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The Vascular Flora of Pilot Knob State Preserve

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Pilot Knob State Preserve is a 365 acre (147 ha) area lying within the boundaries of Pilot Knob State Park. Located in north central Iowa near the northeast corner of Hancock County, this preserve resides on the eastern morainal system of the Des Moines Lobe left from the Wisconsinan glaciation. The vegetation of the preserve is primarily a deciduous woodland on rolling hills interspersed with wetland habitats in the hollows. Iowa's only floating bog is present in one of these hollows and supports numerous vascular plants uncommon to the state. Two species, *Carex cephalantha* (Bailey) Bickn. and *Drosera rotundifolia* L., are currently known only from this site. The vascular flora of the preserve, studied from both field and herbarium collections, totals 422 species.

INDEX DESCRIPTORS: Pilot Knob State Preserve, Pilot Knob State Park, Iowa flora, floating bog.

Prior to European settlement, the territory surrounding Pilot Knob State Preserve was part of the hunting grounds of several Indian tribes, most notably the Winnebago. In the 1850's, European settlement first began to expand into this region of the state displacing the Indians. A detailed history of early settlement is provided in "History of Kossuth, Hancock and Winnebago Counties, Iowa" (Anonymous 1884). With this settlement came an almost complete elimination of the native vegetation through cultivation and drainage of the land.

This paper documents the historical and current status of the flora of Pilot Knob State Preserve. The vascular plant collections of previous workers have been added to my own collections, and this information has been integrated with the pertinent botanical literature to construct a comprehensive floristic survey of the preserve.

LOCATION

Pilot Knob State Preserve is a 365 acre (147 ha) area lying within the boundary of Pilot Knob State Park. The preserve is located in Hancock County, approximately 3.5 miles (5.6 km) east of Forest City. The main body of the preserve occupies the NE ¼ of section 4 and the NW ¼ of section 3, with several smaller contiguous holdings all in T-97N R-23W Ellington Township.

HISTORY

Pilot Knob likely served as a "pilot" or reference point for pioneer settlers moving into and through this region, and at an elevation of 1450 feet (442 m), the knob is a prominent landmark above the surrounding terrain. Early settlers and natural historians initially referred to this geological prominence as Pilot Mound, but by the 1900's Pilot Knob had become the more widely accepted name for this local landmark. This name change may have been instigated by two local newspaper editors to distinguish the feature from a small town in Iowa also called Pilot Mound (Smith and Bovbjerg 1958, Balsanek and Stoneburner 1969), although this could not be verified.

First dedicated as a state park in 1924, the entire park was also given state preserve status on 23 September 1968. In 1978 an adjacent 160 acres (65 ha) in Winnebago County was acquired as parkland. This land is not included within the boundaries of the preserve.

GEOLOGY

The geological setting of Pilot Knob State Preserve is one of the most recent glacial landscapes in the state. Geological features in this area began forming approximately 14,000 years ago due to the movement into Iowa of the Des Moines Lobe of the Wisconsinan ice sheet which was nearly gone from the state 1,000 years later (Prior

1976). During its brief intrusion into the state, the ice sheet covered the location of the preserve and much of north-central Iowa.

As the Wisconsinan ice sheet retreated northward it left behind deposits of glacial drift which had been carried from regions to the north. In areas where the ice melted slowly, or was stagnant for some time, large amounts were deposited forming series of morainal ridges. Pilot Knob is the highest point of one of these morainal series, above almost 300 feet (92 m) of drift on the eastern lateral moraine of the Des Moines Lobe. The complexity of the glacial landscape in this area has led the Iowa Geological Survey to now refer to this moraine as the Altamont-Bemis(?) Moraine Complex (Kemmis 1981). The high relief landform is characterized by a range of rolling hills and interspersed hollows often lacking drainage outlets.

Kemmis et al. (1981) have tentatively classified the drift deposits of the Des Moines Lobe as the Dows Formation, consisting of four members with the preserve most likely underlain by the Pilot Knob Member. They state that where Pilot Knob Member deposits occur, they are always the uppermost glacial sediments in the area and are composed mainly of ". . . coarse grained glaciofluvial deposits, mostly sands and gravels, although till balls and/or thin beds of poorly-sorted, till-like sediments may occasionally occur."

SETTLEMENT VEGETATION

At the beginning of European settlement, Pilot Knob and surrounding territory most likely supported a substantial deciduous woodland with numerous wetlands and prairie openings present. An early report of this woodland by Burnap (1903) recalls his journey by prairie schooner in 1857 beginning near Osage on the Cedar River; "I embarked upon a treeless sea of land . . . until after a 40 mile cruise we came to wooded land among the groves around Rice Lake and Pilot Mound."

The extent of this wooded land as mapped by Trygg (1964) from surveyor's original plats and field notes, shows a forested area interspersed with marshes of approximately 40 square miles (64 km²). This area, which includes Pilot Knob, is flanked on the west, south, and east by the Winnebago River (historically known as Lime Creek) which may have acted as a natural fire break, reducing fire occurrence and allowing forests to persist in an area otherwise dominated by tallgrass prairie.

In another account of the terrain, Upham (1881) describes "a very rough wooded belt two or three miles wide, for a distance of six miles west from Rhode's Mills to Pilot Mound." This apparent decrease of woodland, 25 years after initial settlement, may be explained by the ongoing exploitation of this wooded resource by the settlers of the region. Pammel (1925a), in relating the history of Hancock and Winnebago Counties, states "Probably all of the original trees of the Pilot Knob area were used for the construction of the pioneer homes in

Ellington Township.”

PREVIOUS STUDIES

Several botanical investigations of Pilot Knob have been conducted since the turn of the century. MacBride (1903) presented an inventory and brief description of the woody vegetation of Pilot Knob and surrounding area. Pammel (1925b, c, d, e) provided a more focused discussion on the vegetation and chronicled a large number of woody and herbaceous species which he had observed in or near the present preserve boundaries. Unfortunately, few voucher specimens are known, and the literature concerning locality information is often ambiguous.

The first floristic survey at Pilot Knob was conducted by Grant and Thorne (1955) and encompassed Dead Man's Lake where they described a *Sphagnum* bog. A total of 75 species of vascular plants was reported. The physical and ecological aspects of the lake and bog were studied by Smith and Bovbjerg (1958) and also Smith (1962) who provided a lengthy discussion on the vegetation and occurrence of particular species in these habitats.

Blagen (1967) studied the habitat of the red-backed vole within the park. In the process he developed a substantial plant list for the area and states that specimens were collected and turned in to the Botany Department (Blagen 1967, in litt. 1987). However, no voucher specimens from his study have been located.

PLANT COMMUNITIES

The plant communities of the preserve have been subject to much human modification, both direct and indirect, through time. Beginning with the timber harvest by pioneers and also pasturing of cattle in the early 1900's (Smith 1962), modifications to the vegetation continued with work done by the Civilian Conservation Corps (CCC) active at Pilot Knob in the mid 1930's. The CCC built a number of stone structures including buildings, entrance portals, and a 35 foot (11 m) observation tower which still stand. They constructed roads and trails and also planted approximately 20,000 trees at Pilot Knob in 1934. Four thousand of these were "hard maple" from Rice Lake State Park (Anonymous 1934). Later, an additional 8,000 trees sent from the CCC camp at Eldora were planted by several county relief men. These "were mostly seedlings and consisted of red oak, bur oak, and ash" (Anonymous 1935). This construction and landscaping clearly had an impact on the plant communities of the preserve. Several other factors have impacted the vegetation including cultivation, wetland alteration, fire suppression, and additional species introductions each of which are discussed under the appropriate plant community.

Eight extant plant communities in Pilot Knob State Preserve are recognized in this study (Figure 1). In addition, an extirpated prairie community is also recognized.

