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An Inventory of the Vascular Flora of Hamilton County, Iowa (2001–2004)

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A botanical survey of the vascular flora of Hamilton County, Iowa was conducted from 2001 to 2004. During this survey 973 taxa (761 native) were encountered. A search of the literature and a survey of Iowa State University's Ada Hayden Herbarium for additional documented specimens added 28 taxa to the flora. This total of 1001 taxa places Hamilton County fourth in vascular plant richness among inventories conducted in Iowa since 1950. A checklist including common names of most taxa, habitat and abundance data for all taxa encountered during the current survey is presented. Information on earlier collections includes source, and if based on a herbarium voucher, the date of the voucher collection. This study reports 12 new taxa that are not included in Eilers and Roosa's (1994) checklist of the Iowa vascular flora. Fourteen species found during this inventory are included in the 2002 Iowa Natural Resource Commission list of endangered, threatened, or special concern species. Sites containing significant plant taxa in the survey area are mapped and the notable plant taxa for each of these sites are listed.

The results of this survey provide a more thorough understanding of the flora in Hamilton County and in Iowa. These results are also important to conservation efforts such as habitat restoration and reconstruction, and in evaluating the habitat and abundance status of the vascular flora in Hamilton County and the state. This inventory exemplifies the need for similar extensive studies of the flora of other counties in Iowa. The development of a continuously maintained computer database of information on voucher specimens in the herbaria of Iowa would be an invaluable aid for conducting these studies.

INDEX DESCRIPTORS: Hamilton County flora, floristic checklist, exotic plants, rare orchids, threatened and endangered plant species, Iowa plant communities, Iowa flora.

The vascular flora of Hamilton County, Iowa has received very little attention from professional or amateur botanists. Plant survey work in Hamilton County by botanists from Iowa State College in the late 1800s (Hitchcock 1890, Pammel 1898) resulted in a small number of taxa being reported in published papers. Albert Hitchcock, a student and staff member at Iowa State College, developed a very active interest in the flora of central Iowa. He prepared a list of this flora of approximately 700 species (Hitchcock 1890), based on his thorough botanical exploration. This publication lists a small number of species from Cairo Lake and vicinity in Hamilton County. Louis Pammel was named to head the Iowa State College Botany Department in 1889. Pammel's research resulted in the publication "Old Lake Vegetation in Hamilton County, Iowa" (Pammel 1898). This lake is now known as Anderson Lake. Almost all of the species listed in his publication were also found in or around Anderson Lake during this current inventory.

THE STUDY AREA

Hamilton County, Iowa is located in the north-central part of the state (Fig. 1). The west and east boundaries are at longitude 93° 58' and 93° 28' west of the prime meridian respectively, and the north and south boundaries are at latitude 42° 34' and 42° 12' north of the equator respectively. (R. P. Kollasch, Remote Sensing Specialist, Department of Natural Resources, Iowa Geological Survey, Iowa City, Iowa, personal communication). The land area is 369,563 ac (149,554 ha) or 577 mi² (1495.55 km²) (B. Fankhauser, Hamilton County Conservation Dept., personal communication). The highest elevation in Hamilton County is 1262 ft (388.7 m) above sea level and is

located 6 mi (9.7 km) north of Blairsburg near the Wright County line in the northeast quarter of the county. The lowest elevation is 930 ft (286.4 m) and occurs in an area where the Boone River crosses the western boundary into Webster County and joins the Des Moines River about 3 mi (4.8 km) north of Stratford.

Although the natural vegetation of Hamilton County has been drastically altered by human pressures since the time of European settlement, there remain several significant forest, prairie, lake, and wetland plant communities of interest.

Lakes and Wetlands

At the time of European settlement, five glacial lakes were present in Hamilton County. Three of these lakes, Cairo Lake, Iowa Lake, and Clear Lake (Fig. 2), have since been drained and converted to farmland. Cairo Lake (also called Mud Lake), located in the center of the county 3 mi (4.8 km) northwest of Jewell, was the largest of these lakes (1385 ac, 560.5 ha). Cairo Lake was drained in the early 1890s and had disappeared by 1896. Iowa Lake, in northeastern Hamilton County, was the second largest lake in the county at 877 ac (354.9 ha). This lake was drained in the early 1900s, and the former lake bed continues to be drained by a series of ditches. Clear Lake, located in the southwest part of the county, originally covered about 200 ac (80.9 ha). In 1900 a large tile trench was dug adjacent to the lake, and a few years later the lake bed was planted in corn (Anonymous 1985).

Two glacial lakes currently exist in Hamilton County: Little Wall Lake and Anderson Lake (Fig. 2). Little Wall Lake (275 ac, 111.3 ha), located in the south-central part of the county, is designated as a county park and is used extensively for

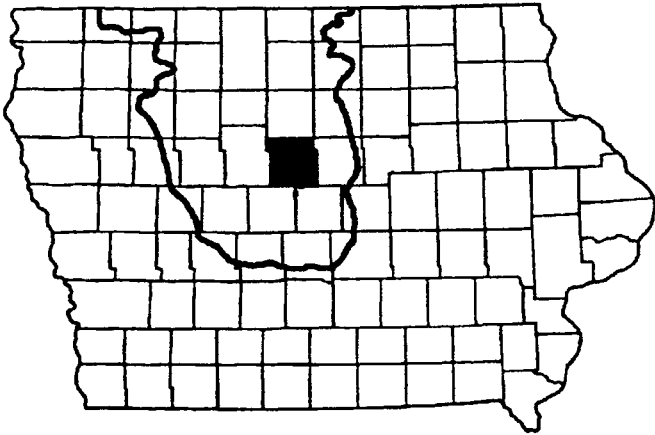


Fig. 1. Location of Hamilton County, Iowa, and the boundary of the Des Moines Lobe, showing the extent of the last glacial advance and the prairie pothole region in Iowa.

swimming, hunting, fishing, picnicking, snowmobiling, and camping. Anderson Lake (200 ac, 80.9 ha), a privately owned lake formerly known as Old Lake, Island Lake, and Goose Lake, occurs in the south-central part of the county within the city limits of Jewell. In the late 1800s, Anderson Lake was observed by Louis H. Pammel to be covered by one to three feet of water over its entire area (Pammel 1898). A quarter century later, water remained in the lake only until the middle of July, while some portions carried a small amount of water the entire year. With the recent addition of a small earthen dam at the drainage outlet, the lake bed of Anderson Lake now contains water the entire year.

There also is an artificial lake (70 ac, 28.3 ha) at Briggs Woods County Park (Fig. 2) in the west-central part of the county. In addition to these lakes there are many man-made drainage ditches and natural and man-made sloughs throughout the county, several of which are in the center of the county. This excerpt from "The History of Hamilton County, Iowa 1985" provides a sense of the historic landscape:

For all of the differences to be found in many historical accounts of early Iowa and particularly Hamilton County, there is total agreement about one aspect. Before the time of the earliest settlers in 1847 until well into the 1900s, this and surrounding areas might well have been the slushiest, sloppiest, marshy swampland of sloughs, ponds, and almost lakes in the entire United States. As people came, they found the land to be very fertile, but a majority of the land was too wet to farm until the 1900s, when the first drainage ditch was established in Hamilton County. Three drainage ditches lie within the boundaries of Jewell, plus an open drainage ditch from Mud Lake. Hamilton County has 310 organized drainage ditches plus several mutual drainage ditches. It is second in the state for organized drainage ditches.

Rivers

The Boone River (Fig. 2) enters Hamilton County in the far northwest corner. It zig-zags southward approximately two-thirds the length of the county before turning into the southwest one-third of the county and entering the Des Moines River just beyond the county line. The Des Moines River borders Hamilton County for less than one mile (1.6 km) in the southwest one-third of the county. The South Skunk River's (Fig. 2) source is in the northeast part of Hamilton County and flows in a southerly direction through the remainder of the county. The South Fork

Iowa River's (Fig. 2) source is also in the northeast part of Hamilton County approximately 3 mi (4.8 km) from the source of the South Skunk River. However, this river flows easterly, exiting the county in the northeast corner. Squaw Creek (Fig. 2) begins and exits the county in the southwest quarter.

Forests

Hamilton County has a large amount of forest vegetation occurring along streams and rivers. These forests belong to the Central Hardwoods Forest Region (Braun 1964) and are dominated primarily by oak (*Quercus*) species. The majority of forest communities in the county occur in the Boone River corridor. The South Skunk River has sparse forest with cultivation of crops to the river banks in many locations. Squaw Creek has even less wooded areas with open grazed pastures and cropfields occupying the riparian and floodplain habitat.

Prairies

Before the time of European settlement most of Hamilton County was covered by prairie vegetation (Anderson 1996), but today the majority of the county has been converted to agricultural use. Nonetheless, several untilled prairie communities still persist in the county. These occur on high sand and gravel moraine hills, wetlands, pioneer cemeteries, and railroad rights-of-way. There are also several hilltop and hillside woods openings (savannas) with prairie and forest species integrated.

METHODS

I conducted extensive field work during the field seasons (April–November) of 2001–2004. During this inventory, I visited native prairies, woodlands, ponds, lakes, and marshes, as well as many sites impacted by human disturbance. These included construction sites, railroad and road rights-of-way, old fields, crop fields, sidewalks, residential lawns, and waste treatment areas.

I compiled a checklist of all vascular plants encountered during this inventory or known from other sources. Included in this checklist are taxa native of Iowa (no symbol), taxa native of the United States but not of Iowa (#), as well as taxa not native to the United States (*). Restoration species (+) are also included in this inventory. As restoration species become naturalized, and in some cases spread beyond the restoration area, they become part of the county flora. Major crop and flower bed species with no tendency to persist from their point of introduction were excluded from the list in most cases. However, *Sorghum bicolor* (L.) Moench, *Triticum aestivum* L., and a few other species occurring annually along railroad rights-of-way and disturbance areas were included in the checklist. The 28 species either found in the Iowa State University Herbarium or reported by Hitchcock (1890) or Pammel (1898) as occurring in Hamilton County that I did not find during the current inventory are listed in the checklist of Hamilton County plants presented in this paper and are indicated by (~).

