1, 2; M 1764
Aster lateriflorus (Linnaeus) Britton: 7; M 1792
Aster linariifolius Linnaeus: 1, 2; M 1769
Aster pilosus Willdenow: 1, 2, 7; M 1768
Aster simplex Willdenow: 5; M 1794
Aster umbellatus Miller: 2, 5, 7; M 1531
Aster vimineus Lamarck: 7; M 1798
Bidens cernua Linnaeus: 7; M 1805
Bidens coronata (Linnaeus) Britton: 7; M 1590
Bidens frondosa Linnaeus: 7; M 1611

Cirsium discolor (Muhlenberg) Sprengel: 7; M 1626, M 1797
Conyza canadensis (Linnaeus) Cronquist: 1, 2, 3, 7; M 1557
Coreopsis palmata Nuttall: 1; M 1263
Coreopsis tripteris Linnaeus: 1, 2; M 1566
Erechtites hieracifolia (Linnaeus) Rafinesque: 2, 7; M 1637
Erigeron annuus (Linnaeus) Persoon: 1, 2, 7; M 1248, M 1630
Erigeron strigosus Muhlenberg: 1, 2, 7; M 1267
Eupatorium perfoliatum Linnaeus: 7; M 1574
Eupatorium rugosum Houttuyn: 2; M 1799
Eupatorium serotinum Michaux: 7; M 1564
Euthamia gymnospermoides Greene: 1, 2, 7; M 1757
Gnaphalium obtusifolium Linnaeus: 1, 2, 7; M 1547
Helianthus divaricatus Linnaeus: 1, 2; M 1443
Helianthus x laetiflorus Persoon: 1; M 1440
Helianthus mollis Lamarck: 1, 7; M 1422
Helianthus occidentalis Riddell: 1, 2; M 1521
Hieracium gronovii Linnaeus: 1, 2; M 1548
Hieracium longipilum Torrey: 1; M 1439
Hieracium scabrum Michaux: 1, 2; M 1582
Krigia biflora (Walter) Blake: 1, 2; Site Record only
Krigia virginica (Linnaeus) Willdenow: 1, 2, 3, 7; M 1181
Lactuca canadensis Linnaeus: 1, 7; M 1411
**Lactuca serriola* Linnaeus: 7; M 1410
Liatris aspera Michaux: 1, 2; M 1592
Liatris spicata (Linnaeus) Willdenow: 2, 5; M 1634, M 1783
Parthenium integrifolium Linnaeus: 2, 5; M 1782
Prenanthes aspera Michaux: 2; M 1632
Rudbeckia hirta Linnaeus: 2; M 1268
Senecio pauperculus Michaux: 7; M 1204
Solidago canadensis Linnaeus: 7; M 1758
Solidago gigantea Aiton: 7; M 1609
Solidago juncea Aiton: 1, 2, 7; M 1534
Solidago nemoralis Aiton: 1, 2, 7; M 1570
Solidago speciosa Nuttall: 1, 2; M 1775
Solidago rugosa Aiton: 2; M 1784
Taraxacum officinale Weber ex Wiggers: 7; M 1186
**Tragopogon dubius* Scopoli: 1, 2, 7; M 1277
Vernonia gigantea (Walter) Trelease: 7; M 1793
Vernonia missurica Rafinesque: 7; M 1533

BETULACEAE

Betula nigra Linnaeus: 7; M 1759

BORAGINACEAE

Hackelia virginiana (Linnaeus) I.M. Johnston: 1, 2, 7; M 1636
Lithospermum caroliniense (J.F. Gmelin) MacMillan: 1, 2, 3; M 1211, M 1594

BRASSICACEAE

**Arabidopsis thaliana* (Linnaeus) Heynhold: 7; M 1169
Arabis lyrata Linnaeus: 1; M 1178
Cardamine parviflora Linnaeus var. *arenicola* (Britton) O.E. Schulz: 7; M 1183
Descurainia pinnata (Walter) Britton ssp. *brachycarpa* (Richardson) Fernald: 7; M 1189
Lepidium virginicum Linnaeus: 7; M 1625
Rorippa islandica (Qeder) Borbas var. *fernaldiana* Butters & Abbe: 7; Site Record only

CAESALPINIACEAE

Cassia fasciculata Michaux: 1, 2, 3, 7; M 1414, M 1525
Cassia nictitans Linnaeus: 1, 2; M 1572

CAMPANULACEAE

Lobelia siphilitica Linnaeus: 7; M 1604
Lobelia spicata Lamarck: 1, 2; Site Record only

CANNABACEAE

**Cannabis sativa* Linnaeus: 7; M 1623

CAPRIFOLIACEAE

Sambucus canadensis Linnaeus: 7; M 1292

CARYOPHYLLACEAE

Cerastium vulgatum Linnaeus: 7; M 1203, M 1417
Dianthus armeria Linnaeus: 7; P 34210
**Lychnis alba* Miller: 7; M 1225
**Saponaria officinalis* Linnaeus: 7; M 1283
Silene stellata (Linnaeus) Aiton f.: 2, 7; M 1789

CELASTRACEAE

Celastrus scandens Linnaeus: 2; M 1804

CHENOPODIACEAE

Chenopodium desiccatum A. Nelson var. *leptophylloides* (Murr) Wahl: 1, 2, 3; M 1600
Cycloloma atriplicifolium (Sprengel) J.M. Coulter: 7; M 1295

CISTACEAE

Helianthemum bicknellii Fernald: 1; M 1552
Lechea minor Linnaeus: 2, 5; M 1545, M 1546
Lechea pulchella Rafinesque: 1, 2, 5; M 1452, M 1544
Lechea villosa Elliott: 1, 2, 3, 7; M 1444, M 1615

CONVOLVULACEAE

Calystegia sepium (Linnaeus) R. Brown: 7; M 1249

ERICACEAE

Gaylussacia baccata (Wangenheim) K. Koch: 2; M 1214
Vaccinium angustifolium Aiton: 2, 5; M 1180, M 1215

EUPHORBIACEAE

Acalypha gracilens A. Gray: 1, 5, 7; M 1785
Acalypha rhomboidea Rafinesque: 5, 7; M 1589
Chamaesyce nutans (Lagasca y Segura) Small: 7; M 1618
Croton glandulosus Linnaeus var. *septentrionalis* Mueller-Argoviensis: 1, 2, 7; M 1296, M 1405
Euphorbia corollata Linnaeus: 1, 2, 3, 7; M 1438
Poinsettia dentata (Michaux) Klotzsch & Garcke var. *dentata*: 7; M 1586

FABACEAE

Amorpha canescens Pursh: 1, 2; M 1259
Amphicarpaea bracteata (Linnaeus) Fernald: 2, 7; M 1635
Baptisia lactea (Rafinesque) Thieret: 2; M 1303
Baptisia leucophaea Nuttall: 1, 2; M 1224, M 1297
Dalea candida (Michaux) Willdenow: 1, 2; M 1300
Desmodium illinoense A. Gray: 1, 3; M 1601
Desmodium sessilifolium (Torrey) Torrey & Gray: 1, 3; M 1555
Lespedeza capitata Michaux: 1, 2, 3; M 1554
Lespedeza hirta (Linnaeus) Hornemann: 2; M 1638
Lespedeza virginica (Linnaeus) Britton: 2; M 1577
**Melilotus alba* Medikus: 7; M 1408
Tephrosia virginiana (Linnaeus) Persoon: 1, 2, 3; M 1260
**Trifolium pratense* Linnaeus: 7; M 1559

FAGACEAE

Quercus alba Linnaeus: 2; M 1767
Quercus palustris Münchhausen: 2, 5, 7; M 1761
Quercus velutina Lamarck: 1, 2, 7; M 1771

GENTIANACEAE

Bartonia virginica (Linnaeus) Britton, Sterns, & Poggenburg: 2, 5, 7; M 1522
Gentiana saponaria Linnaeus: 2, 5; M 1760, M 1781

HYPERICACEAE

Hypericum adpressum Barton: 7; M 1435
Hypericum canadense Linnaeus: 7; M 1424
Hypericum gentianoides (Linnaeus) Britton, Sterns, & Poggenburg: 2, 7; M 1549
Hypericum majus (A. Gray) Britton: 7; M 1420.2, M 1614
Hypericum mutilum Linnaeus: 7; M 1420.1