Floating Bog

Iowa's only known floating bog is located in the western half of Dead Man's Lake, in the southwestern corner of the preserve. It occupies approximately 3 acres (1.2 ha) surrounded by marsh. Smith (1962) reported the mean thickness of the floating mat to be 2 feet (0.6 m) and the pH of the interstitial water as acidic but variable. A low pH of 4.1 near the center of the mat can be 5.7 after spring thaw runoff with the basin receiving most of its water directly as rain (Smith 1962). The vascular flora of the bog supports several *Salix* spp. and an herbaceous layer commonly composed of *Carex lacustris*, *Thelypteris palustris* var. *pubescens*, *Triadenum fraseri*, and *Typha latifolia*. Species common to the bog but not frequent in the state include *Carex chordorrhiza*, *Eriophorum gracile*, and *Potentilla palustris*. Two species on the bog, *Carex cephalantha* and *Drosera rotundifolia*, are reported nowhere else in the state. Grant and Thorne (1955) suggest that part of

the mat may have been removed although Smith (1962) states the attempt was halted due to lack of funding.

Open Water

The areas of open water support an assemblage of submersed and floating-leaved vascular plants. Commonly encountered species include *Nuphar luteum* spp. *variegatum*, *Nymphaea tuberosa*, *Potamogeton* spp., and the free floating *Lemna minor* and *Spirodela polyrhiza*. The only natural body of open water in the preserve is the eastern half of Dead Man's Lake. It occupies approximately 4 acres (1.6 ha) adjacent to the bog and becomes heavily vegetated in the summer. Northeast of Dead Man's Lake is Pilot Knob Lake. This lake and connecting ponds form a larger expanse of open water and was constructed in 1938 using Works Progress Administration or National Youth Administration labor (Balsanek and Stoneburner 1969).

Marsh

Scattered marshes are found throughout the preserve in the undrained hollows between morainic hills, along the outer perimeter of the floating bog, and at the shoreline of both Dead Man's and Pilot Knob Lake. The vegetation is characterized by a flora composed of *Carex* spp., including *C. atherodes* and *C. vesicaria*, *Eleocharis* spp., *Polygonum* spp., and *Scirpus* spp. Frequent along the shoreline is *Sagittaria latifolia* and the shrub *Cephalanthus occidentalis* at Dead Man's Lake.

Marsh, or a similar wetland community, originally covered what is now the site of Pilot Knob Lake. Fitzsimmons (1926) mapped and described a marsh meadow clearly coinciding with the present margins of the lake. His plan suggested "this area to be left unmolested and at no time to be drained, as its value lies in its present open, boggy condition . . ."

The marsh and surrounding vicinity of Dead Man's Lake has also been impacted as this area was historically used for recreation. Fitzsimmons (1926), in a description of Dead Man's Lake, states "Constant use as a pleasant picnic place and the ruthless hand of man, have destroyed some of its boundary plant life." This may explain why *Parnassia caroliniana* [= *P. glauca*] collected by Bohumil Shimek on 17 August 1912 in "Woods bordering Dead Man's Lake" has not been collected there since.

Mesic Upland Forest

This forest occurs on the moist, sheltered north slopes of the morainal hills and ridges within the preserve. The canopy is dominated by *Tilia americana*, and to a lesser extent by *Quercus borealis* and *Quercus ellipsoidalis*. A frequent subcanopy component is *Ostrya virginiana*. Commonly encountered herbaceous species include *Desmodium glutinosum*, *Dicentra cucullaria*, *Solidago flexicaulis*, and in spring an abundance of *Trillium nivale*.

Dry Upland Forest

This forest occupies dry site aspects other than north within the preserve. The canopy is dominated by *Quercus alba*, *Q. ellipsoidalis*, and *Q. macrocarpa* although *Q. alba* is restricted to a grove in the southeastern portion of the preserve west of the amphitheater. *Populus tremuloides* is of lesser importance in the canopy and *Prunus serotina* is common in the forest subcanopy. The herbaceous flora is characterized by species such as *Agastache scrophulariifolia*, *Circaea luteiana* spp. *canadensis*, and *Dentaria laciniata*.

Second Growth Forest

Located in the more heavily used northwestern portion of the preserve, this forest community is recovering from past disturbance. Young *P. tremuloides* and scattered *Quercus* spp. are colonizing the available area already occupied by a number of thicker forming shrubs. Included in this shrub assemblage are *Corylus americana*, *Prunus* spp., *Rhus glabra*, *Rubus* spp., and *Zanthoxylum americanum*.

Old Meadow

The majority of the old meadow community is located west and

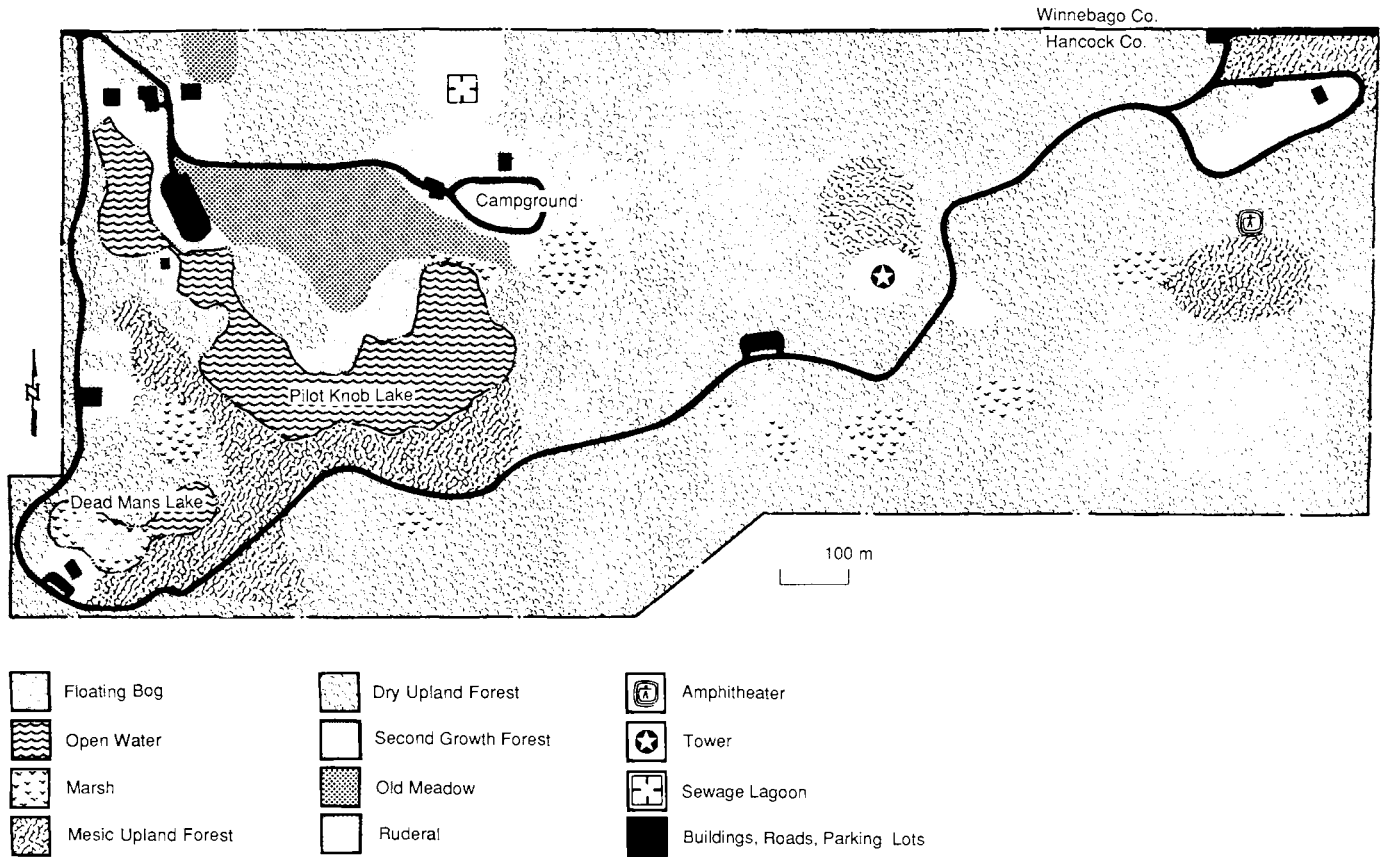


Fig. 1. Plant communities of Pilot Knob State Preserve. Map modified from Pilot Knob State Park (Iowa Conservation Commission, 1986) brochure.

south of the campground on a rolling terrain of small hills. The area was cleared and cultivated in 1912-13, and planted to grains for wildlife after 1925 (Blagen 1967). By 1935-40 the area was a hay meadow (Johnson, A., pers. comm. 1986) and Blagen (1967) states that mowing ceased in 1961.