The checklist provides information regarding the habitat preferences of each plant observed during the inventory. The habitat codes are in four main categories, tree-dominated (T), prairie (P), wetland (W), and open or disturbed (O); the latter category represents sites primarily associated with human activity. Within each of these main categories, there are several subcategories as described in Table 1.

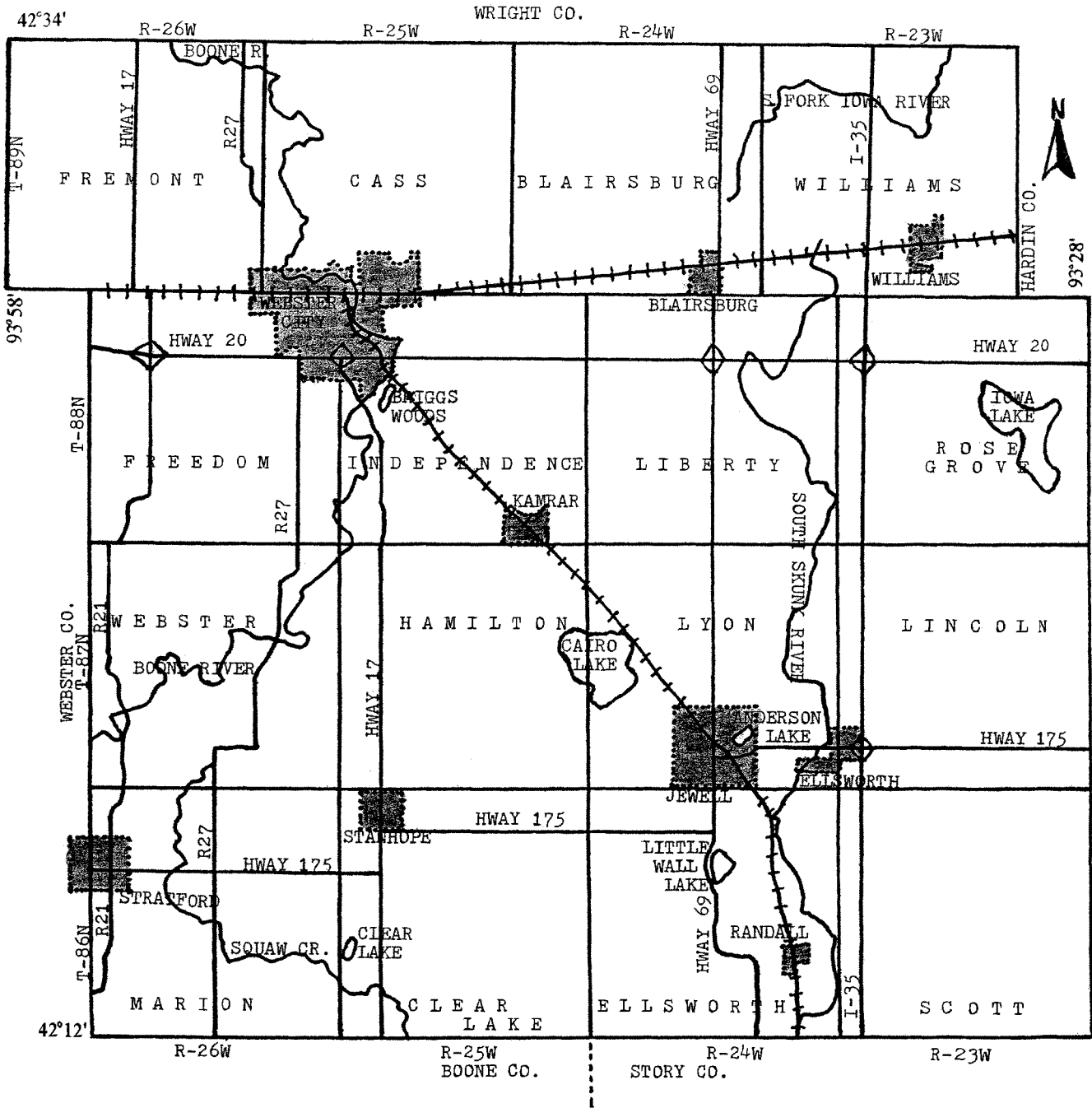


Fig. 2. Map of the Hamilton County, Iowa, survey area.

I assigned abundance codes (common, frequent, infrequent, or sparse) in Hamilton County to each taxa found during the survey. The codes are defined as follows:

- Common*: widely distributed and often found growing in large quantities in several different habitats.
- Frequent*: widespread but not abundant and usually found in only one type of habitat.
- Infrequent*: not widespread and often not found in places where it might be expected to occur.

Sparse: found in only one or a few places.

Definitions for the abundance codes follow those used in Eilers and Roosa (1994). The habitat codes and the general format for this checklist follow those presented in Norris et al. (2001).

Nomenclature for all plant taxa previously reported in Iowa follows Eilers and Roosa (1994), except for Pteridophytes (Flora of North America Committee 1993), Cyperaceae (Flora of North America Committee 2002a), Iridaceae, Liliaceae, and Orchidaceae (Flora of North America Committee 2002b), Poaceae (Clark and Gardner 2004), and *Rubus* L. (Widrechner 1998). Nomenclature

Table 1. Codes used to describe preferred habitats of vascular plants in Hamilton County, Iowa.

1) T (tree-dominated habitats)	
df	dry forest—typically on ridgetops and on south and west-facing slopes
mf	moist forest—typically on north and east-facing slopes
wf	wet forest—typically in bottomlands
wd	woodland—tree dominated habitats with incomplete canopy closure
es	escarpment—due to erosion or soil slumping (usually wet)
ed	edge
2) P (prairie habitats)	
dr	dry prairie
ms	moist prairie
wt	wet prairie—includes 'wet meadow' vegetation from some wetland classification systems
3) W (wetland habitats)	
ez	emergent zone—typically dominated by bulrush, bur-reed and several deep to shallow water sedge species
sz	submergent zone—typically dominated by pondweeds and duckweeds
rp	riparian—includes grassy stream edges and sandbars
md	mudflat—not associated with running water
sp	seep
4) O (open habitats—primarily associated with human disturbance)	
ur	urban—sidewalks, lawns, etc.
cr	croplands, gardens, flowerbeds
rw	rights-of-way—including fencerows, railroad embankments, and powerlines
rc	rocky habitats—including railroad ballast, gravel pits, and sand
of	old field, hayfield
ps	pasture

for plant species previously unreported in Iowa follows Gleason and Cronquist (1991), the Great Plains Flora Association (1986), Steyermark's Flora of Missouri (Yatskievych 1999), or Swink and Wilhelm (1994).

RESULTS

I discovered 973 plant taxa (761 native) in the study area between 2001 and 2004 (Appendix A). An additional 28 plant taxa from Hamilton County are documented (ISC) from past inventory work but were not found during the current inventory. Thus, the grand total of vascular plant taxa known to occur or to have occurred in Hamilton County is 1001 (786 native). The occurrence of all 973 plant taxa discovered in the field during this study are documented by at least one herbarium voucher specimen, or a photo in the case of a few rare species, deposited in the Ada Hayden Herbarium at Iowa State University.

The data in this study reveal that 78% (761) of the taxa observed in Hamilton County are native to the United States, with the remaining 22% (212) being exotic (Table 2). Among the exotic species, most were Poaceae (41 species) followed by Asteraceae (27 species), and Brassicaceae (21 species) (Table 2). *Carex* species can be found in a wide range of habitats and was the largest genus (60 species, all native).

Table 3 lists the number and percent of taxa found in either tree-dominated (455 taxa, 47%), prairie (283 taxa, 29%), wetland (253 taxa, 26%), open (371 taxa, 38%), or more than one type of habitat (280 taxa, 29%). Even with considerable forest areas along the river corridors of Hamilton County, mainly along the Boone River, the number of taxa found on "prairie", "wetland", and "open" areas outnumber tree-dominated taxa by two to one. Of course, there is much more of these open areas with croplands and other human disturbance areas dominating. These human disturbance areas are where the majority of the non-native taxa were found.

Table 4 lists the number and percent of taxa in the Hamilton County flora that were labeled sparse (318 taxa, 33%), infrequent (177 taxa, 18%), frequent (125 taxa, 13%), or common (353 taxa, 36%). These abundance data for taxa growing throughout an entire county was by far the most difficult to complete with maximum accuracy. Since the survey did not cover every acre of the county, it is more than likely that populations of taxa were overlooked. In that case the abundance of some taxa is estimated too low.

Twenty four vascular plant taxa were encountered during the inventory that are listed as endangered (1), threatened (3), or of special concern (10) by the Iowa Natural Resource Commission (Iowa Administrative Code 2002) (Table 5). All of these taxa are native and are listed as sparse on the checklist. Additional information on some of these taxa is included in "Significant Botanical Discoveries" in this paper.

Thirty nine vascular plant taxa were encountered during the inventory that are not listed in Eilers and Roosa (1994) (Table 6). *Acer platanoides* L. and *Acer rubrum* L. × *A. saccharinum* L. are frequent landscape plantings. However, the small trees I found were rare escapes from cultivation propagated naturally from seed. ×*Elyhordeum macounii* (Vassey) Barkworth & Dewey is a very interesting taxon in that many clumps were found in two of the large Hamilton County prairie restorations. Both parent species *Elymus trachycaulus* (Link) Gould ex Shinnars and *Hordeum jubatum* L. were abundant. *E. trachycaulus* was probably in the seed mix, but *H. jubatum* occurred naturally. Also, several clumps of ×*Elyhordeum montanense* (Scribner ex Beal) Bowden, a hybrid between *Elymus virginicus* L. and *Hordeum jubatum*, were found in the same two prairie restorations. *E. virginicus* was part of the prairie seed mix, and again *H. jubatum* occurred naturally. This latter hybrid taxon is listed in Eilers and Roosa (1994).