LAMIACEAE

Lycopus americanus Muhlenberg: 7; M 1583
Lycopus uniflorus Michaux: 7; M 1629
Lycopus virginicus Linnaeus: 7; M 1575
Monarda fistulosa Linnaeus: 1, 7; M 1298
Monarda punctata Linnaeus var. *villicaulis* (Pennell) Shinners: 1, 2, 3, 7; M 1294
**Nepeta cataria* Linnaeus: 7; M 1434
Physostegia virginiana (Linnaeus) Bentham: 1, 2; M 1599
Prunella vulgaris Linnaeus: 7; M 1791
Pycnanthemum virginianum (Linnaeus) T. Durand & B.D. Jackson: 7; M 1446
Scutellaria leonardii Epling: 1; M 1598
Stachys tenuifolia Willdenow var. *hispida* (Pursh) Fernald: 7; M 1449

LAURACEAE

Sassafras albidum (Nuttall) Nees: 1, 2, 7; M 1191

LYTHRACEAE

Lythrum alatum Pursh: 7; M 1607
Rotala ramosior (Linnaeus) Koehne: 7; M 1437

MELASTOMATACEAE

Rhexia virginica Linnaeus: 7; M 1436

MOLLUGINACEAE

**Mollugo verticillata* Linnaeus: 1, 2, 3, 7; M 1603, M 1772

MYRICACEAE

Comptonia peregrina (Linnaeus) J.M. Coulter: 2, 5; M 1220

NYCTAGINACEAE

**Mirabilis nyctaginea* (Michaux) MacMillan: 7; M 1616

NYSSACEAE

Nyssa sylvatica Marshall: 2, 5; M 1647

ONAGRACEAE

Epilobium x wisconsinense Ugent: 7; M 1584
Ludwigia alternifolia Linnaeus: 7; M 1419
Ludwigia palustris (Linnaeus) Elliott var. *americana* (de Candolle) Fernald & Griscom: 7; M 1643
Oenothera biennis Linnaeus: 1, 2, 7; M 1412
Oenothera rhombipetala Nuttall: 1, 2, 3, 7; M 1282, M 1413

PHYTOLACCACEAE

Phytolacca americana Linnaeus: 1, 2, 5, 7; M 1291

PLANTAGINACEAE

**Plantago lanceolata* Linnaeus: 7; M 1289
Plantago patagonica Jacquin: 7; M 1287
**Plantago rugellii* Decaisne: 2, 7; M 1288
Plantago virginica Linnaeus: 7; M 1231

POLEMONIACEAE

Phlox bifida Beck: 1, 2; M 1170

POLYGALACEAE

Polygala polygama Walter: 1, 2; M 1272
Polygala sanguinea Linnaeus: 7; M 1258

POLYGONACEAE

Polygonum careyi Olney: 5, 7; M 1428
**Polygonum hydropiper* Linnaeus: 7; M 1605
Polygonum opelousanum Riddell: 7; M 1429
Polygonum pensylvanicum Linnaeus: 7; M 1421, M 1515
Polygonum punctatum Elliott: 7; M 1530
Polygonum scandens Linnaeus: 1, 2, 7; M 1578
**Rumex acetosella* Linnaeus: 1, 3, 7; M 1185
**Rumex crispus* Linnaeus: 7; M 1247

PORTULACACEAE

Claytonia virginica Linnaeus: 1, 2; M 1176

PRIMULACEAE

Lysimachia lanceolata Walter: 7; M 1281, M 1633
Lysimachia terrestris (Linnaeus) Britton, Sterns, & Poggenburg: 7; M 1433

RANUNCULACEAE

Anemone cylindrica A. Gray: 1, 2; M 1262
Anemone quinquefolia Linnaeus var. *quinquefolia*: 2; M 1216

RHAMNACEAE

Ceanothus americanus Linnaeus: 1, 2; M 1265

ROSACEAE

Agrimonia parviflora Aiton: 2, 5; M 1780
Aronia prunifolia (Michaux) Rehder: 2, 5, 7; M 1187
Crataegus pruinosa (H. Wendland) K. Koch: 7; P 34211
Fragaria virginiana Duchesne: 1, 2, 7; M 1171
Geum canadense Jacquin: 2; M 1788
Potentilla norvegica Linnaeus: 7; M 1415
Potentilla simplex Michaux var. simplex: 7; M 1202
Prunus serotina Ehrhart: 1, 2, 7; M 1763
Rosa carolina Linnaeus: 1, 2, 3; M 1264
**Rosa multiflora* Thunberg: 7; Site Record only
Rosa palustris Marshall: 2; M 1806
Rubus allegheniensis Porter: 1, 2, 7; M 1212
Rubus flagellaris Willdenow: 1, 2, 7; M 1223
Rubus hispidus Linnaeus: 1, 2, 5, 7; M 1266
Rubus occidentalis Linnaeus: 1, 2, 7; M 1230
Rubus schneideri Bailey: 7; M 1432
Spiraea alba Du Roi: 7; M 1450
Spiraea tomentosa Linnaeus: 2, 7; M 1423

RUBIACEAE

Diodia teres Walter: 7; M 1406
Galium aparine Linnaeus: 1, 2, 7; M 1205
Galium obtusum Bigelow: 7; M 1642
Galium pilosum Aiton: 1, 2; M 1580
Hedyotis caerulea (Linnaeus) Hooker: 7; M 1208

SALICACEAE

Populus deltoides Marshall: 7; M 1803
Populus grandidentata Michaux: 2, 5; M 1648
Populus tremuloides Michaux: 2, 5, 7; M 1646
Salix discolor Muhlenberg: 7; M 1190
Salix humilus Marshall: 1, 2, 5; M 1179

SANTALACEAE

Comandra umbellata (Linnaeus) Nuttall: 1, 2; M 1218

SCROPHULARIACEAE

Agalinus purpurea (Linnaeus) Pennell: 7; M 1602
Agalinus tenuifolia (Vahl) Rafinesque: 7; M 1563
Aureolaria pedicularia (Linnaeus) Rafinesque var. *ambigens* (Fernald) Farwell: 1, 2; M 1451
Gratiola virginiana Linnaeus: 7; M 1536, M 1641
Linaria canadensis (Linnaeus) Dumont Courset: 1, 2, 3, 7; M 1182
Lindernia dubia (Linnaeus) Pennell var. *anagallidea* (Michaux) Cooperrider: 7; M 1535
Scrophularia lanceolata Pursh: 1, 2; M 1217
Veronica peregrina Linnaeus var. peregrina: 7; M 1188
Veronicastrum virginicum (Linnaeus) Farwell: 2; M 1301

SOLANACEAE

Physalis heterophylla Nees: 7; M 1628
Physalis virginiana Miller: 1, 2; M 1573
Solanum carolinense Linnaeus: 1, 3, 7; M 1285
Solanum ptycanthum Dunal: 1, 2, 7; M 1766

URTICACEAE

Urtica dioica Linnaeus: 7; M 1627

VERBENACEAE

Verbena bracteata Lagasca & Rodríguez: 7; M 1232
Verbena hastata Linnaeus: 7; M 1416
Verbena stricta Ventenat: 7; M 1284
Verbena urticifolia Linnaeus: 7; M 1624

VIOLACEAE

Viola lanceolata Linnaeus: 7; M 1184
Viola pedata Linnaeus: 1, 2; M 1172
Viola primulifolia Linnaeus: 5, 7; M 1164, M 1645

**Viola rafinesquii* Greene: 7; M 1226
Viola sagittata Aiton: 1, 2, 7; M 1165

VITACEAE

Vitis riparia Michaux: 2, 7; M 1802

APPENDIX 1

The vascular taxa encountered and collected at the De Young site are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = dry sand savanna, 2 = dry-mesic sand savanna, 3 = dry sand prairie, 4 = wet sand prairie, 5 = sand flatwoods, 6 = shrub prairie, 7 = cultural). Following the community number(s), collecting numbers or date collected (when collecting number not assigned) preceded by the initial of the collector's name are given (M for Mary Ann Feist, and P for Loy R. Phillippe).