Presently, the vegetation is dominated by an herbaceous flora composed of early colonizers of mesic habitats. Included are *Asclepias syriaca*, *A. verticillata*, numerous *Aster* spp., *Conyza canadensis*, *Lespedeza capitata*, *Monarda fistulosa*, and an abundance of *Solidago* spp. Several species have been introduced for aesthetic reasons. A population of *Liatris ligulistylis*, occupying a meadow hillside, was transplanted from Myre Slough located northwest of Forest City. Other species found in the south ditch along the road to the campground were probably planted, as evidenced by their placement and/or low number of ramets. These taxa include *Gentiana andrewsii*, *Liatris pycnostachya*, *Pblox maculata*, and *Solidago riddellii*.

Ruderal

The ruderal community occupies areas of recent or ongoing disturbance. The ruderal species, many of Eurasian origin, form an herbaceous flora inhabiting lawns, mowed areas, trail and road edges, and other disturbed areas. Representative of this community are *Digitaria sanguinalis*, *Lotus corniculatus*, *Lysimachia nummularia*, *Matricaria matricarioides*, *Nepeta cataria*, and *Taraxacum officinale*. Also included in this community are non-indigenous woody plants such as *Pinus* spp., *Picea glauca*, and *Platanus occidentalis*. In addition, *Panicum virgatum* and *Sorghastrum nutans* have been seeded into disturbed areas of the preserve for erosion control. These populations are not native to

the preserve and are also included in the ruderal community.

Prairie

Originally, native prairie occupied the summit and some flanks of Pilot Knob itself. This community is now extirpated within the preserve boundaries. This habitat is first alluded to by MacBride (1903) when he described a journey to the top of Pilot Knob: "Forests of oak and ash, linden and hickory spread all around diminishing as we ascend, until we reach the wind-swept summit, perfectly bare. . . ." Fitzsimmons (1926) also recounts a prairie habitat on Pilot Knob when he stated "its summit, as it now exists, pierces through its timber cloak and provides an open expanse of sod-covered ground. . . ."

With the suppression of fire, the surrounding forest gradually invaded the prairie. In a dedication speech for Pilot Knob State Park, Pammel (1925f) briefly mentions a woody invasion by stating "Pilot Knob is the climax of the material left by the ice. Once a small bit of prairie, now overrun with hardy introduced plants. May it be restored." As recently as the late 1950's (ca. 1958), prairie vegetation still existed on the south slope, but was being invaded by trees and sumac (Johnson, A., pers. comm. 1986).

Bohumil Shimek made a number of voucher collections from this prairie knoll on 27 September 1902, 17 August 1912, and 30-31 August 1927. Representative taxa include: *Aster sericeus*, *Gentiana puberula* [= *G. puberulenta*], *Petalostemon purpureum* [= *Dalea purpurea*], and *Polygala verticillata*.

ANNOTATED CATALOGUE

The annotated catalogue of the vascular plants of Pilot Knob State Preserve is based upon field and herbarium research. Field study was conducted by the author during one full season from 29 May 1984 through 13 May 1985. Five additional collecting trips were taken on 25 August 1985, 1 May, 4 June, 15-16 September 1986, and 8 June 1987.

Two herbaria were searched completely for specimens from the study area: The University of Iowa (IA) and University of Northern Iowa (ISTC). Iowa State University (ISC) was searched in part for targeted families, genera, and species.

In the catalogue, nomenclature at family rank and below follows Eilers and Roosa (in manuscript) and is arranged alphabetically. Pertinent synonyms, where necessary, are in brackets; common names are found in parentheses after the scientific binomials. An asterisk (*) preceding a binomial indicates an exotic Eurasian species. A plus sign (+) preceding a binomial indicates a species native to North America and usually Iowa, which has been introduced into the preserve.

The plant communities, in which a species is found, are indicated in the catalogue by the following numbers: Floating Bog (1), Open Water (2), Marsh (3), Mesic Upland Forest (4), Dry Upland Forest (5), Second Growth Forest (6), Old Meadow (7), Ruderal (8), and Prairie (9). A question mark (?) in place of a numeral denotes unreliable plant community information from a voucher collection.

Capital letters following the numerals represent individuals who have collected at least a single specimen from the study area not reported by other collectors. Initials with corresponding name and period of collecting activity are as follows: (B) F. M. Begres (1968), (G) M. L. Grant (1952-59), (P) J. H. Peck (1981), (S) B. Shimek (1902-27), (T) R. F. Thorne (1952-57), (W) W. C. Watson (1984-87), (WO) B. O. Wolden (1948).

Bohumil Shimek has a series of collections dated 30 August 1927, and labeled Pilot Knob, Worth County. These collections have been included in the catalogue and it is presumed this was simply a mistake in labeling since 1) no prominence or feature of any kind called Pilot Knob has been found, past or present, within Worth County, 2) several other collections by Shimek bearing the date of 30 August 1927 are labeled Pilot Knob, Hancock County while still others of the same date are labeled Pilot Mound, Hancock County, and 3) the southwest boundary of Worth County is only 2.5 miles (3.5 km) away and may have caused confusion. Those taxa collected by Shimek labeled Pilot Knob, Worth County which do not have another voucher specimen whose location is given as either Pilot Mound or Pilot Knob, Hancock County are indicated by an open circle (o) preceding the binomial.

A total of 422 species have been identified from Pilot Knob State Preserve, and each species is represented by at least one voucher specimen. The author's voucher specimens are deposited in the University of Northern Iowa Herbarium.

EQUISETOPHYTA

EQUISETACEAE

Equisetum arvense L. (Common horsetail) 3,7;W

POLYPODIOPHYTA

ADIANTACEAE

Adiantum pedatum L. (Northern maidenhair fern) 4,5;T,W

ASPLENIACEAE

- Athyrium filix-femina* (L.) Roth var. *angustum* (Willd.) Moore (Northern lady fern) 4,5;T,W
Cystopteris fragilis (L.) Bernh. var. *mackayi* Lawson [*C. tenuis* (Michx.) Desv.] (Mackay's fragile fern) 4;W
Cystopteris protrusa (Weath.) Blasdell (Creeping fragile fern) 3,5;P
Cystopteris x tennesseensis Shaver (Hybrid bladder fern) ?;T
Dryopteris cristata (L.) Gray (Crested fern) 3;G,W
Onoclea sensibilis L. (Sensitive fern) 3;W
Thelypteris palustris Schott var. *pubescens* (Lawson) Fern. (Marsh fern) 1,3;G,S,T,W

DENNSTAEDTIACEAE

Pteridium aquilinum L. (Kuhn) var. *latiusculum* (Desv.) Underw. ex Heller (Bracken fern) 4,5;W