Significant plant communities in Hamilton County with the legal location, general habitat and size of the sites, and a list of significant taxa found at each of these sites are described in

Table 2. Floristic composition of the Hamilton County survey area.

A. Species, genera, and families in the Hamilton County flora			
Major Groups	Species + (Hybrids)	Genera	Families
Pteridophytes	19 + (1)	11	6
Gymnosperms	3	3	2
Dicotyledons	675 + (16)	316	82
Monocotyledons	283 + (4)	108	18
Total	980 + (21)	438	108

B. Current and Previous years taxa

Origin	Current	Previous Years	Total	%
Native to United States	761	25	786	78
Non-native	212	3	215	22
Total	973	28	1001	100

C. Ten largest families

Family	Native	Non-native	Total (Hybrids)
Asteraceae	104	27	131 (2)
Poaceae	87	41	128 (2)
Cyperaceae	81	0	81 (1)
Rosaceae	40	9	49 (2)
Fabaceae	29	13	42 (0)
Brassicaceae	15	21	36 (0)
Lamiaceae	26	6	32 (1)
Ranunculaceae	26	3	29 (0)
Polygonaceae	16	8	24 (0)
Scrophulariaceae	15	6	21 (0)

D. Eleven largest genera

Genus	Native	Non-native	Total (Hybrids)
<i>Carex</i>	60	0	60 (1)
<i>Aster</i>	17	0	17 (2)
<i>Polygonum</i>	11	4	15 (0)
<i>Salix</i>	10	3	13 (2)
<i>Ranunculus</i>	10	1	11 (0)
<i>Euphorbia</i>	8	2	10 (0)
<i>Rubus</i>	7	3	10 (1)
<i>Solidago</i>	9	0	9 (0)
<i>Rumex</i>	5	4	9 (0)
<i>Bromus</i>	2	7	9 (0)
<i>Muhlenbergia</i>	9	0	9 (0)

Table 3. Habitats of the Hamilton County, Iowa flora.

Habitat Type	No. of Taxa	%
Tree-dominated	455	47
Prairie	283	29
Wetland	253	26
Open	371	38
More than one type	280	29

Table 4. Abundance of the Hamilton County, Iowa flora.

Abundance	No. of taxa	%
Sparse	318	33
Infrequent	177	18
Frequent	125	13
Common	353	36

Appendix B. The map in Fig. 3 shows the location of each of these significant plant communities.

DISCUSSION

A major result of this study is the finding of 973 taxa presently growing in Hamilton County and at least another 28 taxa documented to have grown here in the past. This total of 1001 plant taxa places Hamilton County fourth in total number of taxa among published floral inventories conducted in Iowa since 1950 (Table 7).

The discovery of so many plant taxa in Hamilton County was the result of very extensive searching over four years. I revisited sites numerous times during each field season. In contrast, many other county inventories were conducted over one or two field seasons (Table 7). From the total taxa listed in Table 7 for counties, it can probably be assumed that counties with less than

Table 5. Vascular plant species encountered during inventory of the Hamilton County flora (2001–2004) that are listed as Endangered (E), Threatened (T), or of Special Concern (SC) by the Iowa Natural Resource Commission (Iowa Administrative code 2002). C = found during the current study; Herb. = voucher found in Ada Hayden Herbarium (ISU).

<i>Brasenia Schreberi</i> J. F. Gmelin (Watershield) Herb., SC
<i>Buchloe dactyloides</i> (Nutt.) Engelm. (Buffalo grass) C, SC
<i>Callitriche heterophylla</i> Pursh (Water-starwort) C, SC
<i>Carex aggregata</i> Mack (Sedge) C, SC
<i>Carex crawei</i> Dewey (Sedge) C, SC
<i>Carex tenera</i> Dewey var. <i>tenera</i> (Sedge) C, SC
<i>Carex umbellata</i> Schkuhr ex Willd. (Sedge) C, SC
<i>Chenopodium Missouriensis</i> Aellen (Missouri goosefoot) C, SC
<i>Cirsium hillii</i> (Canby) Fern. (Hollow-rooted thistle) Herb., SC
<i>Cypripedium candidum</i> Muhl. ex Willd. (Small white lady's slipper orchid) C, SC
<i>Cypripedium reginae</i> Walter (Showy lady's slipper orchid) C, T
<i>Echinacea purpurea</i> (L.) Moench (Purple coneflower) C, SC
<i>Eriophorum angustifolium</i> Honck. (Tall cotton-grass) C, SC
<i>Juncus bufonius</i> L. (Toad rush) C, SC
<i>Menyanthes trifoliata</i> L. (Buckbean) Herb., SC
<i>Platanthera praeclara</i> Sheviak & Bowles (Western prairie fringed orchid) Herb., T
<i>Potentilla anserina</i> L. (Silverweed) Herb., T
<i>Prunus nigra</i> Aiton (Canada plum) C, E
<i>Salix candida</i> Fluegge ex Willd. (Sage willow) C, SC
<i>Salix lucida</i> Muhl. (Shining willow) C, T
<i>Schedonardus paniculatus</i> Steudel (Tumble grass) C, SC
<i>Senecio pseudoaureus</i> Rydb. (Western heart-leaved groundsel) C, SC
<i>Spiranthes magnicamporum</i> Sheviak (Great plains ladies'-tresses orchid) C, SC
<i>Spiranthes ovalis</i> Lindley (Oval ladies'-tresses orchid) C, T

Table 6. Vascular plant taxa encountered during inventory of the Hamilton County flora (2001–2004) that are not listed in Eilers and Roosa (1994), *The Vascular Plants of Iowa*.

**Acer platanoides* L. (Norway maple)
Acer rubrum L. × *Acer saccharinum* L. (Red maple × silver maple)
 **Adonis annua* L. (Fall adonis)
Aster cordifolius L. × *A. drummondii* Lindley (Hybrid aster)
Aster cordifolius L. × *A. sagittifolius* Willd. (Hybrid aster)
 **Bromus catharticus* Vahl (Rescue grass)
Carex atherodes × *C. trichocarpa* Schkuhr (Hybrid sedge)
Carex mesochorea Mack. (Sedge)
 **Cornus alba* L. (Tatarian dogwood)
 **Dianthus deltoides* L. (Maiden pink)
Elybordeum macounii (Vassey) Barkworth & Dewey (Macoun's barley)
 **Erysimum hieracifolium* L. (Tall wormseed mustard)
 +**Galium mollugo* L. (Hedge bedstraw)
Geum macrophyllum Willd. (Big-leaved avens)
 **Geranium sibiricum* L. (Siberian geranium)
 **Lapsana Communis* L. (Nipplewort)
 **Ligustrum obtusifolium* Siebold & Zucc. (Privet)
 **Lonicera* × *bella* Zabel (*L. morrowii* Gray × *L. tatarica* L.)
 **Lonicera japonica* Thunb. (Japanese honeysuckle)
 **Lonicera maackii* (Rupr.) Herder (Amur honeysuckle)
 **Lonicera* × *xylosteoides* Tausch (*L. tatarica* L. × *L. xylosteum* L.)
 **Lycium chinense* P. Mill. (Matrimony vine)
Lycopus × *sberardii* Steele (*L. uniflorus* Michx. × *L. virginicus* L.)
 **Prunus cerasus* L. (Dwarf cherry-sour cherry)
 **Ranunculus bulbosus* L. (Bulbous buttercup)
Rosa × *rudiuscula* Green (*R. arkansana* Porter × *R. carolina* L.)
*Rubus ablatu*s Bailey (Dewberry)
 **Rubus caesius* L. (European dewberry)
Rubus frondosus (Bigel.) Rydb. (Yankee blackberry)
Rubus idaeus L. var. *strigosus* Michx. (Wild red raspberry)
Rubus × *neglectus* Peck (*R. idaeus* var. *strigosus* × *R. occidentalis* L.)
 **Rubus parvifolius* L. (Asian dewberry)
Rubus wisconsinensis L. H. Bailey (Wisconsin dewberry)
 **Rumex stenophyllus* Ledeb. (Narrow-leaf dock)
 **Salix* × *rubens* Schrank (*S. alba* L. × *S. fragilis* L.)
Scirpus georgianus R. M. Harper (Common bulrush)
 **Ulmus pumilaa* L. × *U. rubra* Muhl. (Siberian elm × red elm)
 **Veronica polita* Fries (Gray field speedwell)
 **Viburnum lantana* L. (Wayfaring bush)

* = Not native to the United States

+ = Found in reconstructions only

800 total taxa were not complete inventories. Of course, some counties have considerably more diverse flora than others. I conclude that plant inventories conducted over a 1–2 year period in areas the size of counties are probably not complete. This is apparent in the number of taxa collected for each year of this current inventory. I collected 316 taxa in 2001, 474 new taxa in 2002, 125 new taxa in 2003, and still found 58 new taxa in 2004.

Even with my very extensive searching, another year would probably turn up a small number of new taxa. Even though I covered hundreds of acres of all the public areas and hundreds of acres of private lands with diverse vegetation, there are thousands of acres of mostly cropland with little diversity that I did not search.

Exotic Plants in Hamilton County

Within a few decades of the settlement of Iowa by Europeans (beginning approximately in the 1830s), non-native invasive forbs became a significant part of the state's flora (Lewis and Pope 2001). By the close of the 1800s, Louis H. Pammel (1901) recognized six "classes of weeds" in Iowa: those that immediately followed the advent of the state's settlement; weeds that came in along railroads; seed contaminants of grain and flax seeds; native species that "adapted themselves to new conditions"; seed contaminants of grass and clover seed; and weeds of dooryards, hog-lots, and similar disturbed places. These six classes encompassed, but were not limited to, non-native invasive plants.