PTERIDOPHYTES

ASPLENIACEAE

Asplenium platyneuron (Linnaeus) Britton, Sterns, & Pottenburg: 2, 5; P 35168

DENNSTAEDTIACEAE

Pteridium aquilinum (Linnaeus) Kuhn var. *latiusculum* (Desvaux) Linnaeus Underwood ex A. Heller: 2; P 35181

DRYOPTERIDACEAE

Athyrium filix-femina (Linnaeus) Mertens var. *angustum* (Willdenow) G. Lawson: 5; P 34298
Dryopteris carthusiana (Villars) H.P. Fuchs: 5; F 1548, P 34255
Dryopteris cristata (Linnaeus) A. Gray: 5; P 34296
Onoclea sensibilis Linnaeus: 5; P 34565

EQUISETACEAE

Equisetum arvense Linnaeus: 5, 7; F 1536

LYCOPODIACEAE

Diphasiastrum digitatum (Dillenius ex A. Braun) Holub: 5; F 1540

OPHIOGLOSSACEAE

Botrychium dissectum Sprengel: 2, 5; P 34769
Botrychium virginianum (Linnaeus) Swartz: 5; F 1533

OSMUNDACEAE

Osmunda cinnamomea Linnaeus: 4; F 1529
Osmunda regalis Linnaeus: 4, 5; P 34294

THELYPTERIDACEAE

Thelypteris palustris Schott: 5; P 34767

SPERMATOPHYTES: GYMNOSPERMS

CUPRESSACEAE

Juniperus virginiana Linnaeus: 4; Site Record only

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

CYPERACEAE

Carex brachyglossa Mackenzie: 5; P 34290
Carex conoidea Schkuhr ex Willdenow: 4; P 34261
Carex cumulata (L.H. Bailey) Mackenzie: 1; P 34791
Carex emmonsii Dewey ex Torrey: 2, 5; F 1534
Carex festucacea Schkuhr: 5; P 34581
Carex foenea Willdenow: 1; P 34268
Carex haydenii Dewey: 4, 5; F 1525
Carex muhlenbergii Schkuhr ex Willdenow: 1; P 34272
Carex normalis Mackenzie: 5; P 34264
Carex pellita Muhlenberg: 5; P 34291
Carex pensylvanica Lamarck: 1, 2; F 1543
Carex scoparia Schkuhr ex Willdenow: 5; P 34280
Carex swanii (Fernald) Mackenzie: 2, 5; P 34262
Cyperus filiculmis Vahl var. *macilentus* Fernald:1; P 34756
Rhynchospora capitellata (Michaux) Vahl: 4; P 34788

IRIDACEAE

Sisyrinchium albidum Rafinesque: 1; P 34270

JUNCACEAE

Juncus greenei Oakes & Tuckerman: 2; P 34591
Luzula multiflora (Retzius) Legeune var. multiflora: 2; F 1446

LILIACEAE

Aletris farinosa Linnaeus: 2; P 34587
Lilium michiganense Farwell: 4; P 34263
Maianthemum racemosum (Linnaeus) Link: 2; F 1539
Maianthemum stellatum (Linnaeus) Link: 2; F 1542

ORCHIDACEAE

Platanthera lacera (Michaux) G. Don: 5; P 34286

POACEAE

Agrostis perennans (Walter) Tuckerman: 1, 2, 5; P 34595
Andropogon gerardii Vitman: 1, 4, 5, 7; P 34777
Andropogon virginicus Linnaeus: 4, 7; P 35171
Aristida purpurascens Poiret: 1; P 34745
**Bromus inermis* Leysser: 7; P 34282
Calamagrostis canadensis (Michaux) Beauvois: 4, 5; P 34593
Cenchrus longispinus (Hackel) Fernald: 7; P 34782
Eragrostis spectabilis (Pursh) Steudel: 1; P 34750
Glyceria striata (Lamarck) A. Hitchcock: 5 P 34256
Koeleria pyramidata (Lamarck) P. Beauvois: 1; P 34714
Leptoloma cognatum (Schultes) Chase: 1; P 35177
Muhlenbergia frondosa (Poiret) Fernald: 7; P 34740
Muhlenbergia mexicana (Linnaeus) Trinius: 4, 5; P 34764
Panicum capillare Linnaeus: 1, 2, 7; P 34746
Panicum leucothrix Nash: 1, 2; P 34748
Panicum oligosanthes Schultes: 1; P 34747
Panicum villosissimum Nash: 4; P 34284, P 34583
Panicum virgatum Linnaeus: 1, 2, 4, 5, 7; P 34708
**Poa compressa* Linneus: 1; P 34757
**Poa pratensis* Linnaeus: 1, 2, 5, 7; F 1527
Schizachyrium scoparium (Michaux) Nash: 4, 7; P 35170
Sorghastrum nutans (Linnaeus) Nash: 1, 2, 4, 5; P 34779
Sphenopholis obtusata (Michaux) Scribner var. *major* (Torrey) Erdman: 2, 5; P 34297
Sporobolus clandestinus (Biehler) A. Hitchcock: 1; P 35176
Tridens flavus (Linnaeus) A. Hitchcock: 2, 4, 7; P 34716

SMILACACEAE

Smilax lasioneuron Hooker: 5; P 34247

DICOTS

ACERACEAE

Acer negundo Linnaeus: 5, 7; F 1550

ANACARDIACEAE

Rhus copallina Linnaeus: 1, 2, 4; P 34597
Toxicodendron radicans (Linnaeus) Kuntze: 1; P 35174

APIACEAE

Cryptotaenia canadensis (Linnaeus) de Candolle: 5; P 34249
Osmorhiza claytonii (Michaux) Clarke: 5; P 34248
Osmorhiza longistylis (Torrey) de Candolle: 5; F 1538
Sanicula canadensis Linnaeus: 2, 4, 5, 7; P 34251
Sanicula odorata (Rafinesque) Pryer & Phillippe: 5; F 1547
**Torilis japonica* (Houttuyn) de Candolle: 4, 5, 7; P 34572

AQUIFOLIACEAE

Ilex verticillata (Linnaeus) A. Gray: 4, 5; P 34253

ASCLEPIADACEAE

Asclepias amplexicaulis J.E. Smith: 1; P 34713
Asclepias syriaca Linnaeus: 1; P 34752
Asclepias tuberosa Linnaeus: 1; P 34266; P 35167
Asclepias verticillata Linnaeus: 1, 2, 4, 7; P 34720

ASTERACEAE

**Achillea millefolium* Linnaeus: 1, 2, 4, 5, 7; P 34273
Ambrosia artemisiifolia Linnaeus: 1, 4, 7; P 34774
Antennaria plantaginifolia (Linnaeus) Richardson: 1, 2; F 1526
**Arctium minus* Schkuhr: 7; P 34566
Aster azureus Lindley: 1, 2; P 35169
Aster pilosus Willdenow: 1, 7; P 35164
Aster simplex Willdenow: 5, 7; P 35158
Aster umbellatus Miller: 5; P 34765
Bidens bipinnata Linnaeus: 5; P 34770
Cirsium discolor (Muhlenberg) Sprengel: 4, 5, 7; P 34707
Conyza canadensis (Linnaeus) Cronquist: 1, 2, 4, 5, 7; P 34772
Erechtites hieracifolia (Linnaeus) Rafinesque: 2, 7; P 34758
Erigeron annuus (Linnaeus) Persoon: 1, 2, 7; P 34289
Erigeron strigosus Muhlenberg: 1; P 34271
Eupatorium maculatum Linnaeus: 5; P 34724
Eupatorium rugosum Houttuyn: 2, 5; P 34793