OPHIOGLOSSACEAE

Batrachium virginianum (L.) Sw. (Rattlesnake fern) 3,4,5;P,W

OSMUNDACEAE

Osmunda claytoniana L. (Interrupted fern) 4;S,W

PINOPHYTA

CUPRESSACEAE

+*Juniperus virginiana* L. (Red cedar) 8;W

PINACEAE

- +*Picea glauca* (Moench) Voss. (White spruce) 8;W
 +*Pinus resinosa* Aiton (Red pine) 8;W
 +*Pinus strobus* L. (White pine) 8;W
 **Pinus sylvestris* L. (Scotch pine) 8;W

MAGNOLIOPHYTA: LILIOPSIDAE

ALISMACEAE

Alisma plantago-aquatica L. (Water plantain) 3;S,W
Sagittaria latifolia Willd. (Arrowhead) 1,3;G,T,W

ARACEAE

Acorus calamus L. (Sweetflag) 3;T
Arisaema triphyllum (L.) Schott (Jack-in-the-pulpit) 4,5;W

COMMELINACEAE

Tradescantia bracteata Small (Spiderwort) 7,8;W

CYPERACEAE

- Carex athorodes* Sprengel (Awned sedge) 3;W
Carex bebbii (Bailey) Fern. (Bebb's sedge) 7;W
Carex bicknellii Britton (Bicknell's sedge) 7;W
Carex blanda Dewey (Woodland sedge) 3,4;W
Carex brevior (Dewey) Mack. ex Lunnell (Few-headed straw sedge) 7;W
Carex cephalantha (Bailey) Bickn. (Sedge) 1;G,T
Carex chondrorrhiza Ehrh. ex L.f. (Creeping sedge) 1;G,T
Carex comosa Boott (Bristly sedge) 1,2;B,G,T,W
Carex convoluta Mack. (Coarse stellate sedge) 4;W
Carex cristatella Britton (Crested sedge) 3;T
Carex lacustris Willd. (River-bank sedge) 1;G,T
Carex lasiocarpa Ehrh. var. *americana* Fern. (Slender sedge) 1;G,T
Carex limosa L. (Shore sedge) 1;T
Carex lupulina Muhl. ex Willd. (Hop sedge) 3;S,T,W
Carex pennsylvanica Lam. (Pennsylvania sedge) 4,5;W
Carex spregelii Dewey ex Sprengel (Sprengel's sedge) 4;W
Carex stipata Muhl. ex Willd. (Awl-fruited sedge) 3;T,W
Carex stricta Lam. (Tussock sedge) 3;W
Carex vesicaria L. (Inflated sedge) 3;W
Carex vulpinoidea Michx. (Fox sedge) 7;W
Cyperus engelmannii Steudel (Engelman's cyperus) 1,3;T,W
Dulichium arundinaceum (L.) Britton (Three-way sedge) 1,3;G,T,W
Eleocharis acicularis (L.) R. & S. (Needle spike-rush) 3;B
Eleocharis obtusa (Willd.) Schultes (Blunt spike-rush) 3;G
Eleocharis ovata (Roth) R. & S. (Spike-rush) 1,3;T,W
Eleocharis smallii Britton (Creeping spike-rush) 1,3;B,T
Eriophorum gracile W.D.J. Koch (Slender cotton-grass) 1;G,T,W
Scirpus cyperinus (L.) Kunth (Wool-grass) 1,3;G,T,W
Scirpus fluvialis (Torrey) Gray (River bulrush) 3;T,W
Scirpus heterochaetus Chase (Pale great bulrush) 3;W
Scirpus validus Vahl. (Great bulrush) 1,3;T,W

HYDROCHARITACEAE

Elodea canadensis Michx. (Water-weed) 2;T,W

IRIDACEAE

Iris shrevei Small (Blue flag) 3;T,W
Sisyrinchium campentre Bickn. (Blue-eyed grass) 7;W

JUNCACEAE

Juncus dudleyi Wiegand (Dudley rush) 3;W
Juncus tenuis Willd. (Path rush) 3,8;W

LEMNACEAE

Lemma minor L. (Duckweed) 2;T,W
Spirodela polyrrhiza (L.) Schleiden (Greater duckweed) 2;W
Wolffia columbiana Karsten (Watermeal) 2;W

LILIACEAE

- Allium canadense* L. (Wild onion) 4,5;W
Allium tricookum Aiton (Wild leek) 4,5;W
 **Asparagus officinalis* L. (Garden asparagus) 7,8;W
Erythronium albidum Nutt. (Trout lily) 4,5;W
Lilium michiganense Farw. (Michigan lily) 5;W
Smilicina racemosa (L.) Desf. (False solomon's seal) 3,4,5;W
Smilicina stellata (L.) Desf. (False solomon's seal) 3,5;W
Smilax ecirrhata (Engelm. ex Kunth) S. Watson (Carrion flower) 4,5;T,W
Smilax herbacea L. (Carrion flower) 4,5,6;W
Smilax hispida Muhl. (Greenbrier) 4,5,6;W
Trillium flexipes Raf. (Nodding trillium) 4,5;W
Trillium nivale Riddell (Snow trillium) 4;W
Uvularia grandiflora Small (Bellwort) 4,5;W

NAJADACEAE

Najas guadalupensis (Sprengel) Magnus (Naiad) 2;T

ORCHIDACEAE

- Coeloglossum viride* (L.) Hartman var. *virescens* (Muhl. ex Willd.) Luer (Bracted orchid) 5;W
Cypripedium calceolus L. var. *pubescens* (Willd.) Correll (Yellow Lady-slipper) 4;W
Galearis spectabilis (L.) Raf. [*Orchis spectabilis* L.] (Showy orchis) 4,5,6;W
Liparis loeselii (L.) L.C. Rich. (Bog twayblade) 1;T

POACEAE

- Agropyron trachycaulum* (Link) Malte (Slender wheat-grass) 9;S
Agrostis hyemalis (Walter) BSP. var. *tenuis* (Tuckerman) Gl. [*A. scabra* Willd.] (Hairgrass) 1;G,T
Alopecurus aequalis Sobol (Foxtail) 1,2;T,W
 **Alopecurus pratensis* L. (Meadow foxtail) 8;W
 **Andropogon gerardii* Vitman (Big bluestem) 7,9;S,W
 **Bromus inermis* Leysser (Smooth brome) 7,8;W