Table 8 lists some of the more troublesome non-native invasive species that currently occur in native plant communities in Hamilton County. (Lewis 1998) also lists some of these as the common and aggressive weeds of Iowa's natural areas. *Elaeagnus umbellata* Thunb. (Autumn olive), *Lonicera maackii* Maxim. (Amur honeysuckle), *Lonicera tatarica* L. (Tartarian honeysuckle), *Rhamnus cathartica* L. (European buckthorn), and *Rosa multiflora* Thunb. ex Murray (Multiflora rose) are listed among Iowa's "Dirty Dozen" most problematic invasive woody species (Farrar 2001). *Potamogeton crispus* L. (Curly-leaf pondweed), an invasive aquatic plant, was found in two lakes in the county.

Many of the invasive species listed in Table 8 were introduced through cultivation, some intentionally and others accidentally. Intentionally planted species include *Alliaria petiolata* (Bieb.) Cavara & Grande (garlic mustard) which was reportedly cultivated for medicinal purposes. *Bromus inermis* Leysser (smooth brome) and *Melilotus alba* Medicus (white sweet clover) and *Melilotus officinalis* (L.) Pallas (yellow sweet clover) were planted as hay crops. The sweet clovers were also planted for honeybees for the production of honey, as was *Lytbrum salicaria* L. (purple loosestrife). *Coronilla varia* L. (crown vetch) was intentionally planted as a ground cover for erosion control. The woody species were planted as ornamentals and wildlife habitat. *Cirsium arvense* (L.) Scop. (Canada thistle) and *Euphorbia esula* L. (leafy spurge) were accidentally introduced as impurities in crop seed. Curly-leaf pondweed was accidentally introduced along with the common carp (Minnesota Department of Natural Resources 2004). Many invasive plant species have been assimilated into our daily environment (Lewis and Pope 2001). Some invasive species listed in Table 8 are so assimilated into our daily lives that they are still planted in Hamilton County. For example, smooth brome, a considerably cheaper grass than native grasses, continues to be the grass of choice by many in the agricultural community. Crown vetch is still planted as a supposedly good erosion control species. Supposedly sterile purple loosestrife can be seen in flower beds. Bush honeysuckle species are planted in yard landscaping quite often as hedge rows separating properties.

The impact of invasive plants is costly. In economic terms these costs are staggering; Pimentel et al. (2000) estimated that the combined control costs and losses and damages incurred by invasive plant species in the United States exceeds \$34 billion. A large portion of the cost is for purchasing and applying herbicides to control invasive plants. Another large portion occurs in the billions of dollars spent on research to develop bio-engineered crops that resist the application of herbicides to control invasive plants. These costs are ultimately passed on to the farmer and then the consumer. Additional effects of invasive plants include impacts on human health (Lewis and Pope 2001). Billions of dollars are spent on medical bills, health insurance, and medical research because of the affects on human health from the use of herbicides in the attempt to control invasive plants.

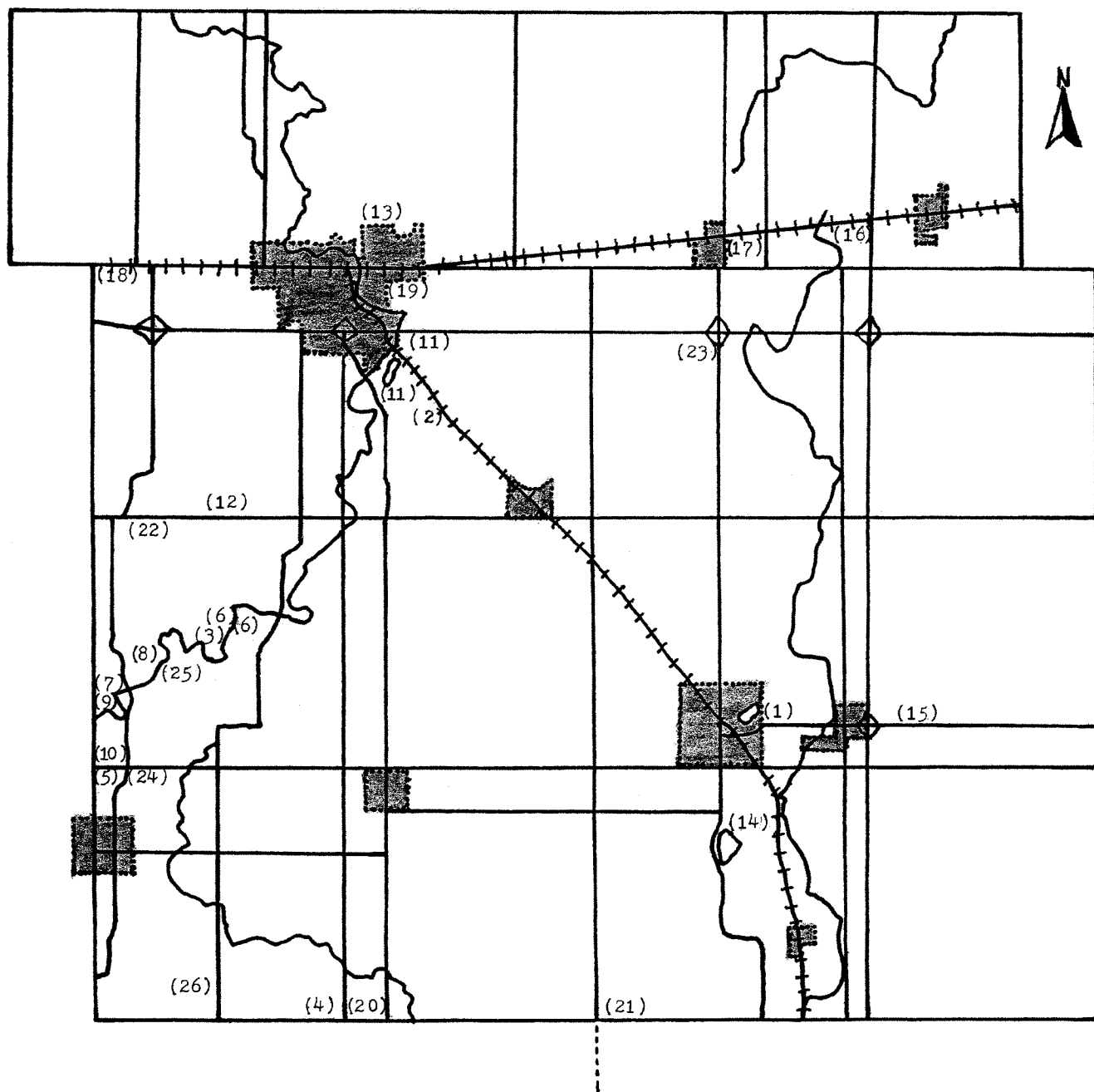


Fig. 3. Map of sites containing significant plant communities in Hamilton County, Iowa. The sites are described in Appendix B.

Effects of invasive plants include loss of native species diversity and loss of aesthetic appeal. Furthermore, the negative affects of non-native species on Iowa's remaining natural areas cannot be overstated (Lewis and Pope 2001). Non-native species not only displace native plant species by occupying space, they also change nutrient and water availability, may affect light availability by shading the native species, and may be a source of introduction of diseases and pests (Randall 1996, Westbrooks 1998). Hartzler and Pope (2001) cite *Rhannus cathartica* as a winter host for the soybean aphid, a new insect pest of soybeans grown in the United States. Also, *Rhannus cathartica* is classified as a primary noxious weed in Iowa (Iowa Administrative Code 2003) because of its role

as an alternative host to oat crown rust, a devastating disease of oats (Hartzler and Pope 2001).

Garlic mustard was hardly known in the state prior to 1990. Eilers and Roosa (1994) cite its abundance and distribution as "rare, in scattered locations, rapidly increasing its range," but it is now known to be present in large populations across the state (Lewis and Pope 2001). This European biennial species is extremely aggressive and will rapidly displace native forbs and wild flowers in woodlands and parks (Owen 2000). There are large populations of this extremely aggressive species in Hamilton County. One of these populations of several acres, growing on the floodplain of the Boone River within the city

Table 7. Number of taxa in published floras of Iowa counties and the city of Ames (city zoning jurisdiction checklist of 1859–2000) completed since 1950.

Location (County unless specified)	Author & Year	Total Taxa	Based on*
Ames (Zoning jurisdiction)	Norris et al. 2001	1120	Field, herb. (ISC), lit.
Allamakee	Peck et al. 1980	1040	Field, herb., lit. (Hartley 1966)
Emmet	Wolden 1956	1013	Field, lit.
Hamilton	Current Study	1001	Mainly field, herb., & lit.
Johnson	Thorne 1955	966	Field, herb., lit. as verified
Lee	Peck et al. 1981	876	Field, herb., lit. as verified
Des Moines	Lammers 1983	809	Field, herb.
Dickinson	Grant 1950, 1953	800	Lit., herb. (ILH), some field
Cedar	Fay 1951, Fay and Thorne 1953	775	Mainly field, some herb.
Guthrie	Roosa et al. 1991	748	Field, herb., lit.
Page	Wilson 1992	746	Mainly field
Poweshiek	Russell 1956	699	Mainly herb. (GRI)
Iowa	Easterly 1951	679	Mainly field, some herb., lit.
Washington	Wagenknecht 1954	677	Mainly field
Lyon	Peck et al. 1984	561	Field, herb., lit. as verified
Fremont	Peck et al. 1978	550	Field, lit., some herb.
Sioux	Peck et al. 1984	506	Field, herb., lit. as verified
Cherokee	Carter 1962	401	Field

*Source of information used to compile checklist as stated or implied in paper.