Eupatorium serotinum Michaux: 5, 7; P 34706
Euthamia graminifolia (Linnaeus) Nuttall: 1, 4; P 35178
Euthamia gymnospermoides Greene: 1, 2, 5, 7; P 35165
Gnaphalium obtusifolium Linnaeus: 1; P 34722
Helianthus divaricatus Linnaeus: 1, 2; P 34717
Helianthus grosseserratus M. Martens: 5, 7; P 34741
Hieracium gronovii Linnaeus: 1, 2; P 34711
Hieracium scabrum Michaux: 1 2; P 34762
Krigia biflora (Walter) Blake: 2; P 34287
Lactuca biennis (Moench) Fernald: 5; P 34742
Lactuca canadensis Linnaeus: 1, 7; P 34753
Lactuca floridana (Linnaeus) Gaertner: 5; P 34776
Liatris aspera Michaux: 1, 2; P 34751
Liatris spicata (Linnaeus) Willdenow: 5; P 34778
Rudbeckia hirta Linnaeus: 2, 5; P 34574
Solidago canadensis Linnaeus: 2, 4, 5, 7; P 35161
Solidago gigantea Aiton: 2, 4, 5; P 34703
Solidago juncea Aiton: 1, 2, 7; P 34709
Solidago nemoralis Aiton: 1, 2; P 34749
Solidago rugosa Miller: 2, 5; P 34765
Solidago speciosa Nuttall: 1, 2; P 35179
**Tragopogon dubius* Scopoli: 1, 2; P 34275
Vernonia gigantea (Walter) Trelease: 4, 5, 7; P 34702, P 34712

BORAGINACEAE

Hackelia virginiana (Linnaeus) I.M. Johnston: 2, 5, 7; P 34564
Lithospermum caroliniense (J.F. Gmelin) MacMillan: 1, 2; P 34267

BRASSICACEAE

Cardamine bulbosa (Schreber) Britton, Sterns, & Poggenburg: 5; F 1531

CAESALPINACEAE

Cassia fasciculata Michaux: 1, 2; P 34754
Cassia nictitans Linnaeus: 1, 2; P 34718

CAMPANULACEAE

Campanula americana Linnaeus: 5; P 34592

CAPRIFOLIACEAE

**Lonicera morrowii* A. Gray: 5, 7; P 34295
Sambucus canadensis Linnaeus: 5; P 35173

CARYOPHYLLACEAE

**Lychnis alba* Miller: 7; F 1552
Paronychia canadensis (Linnaeus) A.W. Wood: 2; P 34293
Silene stellata (Linnaeus) Aiton f.: 2; P 34580

CHENOPODIACEAE

Chenopodium desiccatum A. Nelson: 1, 2; P 34760

CISTACEAE

Helianthemum canadense (Linnaeus) Michaux: 1, 2; P 34743
Lechea pulchella Rafinesque: 4, 5; Site Record only

CORNACEAE

Cornus racemosa Lamarck: 5; P 34254, P 34705

CORYLACEAE

Corylus americana Walter: 1, 2, 5; P 34571

ELAEAGANIACEAE

**Elaeagnus umbellata* Thunberg: 5; P 34786

ERICACEAE

Gaylussacia baccata (Wangenheim) K. Koch: 2; F 1537
Vaccinium angustifolium Aiton: 2; F 1541

EUPHORBIACEAE

Acalypha gracilens A. Gray ssp. gracilens: 1; P 34759
Acalypha rhomboidea Rafinesque: 5; P 34768
Crotonopsis linearis Michaux: 2; P 34589
Euphorbia corollata Linnaeus: 1, 2; P 34719

FABACEAE

Amorpha canescens Pursh: 1, 2; P 34721
Desmodium sessilifolium (Torrey) Torrey & Gray: 1; P 34744
Lathyrus palustris Linnaeus: 5; P 34292
Lespedeza capitata Michaux: 1; P 34755
Lespedeza hirta (Linnaeus) Hornemann: 2; P 34710

FAGACEAE

Quercus alba Linnaeus: 1, 5; P 35172
Quercus palustris Müenchhausen: 2, 5; P 35162
Quercus velutina Lamarck: 1, 2, 5; P 35166

GENTIANACEAE

Bartonia virginica (Linnaeus) Britton, Sterns, & Poggenburg: 5; P 34787
Gentiana saponaria Linnaeus: 5; P 35160

HYPERICACEAE

Hypericum gentianoides (Linnaeus) Britton, Sterns, & Poggenburg: 2, 4, 7; P 34590
Hypericum sphaerocarpum Michaux: 5; P 34257

LAMIACEAE

**Leonurus cardiaca* Linnaeus: 5, 7; P 34246
Lycopus americanus Muhlenberg: 5; P 34783
Lycopus rubellus Moench: 5; P 34792
Monarda fistulosa Linnaeus: 4, 5, 7; P 34575
Monarda punctata Linnaeus: 1, 2; P 34715
Pycnanthemum virginianum (Linnaeus) T. Durand & B.D. Jackson: 4, 5; P 34578
Stachys tenuifolia Willdenow var. *hispida* (Pursh) Fernald: 5; P 34585

LAURACEAE

Sassafras albidum (Nuttall) Nees: 1, 2, 5; P 34771

MELASTOMATACEAE

Rhexia virginica Linnaeus: 2; P 34586

NYSSACEAE

Nyssa sylvatica Marshall: 5; P 35175

OLEACEAE

Fraxinus pennsylvanica Marshall: 5, 7; F 1549, P 34567

ONAGRACEAE

Circaea lutetiana Linnaeus: 5; P 34252
Oenothera pilosella Rafinesque: 5; P 34258

PHYTOLACCACEAE

Phytolacca americana Linnaeus: 5, 7; P 34568

POLEMONIACEAE

Phlox glaberrima Linnaeus: 4; P 34259

POLYGALACEAE

Polygala polygama Walter: 1, 2; P 34274
Polygala sanguinea Linnaeus: 5; P 34573

POLYGONACEAE

**Polygonum cespitosum* Blume: 5, 7; P 343781
**Polygonum hydropiper* Linnaeus: 5, 7; P 34785
Polygonum opelousanum Riddell: 5; P 34784
**Rumex acetosella* Linnaeus: 1, 2; F 1544

RANUNCULACEAE

Anemone quinquefolia Linnaeus: 5; F 1535
Ranunculus abortivus Linnaeus: 5, 7; F 1551

RHAMNACEAE

Ceanothus americanus Linnaeus: 1, 2; P 34723

ROSACEAE

Agrimonia parviflora Aiton: 4, 5, 7; P 34704
Aronia prunifolia (Michaux) Rehder: 4, 5; P 34283
Geum canadense Jacquin: 5; P 34250
Geum laciniatum Murr: 5; P 34598
Potentilla simplex Michaux: 1, 2, 5, 7; F 1528
Prunus serotina Ehrhart: 1, 2, 4, 5, 7; P 34780
Rosa carolina Linnaeus: 1, 2; P 34269
**Rosa multiflora* Thunberg: 5, 7; P 34570
Rosa setigera Michaux: 4, 5; P 34582
Rubus allegheniensis Porter: 1, 2; F 1530
Rubus hispidus Linnaeus: 2, 5; P 34260
Rubus schneideri Bailey: 5; P 34276
Spiraea alba Du Roi: 4, 5; P 34576
Spiraea tomentosa Linnaeus: 5; P 34577

RUBIACEAE

Galium aparine Linnaeus: 5; F 1532
Galium obtusum Bigelow: 5; P 34584
Galium pilosum Aiton: 1, 2; P 34594; P 34761
Hedyotis caerulea (Linnaeus) Hooker: 4; F 1524

SALICACEAE

Populus tremuloides Michaux: 4, 5; P 35163
Salix humilis Marshall: 2, 5; P 35182

SANTALACEAE

Comandra umbellata (Linnaeus) Nuttall: 2; P 35180

SCROPHULARIACEAE

Pedicularis canadensis Linnaeus: 4; P 34285
Scrophularia lanceolata Pursh: 1; F 1545
**Verbascum thapsus* Linnaeus: 5, 7; P 34775
Veronicastrum virginicum (Linnaeus) Farwell: 4, 5; P 34579

SOLANACEAE

Physalis heterophylla Nees: 5; P 34790
Solanum dulcamara Linnaeus: 5; P 34279
Solanum ptycanthum Dunal: 1, 2, 5, 7; P 34773

ULMACEAE

Celtis occidentalis Linnaeus: 5; P 34569
Ulmus americana Linnaeus: 5; P 34265

URTICACEAE

Boehmeria cylindrica (Linnaeus) Swartz: 5; P 34789
Parietaria pensylvanica Muhlenberg: 5; P 34281
Pilea pumila (Linnaeus) A. Gray: 5; P 35159
Urtica dioica Linnaeus: 5; P 34563

VIOLACEAE

Viola pratincola Greene: 5, 7; P 34278
Viola primulifolia Linnaeus: 2, 5; P 34277, P 34588, P 34596
Viola sagittata Aiton: 1, 2, 4, 5, 7; P 34288

APPENDIX II. TREE AND LARGE SHRUB ENCROACHMENT AT PEMBROKE SAVANNAS, KANKAKEE COUNTY, ILLINOIS

Aerial photographs from 1939, 1967, and 1988 were digitized to demonstrate woody encroachment (tree and large shrub) at the Pembroke Savannas (PS), Kankakee County, Illinois. These aerial photographs were borrowed from the University of Illinois Map Library and scanned with a Microtek ScanMaker. 20 stratified random 5 hectare sites, approximately 19.6% of the PS (Figures 8, 9, and 10), were interpreted and then digitized using ARC/INFO (Table 11).