- Bromus pubescens* Muhl. ex Willd. (Canada brome) 5;W
Calamogrostis canadensis (Michx.) Beauv. (Bluejoint) 3;S,T,W
Calamogrostis inexpansa Gray (Northern reed grass) 3;T
Dactylis glomerata L. (Orchard grass) 8;W
Dichanthelium oligosanthos (Schultes) Gould var. *scribnerianum* (Nash) Gould [*Panicum scribnerianum* Nash] (Panic grass) 7,8;W
**Digitaria sanguinalis* (L.) Scop. (Common crabgrass) 8;W
Elymus canadensis L. (Canada wild rye) 5;W
Elymus villosus Muhl. ex Willd. (Slender wild rye) 4;W
Elymus wiegandii Fern. (Wild rye) ?;T
**Eriochloa villosa* (Thunb.) Kunth (Cup grass) 7;W
**Festuca arundinacea* Schreber (Alta fescue) 7,8;W
Festuca obtusa Biehler (Nodding fescue) 3;T
Glyceria borealis (Nash) Barchelder (Manna grass) 1,3;G,S,T
Glyceria grandis S. Watson (American manna grass) 1,3;T,W
Glyceria striata (Lam.) A.S. Hitchc. (Fowl manna grass) 3,4;T,W
Hystrix patula Moench (Bottlebrush grass) 4,5;W
Leersia oryzoides (L.) Sw. (Rice cut-grass) 3;G
Leersia virginica Willd. (Whitegrass) 3,4,5;W
Muhlenbergia frondosa (Poir.) Fern. (Muhly grass) 5;G,T,W
Muhlenbergia glomerata (Willd.) Trin. (Muhly grass) 1;G,T
Muhlenbergia mexicana (L.) Trin. (Muhly grass) 1;T
Oryzopsis racemosa (Smith) Ricker (Rice grass) ?;T
+*Panicum virgatum* L. (Switch grass) 8;W
Phalaris arundinacea L. (Reed canary grass) 3,7;W
**Poa pratensis* L. (Timothy) 8,9;S,W
**Poa compressa* L. (Canadian bluegrass) 8;T
**Poa palustris* L. (Fowl meadow grass) 3;T
**Poa pratensis* L. (Kentucky bluegrass) 7,8;W
**Schizachyrium scoparium* (Michx.) Nash [*Andropogon scoparius* Michx.] (Little bluestem) 9;S
**Setaria glauca* (L.) Beauv. (Yellow foxtail) 8;W
**Setaria viridis* (L.) Beauv. (Green foxtail) 8;W
+*Sorghastrum nutans* (L.) Nash (Indian grass) 8;W
Spartina pectinata Link (Cord grass) 3,7;S,W
Sphenopholis obtusata (Michx.) Scribner var. *major* (Torrey) K.S. Erdman [*S. intermedia* Rydb.] (Wedge grass) 3;T
Sporobolus heterolepis (Gray) Gray (Prairie dropseed) 9;S
- POTAMOGETONACEAE
Potamogeton amplifolius Tuckerman (Large-leaf pondweed) 2;B,G,T,W
Potamogeton natans L. (Floating-leaf pondweed) 2;WO
Potamogeton pusillus L. (Pondweed) 2;S,T
Potamogeton zosteriformis Fern. (Flat-stemmed pondweed) 2;W
- SPARGANIACEAE
Sparganium chlorocarpum Rydb. (Bur-reed) 3;B
Sparganium eurycarpum Engelm. (Bur-reed) 3;W
- TYPHACEAE
Typha latifolia L. (Common cattail) 1,3;T,W
- MAGNOLIOPHYTA: MAGNOLIOPSIDA
- ACERACEAE
Acer negundo L. (Box elder) 5,6;W
+*Acer saccharinum* L. (Silver maple) 8;W
+*Acer saccharum* Marsh. (Sugar maple) 5;W
- ANACARDIACEAE
**Rhus glabra* L. (Smooth sumac) 6,9;S,W
Toxicodendron rydbergii (Small ex Rydb.) Greene (Poison ivy) 4,5,6,7,8;W
- APIACEAE
Cicuta bulbifera L. (Bulbifer water hemlock) 3;G
Cicuta maculata L. (Water hemlock) 3,7;W
Cryptotaenia canadensis (L.) DC. (Honewort) 4,5;W
Heracleum lanatum Michx. (Cow parsnip) 5;W
Osmorhiza claytonii (Michx.) C.B. Clarke (Sweet cicely) 4,5;W
Osmorhiza longistylis (Torrey) DC. (Anise root) 4,5;W
**Pastinaca sativa* L. (Wild parsnip) 7,8;W
Sanicula gregaria Bickn. (Common snakeroot) 4,5;W
Sanicula marilandica L. (Black snakeroot) 4,5;W
Sium suave Walter (Water parsnip) 1,3;W
Taenidia integerrima (L.) Drude (Yellow pimpinell) 5;W
Zizia aurea (L.) W. Koch (Golden alexanders) 4,5;W
- APOCYNACEAE
Apocynum androsaemifolium L. (Spreading dogbane) 6,7;W
Apocynum cannabinum L. (Indian hemp) 3,7;W
- ARALIACEAE
Aralia nudicaulis L. (Wild sarsaparilla) 4,5;T,W
Aralia racemosa L. (Spikenard) 4,5;T,W
Panax quinquefolium L. (Ginseng) 4;W
- ARISTOLOCHIACEAE
Asarum canadense L. (Wild ginger) 4,5;S,T,W
- ASCLEPIADACEAE
Asclepias incarnata L. (Swamp milkweed) 3;W
Asclepias syriaca L. (Common milkweed) 7;W
Asclepias verticillata L. (Whorled milkweed) 7;W
- ASTERACEAE
Achillea millefolium L. ssp. *lanulosa* (Nutt.) Piper (Common yarrow) 7,8;W
Ambrosia artemisiifolia L. (Common ragweed) 7,8,9;S,W
Ambrosia trifida L. (Giant ragweed) 7;W
Antennaria plantaginifolia (L.) Richardson (Pussytoes) 5,8;W
**Arctium minus* Bernh. (Common burdock) 5;W
Artemisia campestris L. ssp. *caudata* (Michx.) Hall & Clem. (Beach wormwood) 9;S
Artemisia ludoviciana Nutt. (White sage) 3,7,9;S,W
Artemisia serrata Nutt. (Sage) 3;T
Aster azureus Lindley (Sky-blue aster) [*A. oolentangiensis* Riddell] 9;S
Aster cordifolius L. (Blue wood aster) 4,5;W
Aster ericoides L. (Heath aster) 7;W
Aster junceiformis Rydb. [*A. borealis* (T. & G.) Prov.] (Rush aster) 1,3;G,T,W
Aster laevis L. (Smooth aster) 5,7,9;S,W
Aster ontarionis Wiegand (Ontario aster) 3;W
Aster sericeus Vent. (Silky aster) 9;S
Aster lanceolatus Willd. [*A. simplex* Willd.] (Panicled aster) 7;W
Bidens cernua L. (Nodding bur marigold) 3,7;W
Bidens frondosa L. (Beggarticks) 3,7;W
Boltonia asteroides (L.) I'Her. (False aster) 3;W
**Cirsium arvense* (L.) Scop. (Canada thistle) 7;W
Cirsium discolor (Muhl. ex Willd.) Sprengel (Field thistle) 7;W
Conyza canadensis (L.) Cronq. (Horseweed) 7;W
Erechtites hieracifolia (L.) Raf. ex DC. (Fireweed) 1,3;G,T,W
Erigeron annuus (L.) Pers. (Daisy fleabane) 7,8;W
Erigeron philadelphicus L. (Fleabane) 4,8;W
Erigeron strigosus Muhl. ex Willd. (Fleabane) 7;W
Eupatorium maculatum L. (Spotted joe-pye-weed) 6;W
Eupatorium perfoliatum L. (Boneset) 3;W
Eupatorium purpureum L. (Purple joe-pye-weed) 4,5;W
Eupatorium rugosum Houtt. (White snakeroot) 4,5;W
Euthamia graminifolia (L.) Nutt. ex Cass. [*Solidago graminifolia* (L.) Salisb.] (Narrow-leaved goldenrod) 9;S
Helianthus decapetalus L. (Pale sunflower) 5;T,W
Helianthus grosseserratus Martens (Saw-tooth sunflower) 7;W
Helianthus tuberosus L. (Jerusalem artichoke) 6,7;W
Heliopsis helianthoides (L.) Sweet. (Ox eye) 6,8;W
**Hieracium umbellatum* L. (Hawkweed) 9;S
Lactuca biennis (Moench) Fern. (Tall blue lettuce) 7,8;W
Lactuca canadensis L. (Wild lettuce) 1;G
**Lactuca serriola* L. (Prickly lettuce) 8;W
- +*Liatris ligulistylis* (A. Nelson) K. Schum. (Blazing star) 7;W
+*Liatris pycnostachya* Michx. (Blazing star) 7;W
**Matricaria matricarioides* (Less.) Porter (Pineapple weed) 8;W
Prenanthes alba L. (Rattlesnake-root) 4;W
Ratibida pinnata (Vent.) Barnh. (Yellow coneflower) 7;W
Rudbeckia hirta L. (Black-eyed susan) 7;W
Rudbeckia laciniata L. (Tall coneflower) 5;W
Senecio pseud aureus Rydb. var. *semicordatus* (Mack. & Bush) T.M. Barkley (Ragwort) 7;W
Silphium perfoliatum L. (Cup plant) 5;W
Solidago canadensis L. (Tall goldenrod) 7;W
Solidago flexicaulis L. (Zig-zag goldenrod) 4;S,W
Solidago gigantea Aiton (Smooth goldenrod) 1,4;T,W
+*Solidago riddellii* Frank ex Riddell (Riddell's goldenrod) 7;W
Solidago rigida L. (Stiff goldenrod) 7;W
Solidago speciosa Nutt. (Showy goldenrod) 9;S
**Taraxacum officinale* Weber (Common dandelion) 7,8;W
**Tragopogon dubius* Scop. (Goat's beard) 7,8;W
**Tragopogon pratensis* L. (Goat's beard) 7;W
Vernonia fasciculata Michx. (Ironweed) 3,7;W
- BALSAMINACEAE
Impatiens pallida Nutt. (Pale touch-me-not) 3,5;W
- BERBERIDACEAE
**Berberis thunbergii* DC. (Japanese barberry) 3,4;W
Caulophyllum thalictroides (L.) Michx. (Blue cohosh) 4,5;W
Podophyllum peltatum L. (May-apple) 5;W
- BETULACEAE
Corylus americana Walter (Hazelnut) 3,4,5,6,9;G,S,T,W
Ostrya virginiana (P. Miller) K. Koch (Ironwood) 4;W
- BORAGINACEAE
Hackelia virginiana (L.) I.M. Johnston (Stickseed) 5;W
Lithospermum canescens (Michx.) Lehm. (Hoary puccoon) 7;W
- BRASSICACEAE
**Barbarea vulgaris* R. Br. (Yellow rocket) 7,8;W
**Capsella bursa-pastoris* (L.) Medicus (Shepherd's purse) 8;W
Cardamine pensylvanica Muhl. ex Willd. (Bitter cress) 3;G
Dentaria laciniata Muhl. ex Willd. (Toothwort) 5;W
**Hesperis matronalis* L. (Dame's rocket) 8;W
Rorippa palustris (L.) Besser (Marsh cress) 3;T
**Thlaspi arvense* L. (Penny cress) 7;W
- CAMPANULACEAE
Campanula americana L. (Tall bellflower) 5;W
Campanula aparimoides L. (Marsh bellflower) 1;G,T
**Campanula rapunculoides* L. (Creeping bellflower) 8;W
Lobelia siphilitica L. (Great lobelia) 3,7;S,W
- CAPRIFOLIACEAE
Lonicera dioica L. var. *glaucescens* (Rydb.) Butters (Wild honeysuckle) 3,4;W
**Lonicera morrowi* Gray (Cultivated honeysuckle) 8;W
**Lonicera tatarica* L. (Cultivated honeysuckle) 8;W
Sambucus canadensis L. (Elderberry) 3;W
Symphoricarpos orbiculatus Moench (Coralberry) ?;T
Triosteum perfoliatum L. (Horse gentian) 5,7;W
Viburnum lentago L. (Nannyberry) 4;W
Viburnum rafinesquianum Schultes (Downy arrowwood) 4;S,W
- CARYOPHYLLACEAE
Moehringia lateriflora (L.) Fenzl. [*Arenaria lateriflora* L.] (Sandwort) 3,4;W
**Silene alba* (P. Miller) Krause [*Lycnis alba* (P. Miller)] (White campion) 7,8;W
Silene stellata (L.) Aiton f. (Starry campion) 5;W
Stellaria longifolia Muhl. ex Willd. (Stickwort) 3,7;T,W
- CELASTRACEAE
Celastrus scandens L. (Bittersweet) 5;W