Field = Field work; herb. = herbarium voucher specimens (with herbarium acronym if primarily from one herbarium); lit. = literature sources; as verified = only including records from literature if verified by voucher specimens. Herbarium acronyms cited: ISC = Ada Hayden Herbarium, Iowa State University; ILH = Iowa Lakeside Laboratory Herbarium; GRI = Grinnell College Herbarium.

limits of Webster City, appears to be rapidly displacing native forbs and wild flowers.

Smooth brome, a strongly rhizomatous perennial species capable of forming a sod, has become one of the most widespread and common exotic grasses since its introduction in North America by the California Experiment Station in 1884. It is a sun-loving species; shade tends to reduce seed production, tiller and rhizome density and biomass (Rosburg 2001). In Hamilton

County smooth brome has also become one of the most widespread, common, and troublesome exotic grasses of partial to full sun, natural and disturbance areas. Due to its very dense and spreading rootstock, it crowds out other species, inhibiting, and in most cases, preventing the growth of most native species.

Canada thistle, one of Iowa's primary noxious weeds (Iowa Administrative Code 2003), has long been known from the state (Lewis and Pope 2001). Canada thistle, for example, is cited as

Table 8. A list of some of the most common and aggressive weeds, problematic invasive woody species, and an invasive aquatic plant.

Common and aggressive weeds	Family
<u>Herbaceous species</u>	
<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande (Garlic mustard)	Brassicaceae
<i>Bromus inermis</i> Leysser (Smooth brome)	Poaceae
<i>Cirsium arvense</i> (L.) Scop. (Canada thistle)	Asteraceae
<i>Coronilla varia</i> L. (Crown vetch)	Fabaceae
<i>Euphorbia esula</i> L. (Leafy spurge)	Euphorbiaceae
<i>Lythrum salicaria</i> L. (Purple loosestrife)	Lythraceae
<i>Melilotus alba</i> Medicus (White sweet clover)	Fabaceae
<i>Melilotus officinalis</i> (L.) Pallas (Yellow sweet clover)	Fabaceae
<u>Woody species</u>	
<i>Rhamnus cathartica</i> L. (European buckthorn)	Rhamnaceae
<i>Elaeagnus umbellata</i> Thunb. (Autumn olive)	Elaeagnaceae
<i>Rosa multiflora</i> Thunb. ex Murray (Multiflora rose)	Rosaceae
<i>Lonicera tatarica</i> L. (Tartarian honeysuckle)	Caprifoliaceae
<i>Lonicera maackii</i> Maxim. (Amur honeysuckle)	Caprifoliaceae
<u>Aquatic species</u>	
<i>Potamogeton crispus</i> L. (Curly-leaf pondweed)	Potamogetonaceae

a major "pest" throughout the state in Pammel's (1913) survey of Iowa weeds. The extensive root system of Canada thistle may extend to a depth of 6 feet or more, especially in well-tilled land. One plant often is the beginning of a constantly enlarging area (Porter and Sylwester 1939). This sun-loving perennial thistle is common in Hamilton County and is a major problem of open areas of the county, including natural areas and disturbance areas.

Crown vetch is a native of Europe, southeast Asia, and northern Africa, that has been extensively planted in the United States. It has typically been planted along roadsides and other rights-of-way, but quickly spreads into adjacent prairies and open fields. Crown vetch prefers full sunlight, but healthy populations have been found in partial shade. It is a serious management threat to natural areas due to its seeding ability and rapid vegetative spreading by creeping roots up to ten feet long (Wisconsin Department of Natural Resources 2004). Crown vetch was found to be common in Hamilton County (Appendix A) in woodland edges, road rights-of-way, stream banks, stream sand and mud bars, railroad rights-of-way, native prairie remnants, and disturbance areas.

Leafy spurge was transported to the United States possibly as a seed impurity in the early 1800s. Leafy spurge reproduces readily by seeds that have a high germination rate and the root system is complex, reaching 15 or more feet into the ground. It is capable of invading disturbed sites, including prairies, savannas, pastures, abandoned fields, and roadside areas (Thunhorst and Swearingen 1999). Leafy spurge, a primary noxious weed of Iowa (Iowa Administrative Code 2003), has become established in large populations along the east-west railroad rights-of-way in northern Hamilton County.

Purple loosestrife was found in two large populations in Hamilton County, one each in Webster and Marion townships. Purple loosestrife was introduced from Europe and Asia into the east coast of North America in the 1800s. Purple loosestrife invades marshes and lakeshores, replacing many rare and endangered wetland plants. In forming dense, impenetrable stands that are unsuitable as cover, food, or nesting sites for a wide range of native birds and animals, wetland birds and animals are at risk also (Iowa Department of Natural Resources 2004).

White and yellow sweet clover are both native to Europe. These clovers have been widely scattered by bee-keepers who have sowed it as a honey bee plant (Pammel and King 1926) for the production of honey. Both sweet clover species are common in Hamilton County along road and railroad rights-of-way, some native and reconstructed prairies, having adverse effects on some of the remaining native species of these areas.

European buckthorn was introduced to the United States in the 1800s as an ornamental shrub. It can reach a height of 10 to 25 ft. Buckthorn displaces native vegetation and causes long-term declines of wooded areas. It is common in some wooded areas and is spreading into many open areas of Hamilton County.

Autumn olive, native to eastern Asia, multiflora rose, native to Japan and China, and Tartarian honeysuckle, native to Russia, were introduced to this country for use as conservation plantings. All three produce berries attractive to birds for food, and this leads to the seed being spread literally everywhere (Darlington and Lloyd 1994, Farrar 2001). These three species and amur honeysuckle, a native of Manchuria and Korea, were found to be common in Hamilton County. Not only are these four species shade tolerant, they are spreading rapidly into old fields, pastures, and rights-of-way of open areas. Multiflora rose is a woody species listed on Iowa's secondary noxious weed list (Iowa Administrative Code 2003).

Curly-leaf pondweed was the most severe nuisance aquatic plant in the midwest until *Myriophyllum spicatum* (Eurasian watermilfoil) appeared. Curly-leaf pondweed is currently forming very dense populations in the shallow waters of Briggs Woods Lake, displacing native aquatic species and making fishing and boating difficult in the shallows. Scattered individual plants of this invasive pondweed were found in the ponds of the Seven B Ranch aquatic gardens and wildlife refuge in the southeast part of Webster City.

Significant Botanical Discoveries in Hamilton County

During this inventory, ten species of Orchidaceae were found (Appendix A). Of these, *Cypripedium reginae* Walter and *Spiranthes ovalis* Lindley are on the 2002 Iowa Natural Resource Commission (NRC) threatened species list. *Cypripedium candidum* Muhl. ex Willd. and *Spiranthes magnicamporum* Sheviak are on the 2002 NRC special concern list. *Cypripedium parviflorum* Salisbury var. *pubescens* (Willd.) Correll is not on the NRC list, but is sparse for Hamilton County.

Cypripedium reginae (showy lady's slipper orchid) was the most unexpected find of this survey. This orchid was historically distributed in northeast, central and north-central Iowa, but was reported by Eilers and Roosa (1994) as rare and local in the northeastern part of the state. It was found on a north-facing, slightly open canopy escarpment-seep on a south hillside of the Boone River. There were also many associated infrequent to rare species growing in this large seep complex. Among these are *Cornus rugosa* Lam. (speckled or round-leaved dogwood), another species listed by Eilers and Roosa (1994) as common in far northeast Iowa and infrequent to rare elsewhere. Other associated species are *Campanula aparinoides* Pursh, *Coeloglossum viride* (L.) Hartman, *Eriophorum angustifolium* Honck., *Lathyrus palustris* L., *Liparis liliifolia* (L.) L.C. Rich ex Lindley, *Polygala senega* L., *Prunus pennsylvanica* L. f., and *Stellaria longifolia* Muhl. ex Willd.

I found several populations of *Spiranthes ovalis* (oval ladies'-tresses orchid) in second growth woods, long-abandoned gravel pits, and edges of woods in Hamilton County. In my experience in central Iowa, this species most often appears in thin canopy woods 10 to 15 years old in association with *Asplenium platyneuron* (L.) Oakes ex D. C. Eaton, *Botrychium dissectum* Sprengel f. *dissectum*, *Botrychium dissectum* Sprengel f. *obliquum* (Muhl.) Fern., *Galearis spectabilis* (L.) Raf., and *Liparis loeselii* (L.) L.C. Rich. ex Lindley.

Brian Fankhauser, Natural Resources Coordinator for the Hamilton County Conservation Department, found the first population of many hundreds of *Cypripedium candidum* (small white lady's slipper orchid) in an untilled wetland area around the perimeter of a pond in the southeast corner of Bauer Slough in 2002. The next year I found a small population of 25 to 30 plants of this species in a wet road and railroad rights-of-way in the eastern part of the county. Species associated with this orchid are *Carex interior* Bailey, *Equisetum fluviatile* L., *Gentiana andrewsii* Griseb., and *Pedicularis lanceolata* Michx.

I found five populations of *Spiranthes magnicamporum* (great plains ladies'-tresses orchid). One population was in a long-abandoned limestone quarry with a small amount of water remaining the entire year where moist to wetland species were becoming established. The other four populations are in moist areas along road and railroad rights-of-way in both eastern and western Hamilton County. Associated species are *Gentiana andrewsii*, *Liatriis pycnostachya* Michx., and *Salix* L.

Cypripedium parviflorum var. *pubescens* (yellow lady's slipper orchid) is listed as infrequent to rare in Iowa by Eilers and Roosa (1994). The small population of 15 to 20 plants was found on an east-facing, slightly open canopy escarpment on the west side of the Boone River only about one half mile (0.8 km) downstream from the population of *Cypripedium reginae*. The moisture in this escarpment was less than the wet conditions of the seep with the *C. reginae*. However, *Coeloglossum viride* and *Polygala senega* were also associated with this orchid, but the other species associated with *C. reginae* were absent.