Data interpretation was difficult depending on the quality and resolutin of the original photos, problems with registering the photos, and problems with the interpretation of the data, specifically differentiating between trees and other features which show up as black or dark gray such as wet areas. The 1939 aerial photographs were flown in July, the 1967 aerials were flown in May, and the 1988 aerials were flown in April.

In 1939 approximately 26.924 ha of the present area was covered by trees and large shrubs (Table 11). These species have increased dramatically, in 1967 there was approximately 48.059 ha cover, and in 1988 approximately 68.278 ha. Trees and large shrubs, from 1939 (26.9% cover) to 1988 (68.3% cover), have significantly increased at the PS. This ia a dramatic increase of 41.354 ha (41.4%) in 49 years.

Table 11. Cover (ha) of trees and large shrubs within 20, 5 hectare, stratified sites digitized from aerial photograph during three years (1939, 1967, and 1988) within the Pembroke Savannas, Kankakee County, Illinois.

5 hectare sites		1939 (ha)	1967 (ha)	1988 (ha)
1	Liebert	0.978	1.496	1.568
2	Liebert	0.850	1.720	2.647
3	Liebert	0.158	0.507	0.774
4	Liebert	0.849	1.068	1.491
5	Liebert	0.245	0.297	0.433
6	Liebert	1.124	1.192	1.866
7	Liebert	2.669	3.239	4.588
8	Liebert	2.256	1.764	3.923
9	Mt. Fraker	0.098	1.899	3.352
10	Mt. Fraker	0.070	2.215	4.155
11	Sweet Fern	0.367	3.532	4.397
12	Sweet Fern	0.149	4.846	4.970
13	Thomas Green	0.995	1.370	4.543
14	Thomas Green	3.543	4.774	4.733
15	Leesville East	1.551	3.264	4.224
16	Leesville East	0.786	3.420	4.538
17	Bentley/Crawford-Jordan	1.243	1.131	1.534
18	Bentley/Crawford-Jordan	3.578	4.631	4.797
19	De Young	2.277	0.754	4.775
20	De Young	3.138	4.940	4.970
	Totals	26.924	48.059	68.278

Figure 9. Pembroke Savannas, Kankakee County, Illinois. Location of 5 hectare sampling sites interpreted for large shrub and tree encroachment at Liebert (sites 1 to 8) and Mt. Fraker (sites 9 & 10).

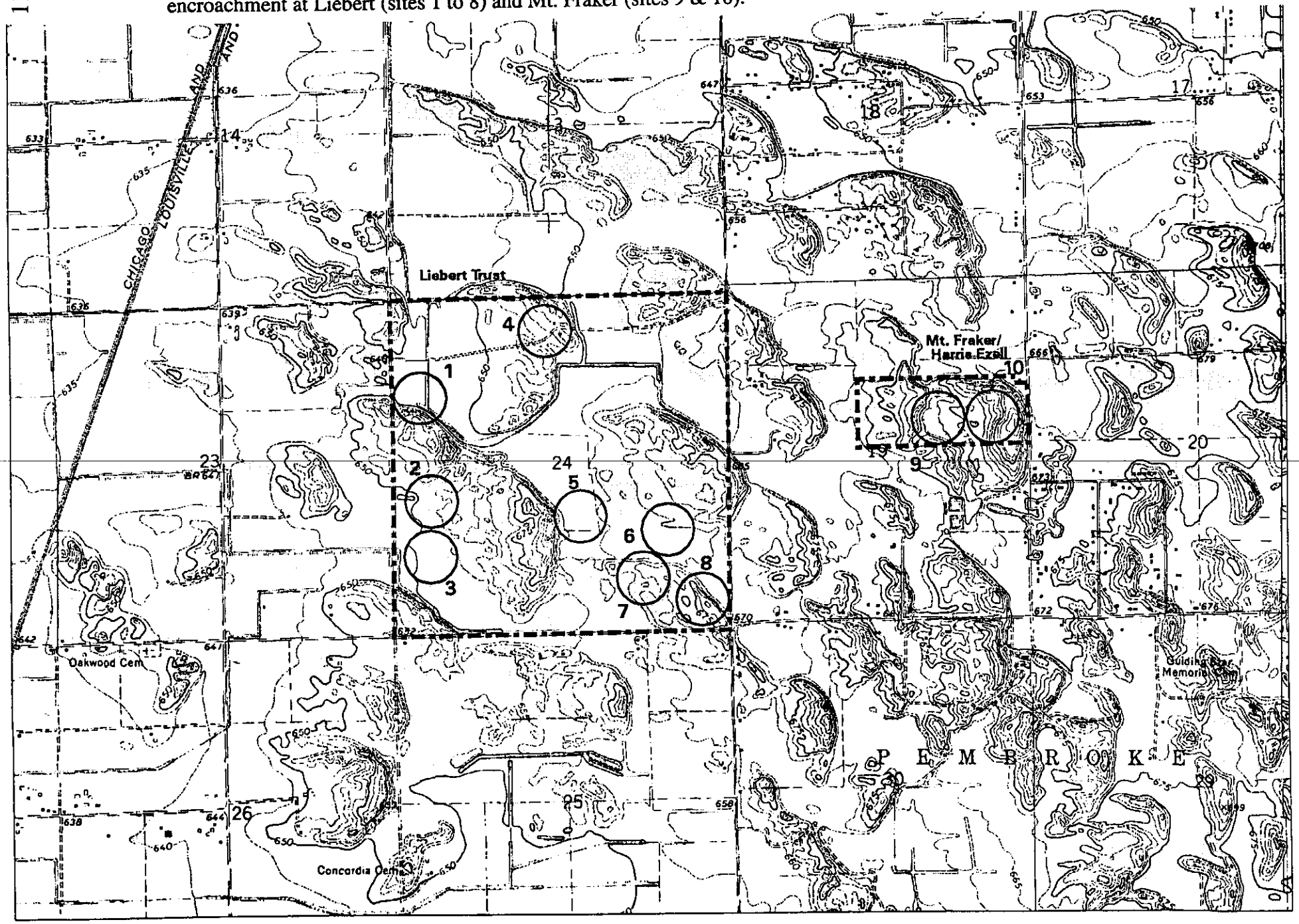


Figure 10. Pembroke Savannas, Kankakee County, Illinois. Location of 5 hectare sampling sites interpreted for large shrub and tree encroachment at Mt Fraker (sites 9 & 10), Sweet Fern (sites 11 & 12), and Thomas Green (sites 13 & 14).