CERATOPHYLLACEAE

Ceratophyllum demersum L. (Coontail) 2;W

CONVOLVULACEAE

Calystegia sepium (L.) R. Br. [*Convolvulus sepium* L.] (Hedge bindweed) 3,7;W
Cuscuta coryli Englem. (Hazel dodder) 3;T
Cuscuta gronovii Willd. (Gronovius's dodder) 4;W

CORNACEAE

Cornus foenina Mill. ssp. *racemosa* (Lam.) J.S. Wilson [C. *racemosa* Lam.] (Gray dogwood) 4,5;T,W
Cornus rugosa Lam. (Round-leaved dogwood) 4,5;T,W

DROSERACEAE

Drosera rotundifolia L. (Sundew) 1;B,G,T,W

ELAEAGNACEAE

**Elaeagnus umbellata* Thunb. (Autumn olive) 7;W

FABACEAE

Amphicarpa bracteata (L.) Fern. (Hog peanut) 4,5;T,W
Astragalus canadensis L. (Milk vetch) 5;W
Baptisia lactea (Raf.) Thierat [B. *leucantha* T. & G.] (Wild indigo) 7,9;S,W
**Cornilla varia* L. (Crown vetch) 7,8;W
**Dalea candida* Willd. [*Petalostemon candidum* (Willd.) Michx.] (White prairie clover) 9;S
Dalea purpurea Vent [*Petalostemon purpureum* (Vent.) Rydb.] (Purple prairie clover) 7,9;S,W
Desmodium canadense (L.) DC. (Canada tickclover) 7;W
Desmodium cuspidatum (Muhl. ex Willd.) Loudon (Tick trefoil) 4,5;T,W
Desmodium glutinosum (Muhl. ex Willd.) Wood (Pointed tick trefoil) 4,5,6;W
Lathyrus ochroleucus Hooker (Wild pea) 4;W
Lathyrus venosus Muhl. ex Willd. (Veiny pea) 7;W
Lespedeza capitata Michx. (Round-headed bush clover) 7,9;S,W
**Lotus corniculatus* L. (Birdsfoot trefoil) 8;W
**Medicago lupulina* L. (Black medic) 7,8;W
**Medicago sativa* L. (Alfalfa) 8;W
**Melilotus alba* Medicus (White sweet clover) 7,8;W
**Melilotus officinalis* (L.) Lam. (Yellow sweet clover) 7,8;W
+ *Robinia pseudoacacia* L. (Black locust) 5;W
**Trifolium campestre* Schreb. [T. *procumbens* L. misappl.] (Low hop-clover) 8;T
**Trifolium pratense* L. (Red clover) 7,8;W
**Trifolium repens* L. (White clover) 7,8;W
Vicia americana Muhl. ex Willd. (American vetch) 7;W

FAGACEAE

Quercus alba L. (White oak) 5;S,W
Quercus borealis Michx. f. [Q. *rubra* L. nom. ambig.] (Northern red oak) 4,5,6;W
Quercus ellipsoidalis E.J. Hill (Jack oak, Hill's oak) 4,5,6;S,T,W
Quercus macrocarpa Michx. (Bur oak) 5;S,W

GENTIANACEAE

+ *Gentiana andrewsii* Griseb. (Bottle gentian) 7;W
Gentiana puberulenta J. Pringle (Downy gentian) 9;S

GERANIACEAE

Geranium maculatum L. (Wild geranium) 4,5;W

HIPPOCASTANACEAE

+ *Aesculus glabra* Willd. (Ohio buckeye) 6;W

HYDROPHYLLACEAE

Ellisia nycetela L. (Wild tomato) 5;W
Hydrophyllum virginianum L. (Virginia waterleaf) 4;W

HYPERICACEAE

Triadenum fraseri (Spach) Gl. [*Hypericum virginicum* L. var. *fraseri* (Spach) Fern.] (Marsh St. Johns wort) 1,3;G,T,W

JUGLANDACEAE

Carya cordiformis (Wang.) K. Koch (Bitternut hickory) 4,5;S,W
Juglans cinerea L. (Butternut) 4,5;W
Juglans nigra L. (Black walnut) 4,5;W