Fifteen species of ferns were encountered during this survey (Appendix A). According to Eilers and Roosa (1994), eight of these ferns are considered rare or absent in central Iowa, with Hamilton County being near the western extent of their range. These species are *Asplenium platyneuron*, *Botrychium dissectum* f. *dissectum*, *Botrychium dissectum* f. *obliquum*, *Cystopteris bulbifera* (L.) Bernh., *Dryopteris carthusiana* (Vill.) H.P. Fuchs, *Dryopteris cristata* (L.) Gray, *Matteucia struthiopteris* (L.) Todara var. *pensylvanica* (Willd.) Morton, and *Woodsia obtusa* (Sprengel) Torrey. However, with the completion of this botanical survey, the abundance of four of these species, as reported by Eilers and Roosa (1994), needs updating. For instance, *Asplenium platyneuron* is not listed as occurring in central Iowa by Eilers and Roosa (1994), but is currently infrequent in Hamilton County. *Botrychium dissectum* f. *dissectum*, listed by Eilers and Roosa (1994) as "rare eastern half", and *Botrychium dissectum* f. *obliquum*, listed as being "infrequent eastern half", are currently infrequent and frequent respectively in Hamilton County. *Dryopteris carthusiana* listed by Eilers and Roosa (1994) as "Common northeast; infrequent southeast; rare central", is likewise, currently frequent in Hamilton County.

Recommendations

The Hamilton County Conservation Department is doing a commendable job of conservation and management of hundreds of acres of public woodlands and native wetlands and prairies and creating additional wetlands and prairies. They have a system of rotational burning small portions of wetlands and prairies annually. Leaving some areas of a wetland or prairie unburned annually will help protect invertebrate species. There are conservation minded individuals volunteering to help pull garlic mustard from the public areas. Some of these same individuals have been removing populations of invasive woody species and conducting burns of cemetery native prairie remnants.

The Iowa Department of Natural Resource's past practice of planting non-native invasive multiflora rose and the recent practice of planting rows of other woody non-native invasive species, such as buckthorn and bush honeysuckle for wildlife habitat, are having increasingly devastating affects on the native plant communities of Hamilton County. The preferred plantings of woody shrubs and small trees for wildlife habitat would be native Iowa species.

The Hamilton County Conservation Department has recently been purchasing some of their prairie reconstruction seed from out-of-state sources. Not only do the cheaper seeds from out-of-state sources have genetic differences, there is the increased chance of the long-distant spread of invasive species, both native and non-native.

In Hamilton County it appears as though there is an excess use of herbicides in roadside ditches in an attempt to control invasive species. One year I saw lots of *Rosa* L. species (wild roses) blooming in the roadside ditches and the next year I saw very few. By mapping larger populations of invasive, problem species and

spraying annually to control, if necessary, and spot spraying small populations, the use of herbicides could be greatly reduced.

It would be especially helpful to conservation organizations, government agencies, and individuals involved in botanical inventories such as The Nature Conservancy, the Iowa Department of Natural Resources, and the Iowa Natural Heritage Foundation to maintain a computer database of voucher specimens in the herbaria of Iowa. I spent over 80 hours searching through the 150,000 Iowa voucher specimens in the Iowa State University Herbarium for Hamilton County voucher specimens. With the above mentioned computer database of information, the task of locating county specimens would be less daunting.

Also, Compilation of the plant list for this paper revealed the need for an updated vascular plant checklist for the state of Iowa. Since Eilers and Roosa published their seminal work on the vascular flora of this state (1994), there has been much floristic and taxonomic work that has rendered this volume out-of-date. Numerous floristic studies conducted in Iowa since the mid-1990s have resulted in the discovery of plant species occurring in this state that are unreported by Eilers and Roosa (e.g., 58 new taxa reported by Norris et. al. 2001 as occurring in central Iowa). Furthermore, recent taxonomic treatments published in the Flora of North America series since the early 1990's have resulted in numerous name changes for the Iowa flora. In fact, many plant names in this paper are now out-of-date because three FNA volumes devoted to the Asteraceae were published well after the initial submission of this paper. An on-line checklist of the vascular plant flora in Iowa, frequently updated to reflect reports of additional taxa as they are discovered and nomenclatural changes published in the systematic literature, is in order (William R. Norris, Department of Natural Sciences, Western New Mexico University, Silver City NM, personal communication). The flora of Hamilton County, Iowa is quite diverse in comparison to many of Iowa's counties. However, with the Des Moines River (Iowa's largest interior waterway) flowing through Webster, Boone, Polk, Warren, and Marion counties in central Iowa, it is conceivable that these counties may each have a more diverse flora. Vascular plant inventories of these counties would probably be fruitful. It would also be interesting to have thorough surveys conducted in the counties immediately beyond the advance of the last glacial episode of 12,000 to 14,000 years ago. These counties could include Guthrie, Dallas, Madison, Polk, Warren, Marion, Jasper, and Marshall Counties. A comparison of the vascular flora of the much older landform of the above counties to the floras of counties (including Hamilton County) of the newest landform, less than 12,000 years old to the north, would likewise be interesting.

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R. Farrar, trees and ferns; and Donald Pratt, *Amaranthaceae* and *Chenopodiaceae* families.

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LITERATURE CITED

- ANDERSON, P. F. 1996. GIS research to digitize maps of Iowa 1832–1859 vegetation from government Land Office Township Plat Maps. Report to the Bureau of Preserves and Ecological Services, Iowa Department of Natural Resources.
- ANONYMOUS. 1985. HISTORY OF HAMILTON COUNTY, IOWA. 1985. Produced by radio station KQWC (Webster City) and Hamilton County Historical Society. Curtiss Media Corporation. Dallas, Texas.
- BRAUN, E. L. 1964. Deciduous forests of eastern North America. Hafner, New York, NY.
- CARTER, J. L. 1962. The vascular flora of Cherokee County. Proceedings of the Iowa Academy of Science 69:60–70.
- CLARK, L. and A. GARDNER. 2004. Grasses of Iowa. Retrieved 2004 Aug 12 from: <http://www.eeob.iastate.edu/research/iowagrasses/>
- DARLINGTON, J. and B. M. LOYD. 1994. Control of Autumn olive, multiflora rose, and Tartarian honeysuckle. Retrieved 2004 Sept 8 from: <http://www.caf.wvu.edu/forage/5412.htm>
- EASTERLY, N. W. 1951. The flora of Iowa County. Proceedings of the Iowa Academy of Science 58:71–95.
- EILERS, L. J. and D. M. ROOSA. 1994. The vascular plants of Iowa: an annotated checklist and natural history. University of Iowa Press, Iowa City, Iowa.
- FARRAR, D. R. 2001. Exotic and invasive woody species in Iowa. Journal of the Iowa Academy of Science 108(4): 154–157.
- FAY, M. J. 1951. The flora of Cedar County, Iowa. Proceedings of the Iowa Academy of Science 58:107–131.
- FAY, M. J. and R. F. THORNE. 1953. Additions to the flora of Cedar County, Iowa. Proceedings of the Iowa Academy of Science 60:122–130.
- FLORA OF NORTH AMERICA EDITORIAL COMMITTEE, EDS. 1993. Flora of North America north of Mexico: Pteridophytes and Gymnosperms (Vol. 2). Oxford University Press, New York.
- FLORA OF NORTH AMERICA EDITORIAL COMMITTEE, EDS. 2002a. Flora of North America north of Mexico: Vol. 23. Magnoliophyta: Commelinidae (in part): Cyperaceae, Oxford University Press, New York.
- FLORA OF NORTH AMERICA EDITORIAL COMMITTEE, EDS. 2002b. Flora of North America north of Mexico: Magnoliophyta: Liliidae: Liliales and Orchidales (Vol. 26). Oxford University Press, New York.
- FLORA OF NORTH AMERICA EDITORIAL COMMITTEE, EDS. 2003. Flora of North America north of Mexico: Magnoliophyta: Commelinidae (In Part): Poacea (Part 2) (Vol. 25). Oxford University Press, New York.
- GLEASON, H. A. and A. CRONQUIST. 1991. Manual of vascular plants of northeastern United States and adjacent Canada, 2nd edition. The New York Botanical Garden.
- GRANT, M. L. 1950. Dickinson County flora (A preliminary checklist of the vascular plants of Dickinson County, Iowa, based on the herbarium of Iowa Lakeside Laboratory). Proceedings of the Iowa Academy of Science 57:91–129.
- GRANT, M. L. 1953. Additions to and notes on the flora of Dickinson County, Iowa. Proceedings of the Iowa Academy of Science 60:131–140.
- GREAT PLAINS FLORA ASSOCIATION. 1986. Flora of the Great Plains. University Press of Kansas, Lawrence, KS.
- HARTZLER, B. and R. POPE. 2001. Buckthorn control and soybean aphids. Retrieved 2004 Sept 8 from: <http://www.weeds.iastate.edu/mgmt/2001/buckthorn.htm>
- HITCHCOCK, A. S. 1890. A catalogue of the Anthophyta and Pteridophyta of Ames, Iowa. Transactions of the St. Louis Academy of Science 5:477–532.
- IOWA ADMINISTRATIVE CODE. 2002. Endangered and threatened plant and animal species. Natural Resource Commission, Chapter 77. Iowa Administrative Code, January 9, 2002.
- IOWA ADMINISTRATIVE CODE. 2003. Iowa noxious weeds. Iowa State Legislature, Chapter 317.1A. Retrieved 2004 Nov 13 from: <http://www.legis.state.ia.us/IACODE/2003/317/1A.html>
- IOWA DEPARTMENT OF NATURAL RESOURCES. 2004. Purple loosestrife (*Lythrum salicaria*). Retrieved 2004 Sept 8 from: <http://www.iowadnr.com/fish/news/exotics/loose.html>
- LAMMERS, T. G. 1983. The vascular flora of Des Moines County, Iowa. Proceedings of the Iowa Academy of Science 90:55–71.
- LEWIS, D. Q. 1998. A literature review and survey of the status of Iowa's terrestrial flora. Journal of the Iowa Academy of Science 105(2): 45–54.
- LEWIS, D. Q. and R. O. POPE. 2001. An overview and management plan of Iowa's non-native, invasive, terrestrial forbs. Journal of the Iowa Academy of Science 108(4): 116–123.
- MINNESOTA DEPARTMENT OF NATURAL RESOURCES. 2004. Curly-leaf pondweed (*Potamogeton crispus*). Retrieved 2004 Sept 8 from: <http://www.seagrant.umn.edu/exotics/fieldguide.html>
- NORRIS, W. R., D. Q. LEWIS, M. P. WIDRLECHNER, J. D. THOMPSON, and R. O. POPE. 2001. Lessons from an inventory of the Ames, Iowa flora (1859–2000). Proceedings of the Iowa Academy of Science 108(2): 34–63.
- OWEN, M. 2000. Garlic mustard—serious invader from the east. Retrieved 2004 Sept 1 from: <http://www.weeds.iastate.edu/mgmt/qtr00-1/garlicmust.htm>
- PAMMEL, L. H. 1898. Old Lake Vegetation in Hamilton County, Iowa. Plant World 2:43–45.
- PAMMEL, L. H. 1901. Some changed conditions of our flora incident to the settlement of the state. Proceedings of 22nd Annual Meeting of the Society for Promotion of Agricultural Science, Pages 1–6.
- PAMMEL, L. H. 1913. The weed flora of Iowa. Iowa Geological Survey Bulletin No. 4. Iowa Geological Survey, Des Moines, Iowa.
- PAMMEL, L. H. and C. M. KING. 1926. The weed flora of Iowa. Iowa Geological Survey Bulletin No. 4, Revised Edition. Iowa Geological Survey, Des Moines, Iowa.
- PECK, J. H., L. J. EILERS, and D. M. ROOSA. 1978. The first Iowa foray (continued): the vascular plants of Fremont County, Iowa. Iowa Bird Life 48:3–18.
- PECK, J. H., D. M. ROOSA, and L. J. EILERS. 1980. A checklist of the vascular flora of Allamakee County, Iowa. Proceedings of the Iowa Academy of Science 87:62–75.
- PECK, J. H., T. G. LAMMERS, B. W. HAGLAN, D. M. ROOSA, and L. J. EILERS. 1981. A checklist of the vascular flora of Lee County, Iowa. Proceedings of the Iowa Academy of Science 88:159–171.
- PECK, J. H., B. W. HAGLAN, L. J. EILERS, D. M. ROOSA, and D. VAN DER ZEE. 1984. Checklist of the vascular flora of Lyon and Sioux Counties, Iowa. Proceedings of the Iowa Academy of Science 91:92–97.
- PIMENTEL, D., L. LACH, R. ZUNIGA, and D. MORRISON. 2000. Environmental and economic costs of nonindigenous species in the United States. BioScience 50:53–65.