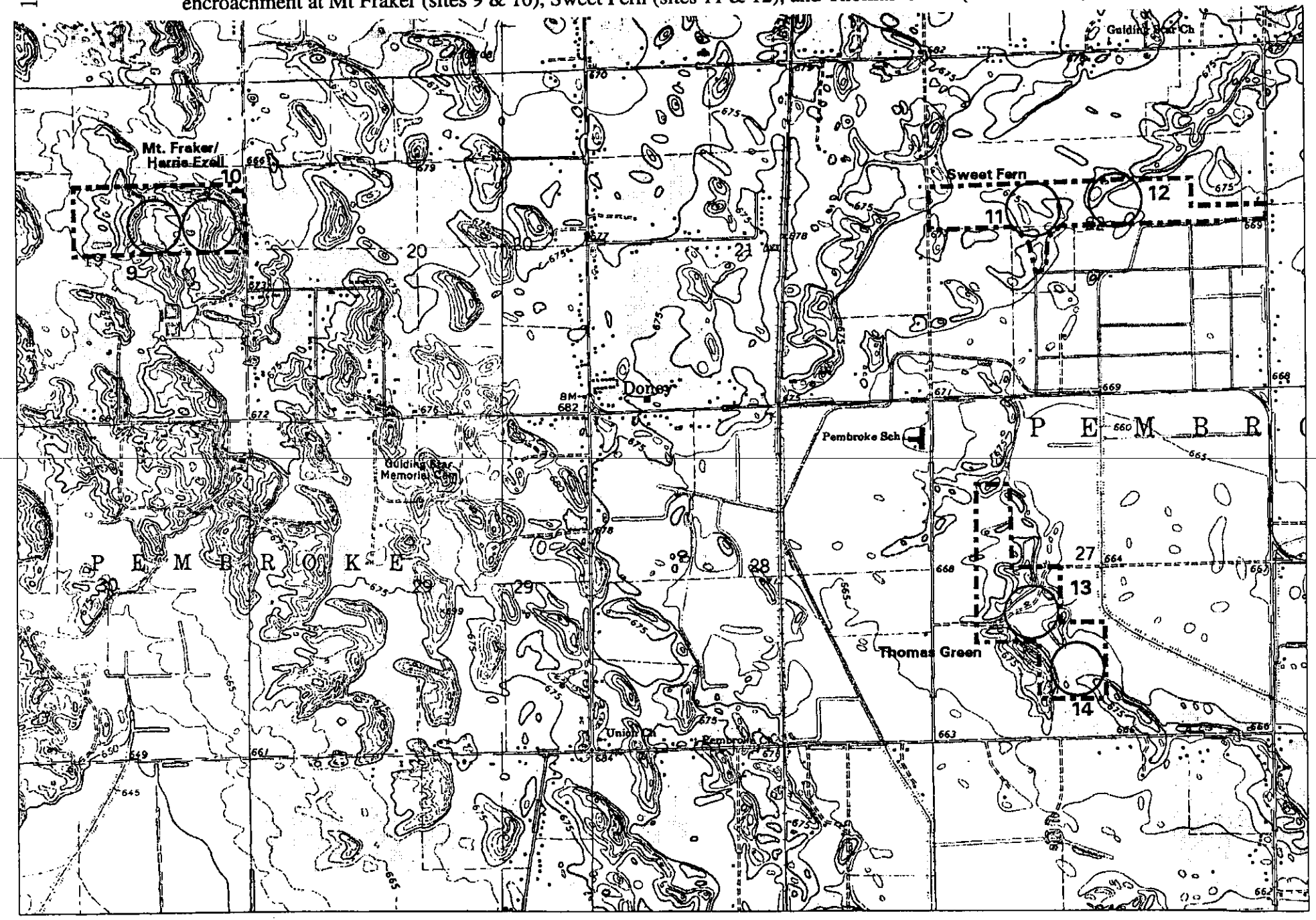


Figure 11. Pembroke Savannas, Kankakee County, Illinois. Location of 5 hectare sampling sites interpreted for large shrub and tree encroachment at Leesville East (sites 15 & 16).

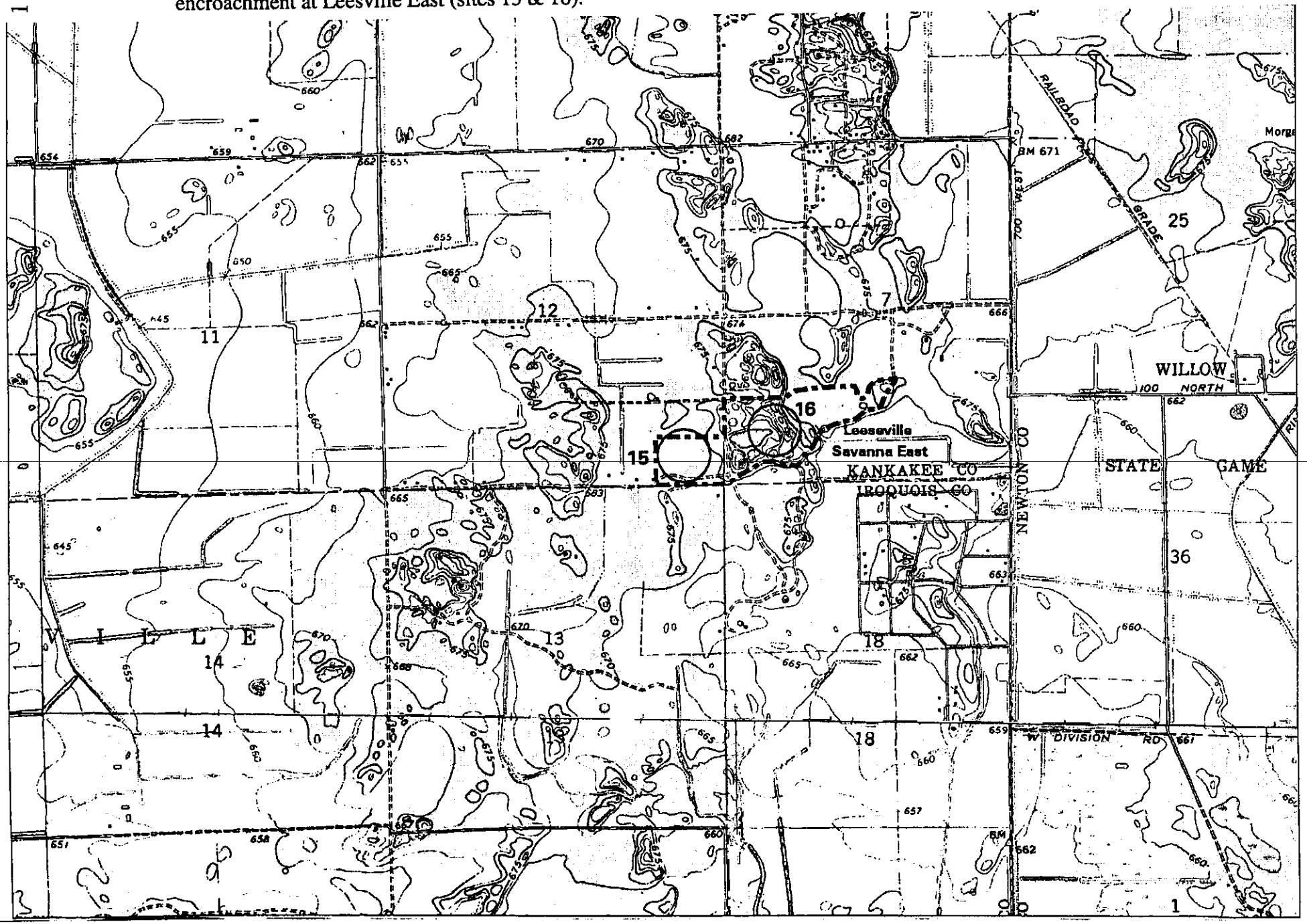
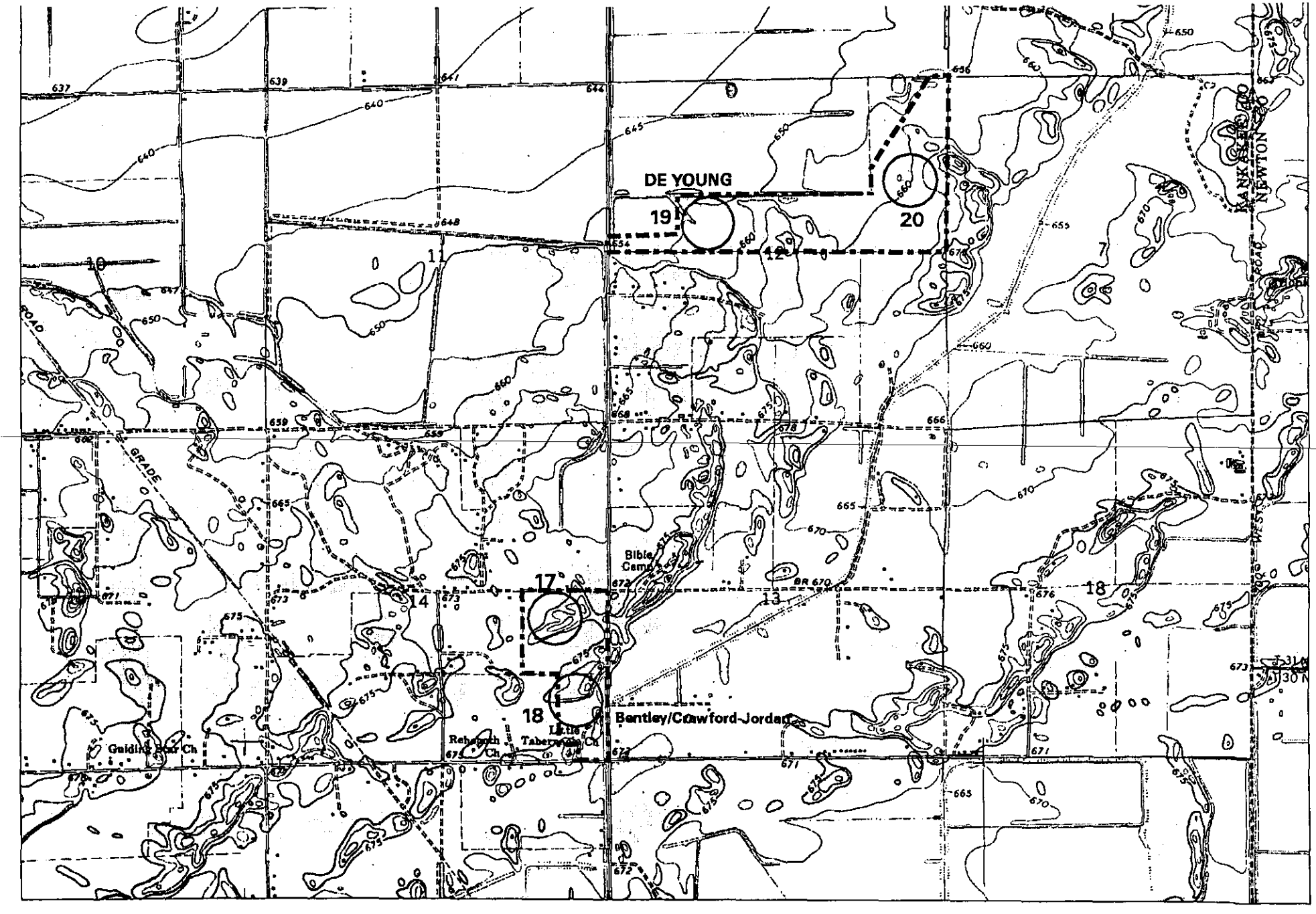