LAMIACEAE

Agastache scrophulariifolia (Willd.) Kuntze (Giant hyssop) 5;W
**Leonorus cardiaca* L. (Motherwort) 5,8;W
Lycopus americanus Muhl. ex Bart. (Water horehound) 1,3;G,T,W
Lycopus uniflorus Michx. (Northern bugleweed) 1,3;G,S,T,W
Mentha arvensis L. (Wild mint) 3;W
Monarda fistulosa L. (Wild bergamot) 5,7;W
**Nepeta cataria* L. (Catnip) 8;W
**Prunella vulgaris* L. (Self heal) 3,8;S,T,W
Pycnanthemum virginianum (L.) Durand & Jackson (Mountain mint) 3;S
Scutellaria galericulata L. (Marsh skullcap) 1,3;B,T,W
Scutellaria lateriflora L. (Mad-dog skullcap) 3;T,W
Stachys palustris L. (Woundwort) 3,7;W

LENTIBULARIACEAE

Utricularia minor L. (Small bladderwort) 1;T
Utricularia vulgaris L. (Common bladderwort) 1;G,T

MENISPERMACEAE

Menispermum canadense L. (Moonseed) 4,5;W

NYMPHACEAE

Brasenia schreberi Gmelin (Watershield) 2;G,S,T
Nuphar luteum (L.) Sibth. & Smith ssp. *variegatum* (Engelm. ex Dur.) E.O. Beal (Yellow water lily) 2;T,W
Nymphaea tuberosa Paine (White water lily) 2;B,G,T,W

OLEACEAE

Fraxinus nigra Marsh. (Black ash) 4;W
Fraxinus pennsylvanica Marsh. var. *lanceolata* (Borkh.) Sarg. (Green ash) 3;W

ONAGRACEAE

Circaea luteitana (L.) Ascherson & Magnus ssp. *canadensis* (L.) Ascherson & Magnus [C. *quadrifidulata* (Maxim.) Franch. & Sav. var. *canadensis* (L.) Hara] (Small enchanter's nightshade) 5;W
Epilobium coloratum Biehler (Cinnamon willowherb) 1,3;G,T,W
Epilobium leptophyllum Raf. (Bog willowherb) 1;G,T
Ludwigia polycarpa Short & Peter (False loosestrife) 3;S
Oenothera biennis L. ssp. *centralis* Munz (Evening primrose) 6,7;W

OXALIDACEAE

Oxalis stricta L. (Yellow wood sorrel) 3,8;W

PAPAVERACEAE

Dicentra cucullaria (L.) Bernh. (Dutchman's breeches) 4;W
Sanguinaria canadensis L. (Bloodroot) 4,5;W

PHRYMACEAE

Phryma leptostachya L. (Lopseed) 4,5;W

PLANTAGINACEAE

**Plantago major* L. (Common plantain) 3;T
Plantago rugelii Dcne. (Rugel's plantain) 3,8;T,W

PLATANACEAE

+ *Platanus occidentalis* L. (Sycamore) 8;W

POLEMONIACEAE

Phlox divaricata L. (Sweet william) 4,5;W
Phlox maculata L. (Meadow phlox) 7;W

POLYGALACEAE

Polygala sanguinea L. (Field milkwort) 3;S
Polygala verticillata L. (Whorled milkwort) 9;S

POLYGONACEAE

Polygonum amphibium L. var. *emersum* Michx. [P. *coccineum* Muhl.] (Water smartweed) 3;S,T,W
Polygonum amphibium L. var. *stipulaceum* (Coleman) Fern. [P. *natans* Eaton] (Water smartweed) 3;W
Polygonum lapathifolium L. (Pale smartweed) 3;W
Polygonum pennsylvanicum (L.) Small (Pennsylvania smartweed) 3;T
Polygonum persicaria L. (Lady's thumb) 3;T
Polygonum punctatum Ell. (Water smartweed) 1,3;G,T,W
Polygonum scandens L. (Climbing false buckwheat) 5;T,W

Polygonum virginianum L. (Jumpseed) 3,4,5;W
Rumex altissimus Wood (Pale dock) 2,7;W
**Rumex crispus* L. (Curly dock) 3,7;G,W
Rumex orbiculatus Gray (Great water dock) 1,3;T,W

PRIMULACEAE

Lysimachia ciliata L. (Fringed loosestrife) 4;W
**Lysimachia nummularia* L. (Moneywort) 8;W
Lysimachia terrestris (L.) BSP. (Swamp loosestrife) 1;B,G,T,W
Lysimachia thyriflora L. (Tufted loosestrife) 1;G,T,W

RANUNCULACEAE

Actaea rubra (Aiton) Willd. (Red baneberry) 4,5;W
Anemone canadensis L. (Canada anemone) 7;W
Anemone quinquefolia L. (Wood anemone) 4,5;W
Anemone virginiana L. (Tall anemone) 4,6,7;W
Aquilegia canadensis L. (Columbine) 4,5;S,W
Hepatica nobilis P. Miller var. *acuta* (Pursh) Steyerem. [H. *acutiloba* DC.] (Liverleaf) 4,5;T,W
Pulsatilla patens (L.) P. Miller var. *multifida* Pritz. [Anemone *patens* L.] (Pasque flower) 9;S
Ranunculus abortivus L. (Small-flowered crowfoot) 3,4,7,8;W
Ranunculus septentrionalis Poirer (Swamp buttercup) 4,5;W
Thalictrum dasycarpum Fischer & Ave-Lall. (Meadow-rue) 4,7,8;W
Thalictrum thalictroides (L.) Eames & Boivin [Anemone *thalictroides* (L.) Spach] (Rue anemone) 4,5;W

RHAMNACEAE

Ceanothus americanus L. var. *pitcheri* T. & G. (New Jersey tea) 7;W
**Rhamnus cathartica* L. (Common buckthorn) 5;W

ROSACEAE

Agrimonia gryposepala Wallr. (Agrimony) 5;S,W
Agrimonia pubescens Wallr. (Downy agrimony) 4,5;T,W
Amelanchier alnifolia Nutt. (Juneberry) ?;T
Amelanchier humilis Wieg. (Juneberry) 4;W
Crataegus calpodendron (Ehrh.) Medicus (Hawthorn) 5,6;W
Crataegus succulenta Schrader ex Link (Hawthorn) 5,6;W
Fragaria virginiana Duchesne (Wild strawberry) 4,5;W
Geum canadense Jacq. (White avens) 4;W
Malus ioensis (Wood) Britton (Wild crab) 5,6;T,W
Malus prunifolia (Willd.) Borkh. (Plum-leaf crab) 8;W
Potentilla arguta Pursh (Tall cinquefoil) 9;S
Potentilla norvegica L. (Rough cinquefoil) ?;S
Potentilla palustris (L.) Scop. (Marsh cinquefoil) 1;B,G,T,W
**Potentilla recta* L. (Sulphur cinquefoil) 7;W
Potentilla simplex Michx. (Old-field cinquefoil) 7;W
Prunus mexicana S. Wats. (Big-tree plum) 5,6;W
Prunus pennsylvanica L. f. (Pin cherry) 5,6;W
Prunus serotina Ehrh. (Black cherry) 4,5,6;W
Prunus virginiana L. (Choke cherry) 5;W
°*Rosa blanda* Aiton (Meadow rose) 7,9;S,W
Rubus allegheniensis Porter ex Bailey (Blackberry) 5,6;W
Rubus strigosus Michx. (Wild red raspberry) 5,6;W
**Sorbus aucuparia* L. (Mountain ash) 3;T,W
Spiraea alba Du Roi (Meadowweet) 1,3;B,G,S,T,W

RUBIACEAE

Cephalanthus occidentalis L. (Buttonbush) 1,3;B,G,S,W
Galium aparine L. (Cleavers) 4,5;W
Galium boreale L. (Northern bedstraw) 4,5,7;W
Galium concinnum T. & G. (Shining bedstraw) 3,4,5;W
Galium tinctorium L. (Bedstraw) 1;G,T,W
Galium trifidum L. (Small bedstraw) 3;T
Galium triflorum Michx. (Sweet-scented bedstraw) 4,5;W