- PORTER, R. H. and E. P. SYLWESTER. 1939. Noxious and other bad weeds of Iowa. Iowa State College Ext. Circ. 201.
- RANDALL, J. M. 1996. Weed control for the preservation of biological diversity. *Weed Technology* 10:370–383.
- ROOSA, D. M., L. J. EILERS, and S. ZAGER. 1991. An annotated checklist of the vascular plant flora of Guthrie County, Iowa. *Journal of the Iowa Academy of Science* 98:14–30.
- ROSBURG, T. R. 2001. Iowa's non-native graminoids. *Journal of the Iowa Academy of Science* 108(4): 142–153.
- RUSSELL, N. H. 1956. A checklist of the vascular flora of Poweshiek County, Iowa. *Proceedings of the Iowa Academy of Science* 63:161–176.
- SWINK, F. and G. WILHELM. 1994. *Plants of the Chicago region*, 4th edition. Indiana Academy of Science, Indianapolis, Indiana.
- THORNE, R. F. 1955. Flora of Johnson County, Iowa. *Proceedings of the Iowa Academy of Science* 62:155–196.
- THUNHORST, G. and J. M. SWEARINGEN. 1999. Leafy spurge (*Euphorbia esula*) Retrieved 2004 Oct 21 from: <http://www.nps.gov/plants/alien/fact/eues1.htm>
- WAGENKNECHT, B. L. 1954. The flora of Washington County, Iowa. *Proceedings of the Iowa Academy of Science* 61:184–204.
- WESTBROOKS, R. 1998. *Invasive plants, changing the landscape of America: Fact book*. Federal Interagency Committee for the Management of Noxious and Exotic Weeds, Washington, D.C.
- WIDRLECHNER, M. P. 1998. The genus *Rubus* L. in Iowa. *Castanea* 63:415–465.
- WILSON, B. L. 1992. Checklist of the vascular flora of Page County, Iowa. *Journal of the Iowa Academy of Science* 99:23–33.
- WISCONSIN DEPARTMENT OF NATURAL RESOURCES. 2004. Crown vetch (*Coronilla varia*). Retrieved 2004 Sept 8 from: <http://www.dnr.state.wi.us/org/land/er/invasive/factsheets/crown.htm>
- WOLDEN, B. O. 1956. The flora of Emmet County, Iowa. *Proceedings of the Iowa Academy of Science* 63:118–136.
- YATSKIEVYCH, G. 1999. Steyermark's flora of Missouri, Volume 1. Conservation Commission of the State of Missouri in cooperation with The Missouri Botanical Garden Press, St. Louis, Missouri.

Appendix A. Checklist of the Hamilton County flora. Voucher specimens are deposited in the Ada Hayden Herbarium at Iowa State University, Ames, Iowa. Key No symbol = Taxa native of the United States. # = Taxa native of the United States but not Iowa as reported by Eilers and Roosa (1994). * = Taxa not native of the United States. + = Taxa found only in restorations and not found spreading beyond the restorations. () = A widely used common name. ~ = Species listed for Hamilton County that were not found for this current inventory that were found in either Hitchcock (1890) literature (H) or L. H. Pammel (1898) literature (P) followed in brackets [] by the synonym used by these authors when it differed from current nomenclature, or a specimen that was found in the Iowa State University Herbarium (Herb.), followed by the year of collection, if available. Pteridophytes follow (Flora of North America Committee 1993), Cyperaceae follow (Flora of North America Committee 2002a), Iridaceae, Liliaceae, and Orchidaceae follow (Flora of North America Committee 2002b), and Poaceae follow (Clark and Gardner 2004) with Eilers and Roosa (1994) "The Vascular Plants of Iowa" nomenclature following in brackets [], where there has been an update. Plant habitat codes—see Table 1. Abundance codes—sparse, infrequent, frequent, or common in Hamilton County.

PTERIDOPHYTES

ADIANTACEAE

Adiantum pedatum L. (Northern maidenhair fern) Tmf—common

ASPLENIACEAE

Asplenium platyneuron (L.) Oakes ex D.C. Eaton (Ebony spleenwort) Twd, ed—infrequent

DRYOPTERIDACEAE

Athyrium felix-femina (L.) Roth var. *angustum* (Willd.) Moore (Northern lady fern) Tmf—infrequent

Cystopteris bulbifera (L.) Bernh. (Bulblet bladder fern) Tmf—sparse

Cystopteris protrusa (Weath.) Blasdell (Creeping fragile fern) Tmf—common

Cystopteris tenuis (Michx.) Desv. (Fragile fern) Tmf—sparse

Dryopteris carthusiana (Vill.) H.P. Fuchs (Spinulose wood fern) Tmf, wf—frequent

Dryopteris cristata (L.) Gray (Crested wood fern) Tmf—sparse

Matteuccia struthiopteris (L.) Todaro var. *pennsylvanica* (Willd.) Morton (Ostrich fern) Twf, ed—sparse

Onoclea sensibilis L. (Sensitive fern) Ted—sparse

Woodsia obtusa (Sprengel) Torrey (Blunt-lobed woodsia) Tmf—sparse

EQUISETACEAE

Equisetum arvense L. (Common horsetail) Tmf, wf, es; Pms, wt—common

Equisetum × *ferrissii* Clute (*E. hyemale* × *E. laevigatum*) Pms; Orw—common

Equisetum fluviatile L. (Swamp horsetail) Wez, sz—infrequent

Equisetum hyemale L. var. *affine* (Engelm.) A.A. Eaton (Common scouring-rush) Twf, es; Orw—common

Equisetum laevigatum A. Br. (Smooth scouring-rush) P; Orw—common

OPHIOGLOSSACEAE

Botrychium dissectum Sprengel f. *dissectum* (Dissected grape fern) Tmf, wd—infrequent

Botrychium dissectum Sprengel f. *obliquum* (Muhl.) Fern. (Oblique grape fern) Tmf, wd—frequent

Botrychium virginianum (L.) SW. (Rattlesnake fern) T—common

OSMUNDACEAE

Osmunda claytoniana L. (Interrupted fern) Tmf—sparse

GYMNOSPERMS

CUPRESSACEAE

Juniperus virginiana L. (Red cedar) T; O—common

**Thuja occidentalis* L. (Northern white cedar) Oof—sparse

PINACEAE

Pinus strobus L. (Eastern white pine) Oof—sparse

ANGIOSPERMS

(DICOTYLEDONS)