Figure 12. Pembroke Savannas, Kankakee County, Illinois. Location of 5 hectare sampling sites interpreted for large shrub and tree encroachment at Bentley/Crawford-Jordan (sites 17 & 18) and De Young (sites 19 & 20).



Threatened & Endangered Plants Plus Notable Plants Found At Bentley/Crawford-Jordan, Kankakee County, Illinois (2002). (P = Loy R. Phillippe).
Status (E = Endangered, T = Threatened, N = Notable Plant)

	Taxon	Location (Decimal Degrees)		Accuracy (± feet)	Status
1.	Carex cumulata (L.H. Bailey) Fernald P 34631 (counted 17 multi-stemmed clumps in a former crop field, cultural community)	41.08925,	-087.56693	17	N
2.	Lupinus perennis Linnaeus P 34385 (estimat 25 plants in a dry-mesic sand savanna)	41.08797,	-087.56364	30	N
3.	Polygonum careyi Olney Site Record only (single individual in an inclusion of sand flatwoods within a degraded dry-mesic sand savanna)	41.08969,	-087.56744	19	E
4.	Rubus setosus Bigelow P 34158 (colony about 30 feet circumference in a shrub prairie)	41.085389,	-087.563194	34	E
	Rubus setosus Bigelow Site Record only (colony about 30 feet circumference in a dry-mesic sand savanna remnant)	41.089778,	-087.565694	19	E
5.	Viola primulifolia Linnaeus P 34557 (counted 4 plants in a shrub prairie)	41.085556,	-087.563333	--	E
	Viola primulifolia Linnaeus P 34647 (counted 75 plants in an old field, cultural community)	41.08347,	-087.56358	21	E

Threatened & Endangered Plants Plus Notable Plants Found At De Young, Kankakee County, Illinois (2002). (P = Loy R. Phillippe).
Status (E = Endangered, T = Threatened, N = Notable Plant)

	Taxon	Location (Decimal Degrees)		Accuracy (± feet)	Status
1.	Carex cumulata (L.H. Bailey) Fernald P 34791 (counted 6 multi-stemmed clumps in very small seep within a dry sand savanna)	41.10564,	-087.55291	22	N
2.	Polygonum careyi Olney Site Record only (one individual in an open mesic sand savanna)	41.10468,	-087.55605	24	E
3.	Rubus setosus Bigelow P 34276 (colony about 15 feet circumference in sand flatwoods)	41.10680,	-087.54992	49	E
4.	Viola primulifolia Linnaeus P 34277 (counted 150 plants in a sand flatwoods)	41.10680,	-087.54992	49	E
	Viola primulifolia Linnaeus P 34588 (counted 500 plants in an open mesic sand savanna)	41.10468,	-087.55605	24	E
	Viola primulifolia Linnaeus P 34596 (counted 100 plants in a sand flatwoods)	41.10655,	-087.55041	55	E
	Viola primulifolia Linnaeus P 34766 (counted 100 plants in a sand flatwoods)	41.10656,	-087.55232	18	E
	Viola primulifolia Linnaeus Site Record only (counted 10 plants in a sand flatwoods)	41.10722,	-087.54774	35	E
	Viola primulifolia Linnaeus P 34726 (counted 10 plants in an open sand flatwoods)	41.09822,	-087.56364	17	E

Threatened and Endangered Plants Plus Notable Plants Collected At Leesville East, Kankakee County, Illinois in 2002. (F = Mary Ann Feist, M = Paul B. Marcum). Status (E = Endangered, T = Threatened, N = Notable Plant)

	Taxon	Location		(Decimal Degrees)Accuracy (+/- ft)	Status
1.	Baptisia tinctoria (Linnaeus) R. Brown F 1900 (counted about a dozen plants in disturbed dry-mesic sand savanna)	41.01120,	-87.53690	20.0	N
	Baptisia tinctoria (Linnaeus) R. Brown Site Record only (counted about a dozen plants in disturbed dry-mesic sand savanna)	41.01311,	-87.53111	10.0	N
2.	Carex cumulata (L. H. Bailey) Fernald M 1475 (2 or 3 clumps in a disturbed dry-mesic sand savanna)	41.01202,	-87.54521	17.5	N
3.	Eleocharis wolfii A. Gray F 1973 (small patch on edge of wet old field along pipeline right-of-way, cultural community)	41.01052,	-87.53577	10.0	N
4.	Hypericum adpressum Barton F 1994 (estimated several hundred stems growing in wet old field, cultural community)	41.01052,	-87.53577	10.0	E
5.	Polygonum careyi Olney M 1462 (estimated between 12 to 15 plants, cultural community)	41.01180,	-87.54414	18.0	E
	Polygonum careyi Olney F 1992 (several plants growing in an old field, cultural community)	41.01052,	-87.53577	10.0	E
6.	Rubus setosus Bigelow F 1966 (colony 30 feet in circumference in disturbed sand flatwoods)	41.01085,	-87.53716	26.0	E
	Rubus setosus Bigelow F 1991 (colony 20 feet in circumference on edge of old field, cultural community)	41.01052,	-87.53577	10.0	E
	Rubus setosus Bigelow F 1920	41.01164,	-087.53631	16	E
7.	Sisyrinchium atlanticum Bicknell F 1626 (counted 14 plants in disturbed sand flatwoods)	41.01275,	-87.53720	30.0	E
8.	Talinum rugospermum Holzinger F 2128 (a few plants in a dry sand savanna)	41.0127,	-087.5393	--	N