RUTACEAE

Zanthoxylum americanum P. Miller (Prickly ash) 5,6;W

SALICACEAE

Populus deltoides Bartram ex Marsh. (Cottonwood) 3,7;W

Populus grandidentata Michx. (Big-tooth aspen) 4,5;W

Populus tremuloides Michx. (Quaking aspen) 5,6;W

Salix amygdaloides Andersson (Peach-leaved willow) 3;T

Salix bebbiana Sarg. (Beaked willow) 1;G,T,W

Salix discolor Muhl. (Pussy willow) 1;T

Salix exigua Nutt. ssp. *interior* (Rowles) Cronq. (Sandbar willow) ?;S

Salix humilis Marsh. (Prairie willow) 9;S

Salix nigra Marsh. (Black willow) 1,2;G,S,T

Salix pedicellaris Pursh (Bog willow) 1;G,T,W

Salix petiolaris Smith (Meadow willow) 1;G,T

SAXIFRAGACEAE

Parnassia glauca Raf. (Grass of Parnassus) ?;S

Penthorum sedoides L. (Ditch stoncrop) 3;W

Ribes missouriense Nutt. ex T. & G. (Wild gooseberry) 4,5,6;W

SCROPHULARIACEAE

Agalinis aspera (Benth) Britton [*Gerardia aspera* Douglas] (False foxglove) 9;S

Mimulus ringens L. (Alleghany monkey-flower) 3;W

Scrophularia lanceolata Pursh (Figwort) 4,5;W

**Verbascum thapsus* L. (Common mullein) 7,8;W

**Veronica peregrina* L. (Purslane speedwell) 7;W

Veronicastrum virginicum (L.) Farw. (Culver's root) 4,5,7;W

SOLANACEAE

Physalis heterophylla Nees. (Ground cherry) 7;W

Physalis virginiana P. Miller (Ground cherry) 7;W

**Solanum dulcamara* L. (European bitter-sweet) 3;W

TILIACEAE

Tilia americana L. (Basswood) 4;W

ULMACEAE

Celtis occidentalis L. (Hackberry) 5;W

Ulmus americana L. (American elm) 5;W

URTICACEAE

Boehmeria cylindrica (L.) Sw. (Bog hemp) 3;W

Laportea canadensis (L.) Wedd. (Wood nettle) 3;W

Parietaria pennsylvanica Muhl. ex Willd. (Pellitory) 8;W

Pilea pumila (L.) Gray (Clearweed) 3;W

Urtica dioica L. (Stinging nettle) 3,5;W

VERBENACEAE

Verbena hastata L. (Blue vervain) 1,3;T,W

Verbena urticifolia L. (White vervain) 3,5;W

VIOLACEAE

Viola pedatifida G. Don. (Prairie violet) 7;W

Viola pubescens Aiton (Downy yellow violet) 4,5;W

Viola sororia Willd. (Hairy blue violet) 4,5;W

VITACEAE

Parthenocissus quinquefolia (L.) Planchon (Virginia creeper) ?;T

Parthenocissus vitacea (Knerr) Hitchc. (Woodbine) 1,5;G,W

Vitis riparia Michx. (Riverbank grape) 4,5,6;W

EXCLUDED FLORA

Numerous species have been excluded from the catalogue for a variety of reasons. Three excluded species are reported by Grant and Thorne (1955): *Potamogeton illinoensis* Morong. (Thorne 14581) which was evidently collected but the voucher was not located; *Pyrus melanocarpa* (Michx.) Willd. [= *Aronia melanocarpa* (Michx.) Ell.] (Grant 12534) was a misidentified *Prunus* sp. seedling, probably *P. serotina*; and *Triglochin maritima* L. which was reported from the bog mat. However, it was stated this species was overlooked and not collected.

Voucher collections of seedlings have been excluded as was a putative hybrid *Aster* (Wolden s.n.) because of questionable parentage. A 1940's report of *Cyripedium reginae* Walter (Cole, D., pers. comm. 1987) is lacking a voucher collection and has also been excluded.

Unvouchered species reported in the literature have been excluded (McBride 1903, Pammel 1925b, c, d, e, Smith 1962, Blagen 1967). Many of these citations lack specific locality information and cannot be reliably confined to the present boundaries of the preserve. The literature citations which do have adequate locational information are given with habitat description if available.

Both McBride (1903) and Pammel (1925b) lack sufficient information for location of species within the preserve. Pammel (1925c) reports "black currant" (*Ribes americanum* P. Miller) and "alternate-leaved dogwood" (*Cornus alternifolia* L. f.) to occur within the present boundaries of the preserve. Pammel (1925d) also reports "wild rice" (*Zizania aquatica* L.) "which at one time was common in Dead Man's Lake" and "patience dock" (*Rumex patientia* L.). In addition, Pammel (1925e) reports *Scirpus atrovirens* Willd., *Menyanthes trifoliata* L., and *Lythrum alatum* Pursh "in the bog of Dead Man's Lake." He probably also included the open water habitat of Dead Man's Lake in this description. Smith (1962) reports *Potamogeton foliosus* Raf. from Pilot Knob Lake.

The following species are reported by Blagen (1967), although no habitat information was available. *Acalypha rhomboidea* Raf., *Acerates birtella* Pennel [= *Asclepias birtella* (Pennel) Woodson], *Actaea alba* (L.) Miller [= *A. pachypoda* Ell.], *Agropyron repens* (L.) Beauv., *Agrostis alba* L. [= *A. gigantea* Roth], *Amelanchier canadensis* L. [= *A. arborea* Michx. f. Fern.], *Anthemis cotula* L., *Apocynum sibiricum* Jacq., *Cannabis sativa* L., *Carex gravior* Bailey, *Carya ovata* (P. Miller) K. Koch, *Cercis canadensis* L., *Chenopodium album* L., *Cirsium vulgare* (Savi) tenore, *Claytonia virginica* L., *Cornus drummondii* C.A. Meyer, *Crataegus mollis* (T. & G.) Scheele, *Echinochloa crusgalli* (L.) Beauv., *Euonymus atropurpureus* Jacq., *Euphorbia* spp., *Hordeum jubatum* L., *Impatiens biflora* Walter [= *I. capensis* Meerb.], *Isopyrum biternatum* (Raf.) T. & G., *Lepidium densiflorum* Schrader, *Malva neglecta* Wallr., *Morus rubra* L., *Polygonatum canaliculatum* (Muhl.) Pursh [= *P. biflorum* (Walter

Ell.], *Polygonum aviculare* L., *P. erectum* L. [= *P. achoreum* Blake], *P. convolvulus* L., *Populus sargentii* Dode [= *P. deltoides* Bartram ex. Marsh. spp. *monilifera* (Aiton) Eckenw.], *Prunus americana* Marsh., *Pycnanthemum pilosum* Nutt., *Quercus coccinea* Muenchh., *Q. velutina* Lam., *Ranunculus pennsylvanicus* L. f., *Rubus occidentalis* L., *Rumex mexicanus* Meisner, *Salix fragilis* L., *Sassafras albidum* (Nutt.) Nees, *Sisymbrium altissimum* L., *Sitanion hystrix* (Nutt.) J.G. Small, *Solanum nigrum* L. [= *S. americanum* P. Miller], *Stellaria media* (L.) Vill., *Stipa spartea* Trin., *Trifolium hybridum* L., *Ulmus pumila* (L.) Gray.

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ADDENDUM

During the 1988 field season, plot sampling was conducted by D.R. Farrar and C.L. Johnson-Groh at Pilot Knob State Preserve for the Iowa State Preserves Advisory Board. This work revealed an additional species of note: *Botrychium dissectum* Sprengel f. *obliquum* (Muhl.) Fern. (Grape fern). A voucher specimen collected by D.R. Farrar is deposited in the Iowa State University Herbarium.