9.	Viola primulifolia Linnaeus M 1492 (few plants, 10 to 20, in disturbed dry-mesic sand savanna)	41.01122,	-87.53693	17.4	E
	Viola primulifolia Linnaeus F 1624 (20 to 30 plants scattered in disturbed sand flatwoods)	41.01275,	-87.53720	30.0	N
	Viola primulifolia Linnaeus F 1993 (10 to 20 plants near edge of old field, cultural community)	41.01052,	-87.53577	10.0	E

Threatened & Endangered Plants Plus Notable Plants Found At Liebert, Kankakee County, Illinois (2002). (B = Daniel T. Busemeyer, P = Loy R. Phillippe). Status (E = Endangered, T = Threatened, N = Notable Plant)

	Taxon	Location (Decimal Degrees)		Accuracy (± feet)	Status
1.	Hymenopappus scabiosaeus L'Hér P 34197 (about 50 plants in a dry sand savanna and adjacent roadside)	41.073389,	-087.675472	16	N
2.	Lupinus perennis Linnaeus Site Record only (counted 10 plants in a degraded dry sand savanna)	41.06675,	-087.66009	33	N
	Lupinus perennis Linnaeus B 976 (estimated 100 plants in a dry sand savanna)	41.08097,	-087.65997	17	N
3.	Polygonum careyi Olney B 1092 (counted 8 plants along sand road in open dry sand savanna)	41.10468,	-087.55605	24	E
4.	Scleria pauciflora Willdenow var. caroliniana (Willdenow) A.W. Wood B 1018 (counted 15 clumps along sand road in open dry sand savanna)	41.07154,	-087.67548	19	N
5.	Viola primulifolia Linnaeus B 884 (counted 50 plants along edge of drainage ditch)	41.0746,	-087.6583	15	E
	Viola primulifolia Linnaeus Site Record only (counted 5 plants along edge of drainage ditch)	41.0753,	-087.6601	17	E

Threatened and Endangered Plants Plus Notable Plants Found At Mt. Fraker, Kankakee County, Illinois (2002). (C = Connie J. Carroll, F = Mary Ann Feist). Status (E = Endangered, T = Threatened, N = Notable Plant)

	Taxon	Location (Decimal Degrees)		Accuracy (± feet)	Status
1.	Talinum rugospermum Holzinger F 1668 (counted 24 plants in a dry sand savanna)	41.07577,	-087.64113	13	N
	Talinum rugospermum Holzinger Site Record only (counted 18 plants in a dry sand savanna)	41.07351,	-087.64730	13	N
	Talinum rugospermum Holzinger Site Record only (counted 25 plants in a dry sand savanna)	41.07443,	-087.64084	22	N
	Talinum rugospermum Holzinger Site Record only (counted 10 plants in a dry sand savanna)	41.07452,	-087.64212	17	N
	Talinum rugospermum Holzinger Site Record only (counted 10 plants in a dry sand savanna)	41.07517,	-087.64352	15	N
	Talinum rugospermum Holzinger Site Record only (counted 5 plants in a dry sand savanna)	41.07513,	-087.64196	18	N
	Talinum rugospermum Holzinger C 43 (counted 10 plants in a dry sand savanna)	41.0757,	-087.6407	--	N

Threatened and Endangered Plants Plus Notable Plants Found At Sweet Fern, Kankakee County, Illinois (2002). (M = Paul B. Marcum).
Status (E = Endangered, T = Threatened, N = Notable Plant)

	Taxon	Location (Decimal Degrees)		Accuracy (+/- ft)	Status
1.	Population 1. M 1257, M 1529 (~500 plants in old field, cultural community)				
	Carex cumulata (L. H. Bailey) Fernald	41.0749,	-87.5992	--	N
	Carex cumulata (L. H. Bailey) Fernald	41.07605,	-87.59911	21.8	N
	Carex cumulata (L. H. Bailey) Fernald	41.07570,	-87.59783	14.6	N
	Carex cumulata (L. H. Bailey) Fernald	41.07525,	-87.59882	19.9	N
	Carex cumulata (L. H. Bailey) Fernald	41.07624,	-87.59834	50	N
	Population 2. Site Record only (~15 to 20 plants along ditch, cultural community)				
	Carex cumulata (L. H. Bailey) Fernald	41.07606,	-87.58930	21.5	N
2.	Population 1. M 1220 (~500 to 1,000 shrubs present in sand flatwoods and dry-mesic sand savanna)				
	Comptonia peregrina (Linnaeus) Coulter	41.0756,	-87.5885	16	E
	Comptonia peregrina (Linnaeus) Coulter	41.0754,	-87.5869	16	E
	Comptonia peregrina (Linnaeus) Coulter	41.0751,	-87.5870	18	E
	Comptonia peregrina (Linnaeus) Coulter	41.07554,	-87.58636	19.1	E
	Comptonia peregrina (Linnaeus) Coulter	41.07487,	-87.58772	16.9	E
	Comptonia peregrina (Linnaeus) Coulter	41.07675,	-87.58876	15.9	E
	Comptonia peregrina (Linnaeus) Coulter	41.07635,	-87.58901	16.5	E
	Comptonia peregrina (Linnaeus) Coulter	41.07536,	-87.58850	20	E
	Comptonia peregrina (Linnaeus) Coulter	41.0757,	-87.5885	--	E
	Comptonia peregrina (Linnaeus) Coulter	41.07502	-87.58672	21	E
	Comptonia peregrina (Linnaeus) Coulter	41.07540	-87.58666	28	E

3.	Population 1. M 1435 (~500 flowering plants in an old field, cultural community)				
	Hypericum adpressum Barton.	41.0749,	-87.5992	--	E
	Hypericum adpressum Barton.	41.07605,	-87.59911	21.8	E
	Hypericum adpressum Barton.	41.07614,	-87.59702	31.2	E
4.	Population 1. M 1428 (~50 to 100 plants observed in filled ditch, cultural community)				
	Polygonum careyi Olney	41.07467,	-87.59932	16.6	E
	Polygonum careyi Olney	41.07572	-87.59932	12.1	E
	Population 2. Site Record only (~10 to 20 plants in and along ditch, cultural community)				
	Polygonum careyi Olney	41.07606,	-87.58930	21.5	E
	Polygonum careyi Olney	41.07658,	-87.58957	21.2	E
	Population 3. Site Record only (6 plants observed at the north edge of sand flatwoods)				
	Polygonum careyi Olney	41.07675,	-87.58876	15.9	E
5.	Population 1. M 1432 (3 plants at the south end of filled ditch, cultural community)				
	Rubus setosus Bigelow	41.07467,	-87.59932	16.6	E
6.	Population 1. M 1514 (~20 plants observed along the north and west part of the filled ditch, cultural community)				
	Scleria muhlenbergii Steudel	41.07572	-87.59932	12.1	N
7.	Population 1. M1524 (7 plants observed at the edge of an old field and a dry sand savanna)				
	Scleria pauciflora Willdenow var. caroliniana (Willdenow) A.W. Wood	41.07570,	-87.59783	14.6	N
8.	Population 1. M 1201 (Greater than 1,000 plants in wet old field west of filled ditch, cultural community)				
	Sisyrinchium atlanticum Bicknell	41.0752,	-87.5998	22	E
	Population 2. Site Record only (3 plants observed at the edge of an old field and dry-mesic sand savanna)				
	Sisyrinchium atlanticum Bicknell	41.07648,	-87.59379	16.5	E
	Population 3. Site Record only (5 plants observed along ditch)				
	Sisyrinchium atlanticum Bicknell	41.0764,	-87.5894	--	E
9.	Population 1. M 1164 (~25 plants observed along the steep bank of a ditch)				
	Viola primulifolia Linnaeus	41.07522,	-87.58875	26	E

Population 2. M 1645 (~20 plants observed at the north edge of the sand flatwoods)

Viola primulifolia Linnaeus	41.07675,	-87.58876	15.9	E