ACANTHACEAE

Ruellia humilis Nutt. (Wild petunia) Tdf, wd—sparse

ACERACEAE

**Acer ginnala* Maxim. (Amur maple) Orw—frequent

Acer negundo L. (Box elder) Twf; Orw, of—common

Acer nigrum Michx. f. (Black maple) Tmf—common

**Acer platanoides* L. (Norway maple) Twf; Our—sparse

Acer rubrum L. (Red maple) Twf; Our—sparse

Acer rubrum L. × *A. saccharinum* L. (Red maple × silver maple) Our—sparse

Acer saccharinum L. (Silver maple) Twf—common

AIZOACEAE

**Mollugo verticillata* L. (Carpetweed) Wrp; Ocr, rc—common

AMARANTHACEAE

Amaranthus albus L. (Tumble pigweed) Our, rw—frequent

#*Amaranthus blitoides* S. Watson (Prostrate pigweed) Our, rw—frequent

**Amaranthus hybridus* L. (Green amaranth) Orw—sparse

#*Amaranthus powellii* S. Watson (Smooth pigweed) Orc—sparse

**Amaranthus retroflexus* L. (Redroot pigweed) O—common

Amaranthus tuberculatus (Moq.) Sauer (Water hemp) Ocr—common

ANACARDIACEAE

Rhus glabra L. (Smooth sumac) T; P; O—common

Rhus typhina L. (Staghorn sumac) Orw—sparse

Toxicodendron radicans (L.) Kuntze ssp. *negundo* (Greene) Gillis (Poison ivy) T; P; O—common

Toxicodendron rydbergii (Small ex Rydb.) Greene (Rydberg's poison ivy) T—sparse

APIACEAE

Chaerophyllum procumbens (L.) Crantz (Chervil) Twf—infrequent

~*Cicuta bulbifera* L. (Bulblet water hemlock) Herb., 1924, 1930

Cicuta maculata L. (Water hemlock) Pwt—frequent

**Conium maculatum* L. (Poison hemlock) Orw, rc—infrequent

Cryptotaenia canadensis (L.) DC. (Honestwort) Tmf, wf—common

**Daucus carota* L. (Queen Anne's lace) Twd, ed; P; O—common

Eryngium yuccifolium Michx. (Rattlesnake master) Pms—infrequent

Heracleum lanatum Michx. (Cow parsnip) T; Orw—infrequent

Osmorhiza claytonii (Michx.) C.B. Clarke (Sweet cicely) Tmf—common

Osmorhiza longistylis (Torrey) DC. (Anise root) Tmf—common

Oxyopolis rigidior (L.) Raf. (Cowbane) Pwt—sparse

**Pastinaca sativa* L. (Wild parsnip) T; P; O—common

Appendix A. Continued.

- Sanicula canadensis* L. (Black snakeroot) T–common
Sanicula gregaria Bickn. (Common snakeroot) Tmf,wf–common
Sanicula marilandica L. (Black snakeroot) Tmf,es–infrequent
Sium suave Walter (Water parsnip) Twf; Pwt–sparse
Taenidia integerrima (L.) Drude (Yellow pimpernel) Tdf,wd–infrequent
Zizia aurea (L.) Koch (Golden Alexander) T; P–common
- APOCYNACEAE**
Apocynum androsaemifolium L. (Spreading dogbane) Twd,es,ed–frequent
Apocynum cannabinum L. (Indian hemp) Pms,wt; Wrp,md; Orw–common
Apocynum sibiricum Jacq. (Clasping dogbane) Pms,wt; Wrp,md; Orw–common
**Vinca minor* L. (Common periwinkle) Orw–sparse
- ARALIACEAE**
Aralia nudicaulis L. (Wild sarsaparilla) Tmf–frequent
Aralia racemosa L. (Spikenard) Tmf–infrequent
Panax quinquefolius L. (Ginseng) photo–Tmf–sparse
- ARISTOLOCHIACEAE**
Asarum canadense L. (Wild ginger) Tmf,wf–common
- ASCLEPIADACEAE**
Asclepias incarnata L. (Swamp milkweed) Pwt; Wrp–common
Asclepias purpurascens L. (Purple milkweed) Twd,ed,es–infrequent
Asclepias sullivantii Engelm. ex Gray (Prairie milkweed) Pms,wt–infrequent
Asclepias syriaca L. (Common milkweed) T; P; W; O–common
Asclepias tuberosa L. ssp. *interior* Woodson (Butterfly milkweed) Pms–infrequent
Asclepias verticillata L. (Whorled milkweed) Twd; Pms,wt; Orw–common
Asclepias viridiflora Raf. (Green milkweed) Tdf,wd; Pdr–sparse
Cynanchum laeve (Michx.) Pers. (Bluevine) Ted–sparse
- ASTERACEAE**
Achillea millefolium L. ssp. *lanulosa* (Nutt.) Piper (Yarrow) P; O–common
Ambrosia artemisiifolia L. (Common ragweed) T; P; Wrp; O–common
**Ambrosia psilostachya* DC. (Western ragweed) Pdr–infrequent
Ambrosia trifida L. (Giant ragweed) T; P; Wrp; O–common
Antennaria neglecta Greene (Pussytoes) Tdf; Pdr–common
Antennaria plantaginifolia (L.) Richardson (Ladies'-tobacco) Tdf–common
**Anthemis cotula* L. (Dog fennel) Orc–frequent
**Arctium minus* Bernh. (Common burdock) T; P; O–common
*+*Artemisia absinthium* L. (Absinthium- common wormwood) Pms–sparse
#*Artemisia biennis* Willd. (Biennial wormwood) Wrp–sparse
Artemisia campestris L. ssp. *caudata* (Michx.) Hall & Clem. (Western sawewort) Pdr–sparse
Artemisia dracunculus L. (False tarragon) Pdr–sparse
Artemisia ludoviciana Nutt. (White sage) Pdr; Orw,ps–common
Aster azureus Lindley (Sky-blue aster) Pdr,ms–frequent
Aster cordifolius L. (Blue wood aster) Tdf,mf–common
Aster cordifolius L. × *A. drummondii* Lindley (Hybrid aster) Tmf,wd,ed–sparse
Aster cordifolius L. × *A. sagittifolius* Willd. (Hybrid aster) Tmf,wd,ed–sparse
Aster drummondii Lindley (Drummond's aster) Tmf,wd,ed–frequent
Aster ericoides L. (Heath aster) Pms–common
Aster laevis L. (Smooth blue aster) Ted; Pms–frequent
Aster lanceolatus Willd. (Panicked aster) Twf; Wez–infrequent
Aster lateriflorus (L.) Britton (Side-flowered aster) Tmf,wf–infrequent
Aster novae-angliae L. (New England aster) P–frequent
Aster oblongifolius Nutt. (Aromatic aster) Pdr–sparse
Aster ontarionis Wieg. (Ontario aster) Twf–common
Aster pilosus Willd. (Hairy aster) Twf; P; O–common
Aster praealtus Poirer (Willow aster) Wez–infrequent
Aster prenanthoides Muhl. ex Willd. (Crooked-stem aster) Tmf–common
Aster puniceus L. (Swamp aster) Pwt; Wez–infrequent
Aster sericeus Vent. (Silky aster) Pdr–sparse
Bidens cernua L. (Nodding bur marigold) Wrp,md–common
Bidens connata Muhl. ex Willd. (Purple-stem beggar-ticks) Pwt; Wrp,md; Orw–common
Bidens frondosa L. (Devil's beggar-ticks) Pwt; Wrp,md,sp–common
+*Bidens polylepis* Blake (Ozark tickseed-sunflower) Orw–sparse
Bidens tripartita L. (Strawstem beggar-tick) Wrp,md–frequent
Bidens vulgata Greene (Tall beggar-tick) Wrp,md; Orw–frequent
Boltonia asteroides (L.) L 'Her. (False aster) Wez,sz–sparse
Brickellia eupatorioides (L.) Shinnars (False boneset) Tdf; Pdr; Orc–common
Cacalia plantaginea (Raf.) Shinnars (Tuberous Indian plantain) Pms–infrequent
**Carduus acanthoides* L. (Plumeless thistle) Pms; Ops–infrequent
**Carduus nutans* L. (Musk thistle) Ted; Wrp; Oof,ps–infrequent
**Centaurea maculosa* Lam. (Star thistle) Pdr–sparse
**Cichorium intybus* L. (Chicory) Orw–common
Cirsium altissimum (L.) Sprengel (Tall thistle) Pwt; O–common
**Cirsium arvense* (L.) Scop. (Canada thistle) T; P; W; O–common
Cirsium discolor (Muhl. ex Willd.) Sprengel (Field thistle) Pms; O–common
~*Cirsium flodmanii* (Rydb.) Arthur (Prairie thistle) Herb., 1901, 1908
~*Cirsium hillii* (Canby) Fern. (Hollow-rooted thistle) Herb., 1926, 1928
**Cirsium vulgare* (Savi) Tenore (Bull thistle) O–common
Conyza canadensis (L.) Cronq. (Horseweed) O–common
~*Conyza ramosissima* Cronq. (Dwarf horseweed) Herb., 1927
#+*Coreopsis lanceolata* L. (Tickseed coreopsis) Pms–sparse
Coreopsis palmata Nutt. (Prairie coreopsis) Pms–infrequent
#*Coreopsis tinctoria* Nutt. (Golden coreopsis) Wrp–sparse
Coreopsis tripteris L. (Tall tickseed) Ted–sparse
**Crepis tectorum* L. (Hawksbeard) Orc–sparse
Dyssodia papposa (Vent.) A.S. Hitchc. (Fetid marigold) Orc–sparse
Echinacea pallida Nutt. (Pale purple coneflower) Twd; Pdr–infrequent
Echinacea purpurea (L.) Moench (Purple coneflower) Pdr–sparse
Erechtites hieracifolia (L.) Raf. ex DC. (Fireweed) Twf; Orw–frequent
Erigeron annuus (L.) Pers. (Annual fleabane) O–common

Appendix A. Continued.

- Erigeron philadelphicus* L. (Philadelphian fleabane) Twf,es; Wrp—common
Erigeron strigosus Muhl. ex Willd. (Daisy fleabane) T; P; O—common
Eupatorium altissimum L. (Tall thoroughwort) Pms,wt; Orw—common
Eupatorium maculatum L. (Spotted Joe-Pye-weed) Wsp—sparse
Eupatorium perfoliatum L. (Boneset) Pwt—common
Eupatorium purpureum L. (Purple Joe-Pye-weed) Tmf,wf—common
Eupatorium rugosum Houtt. (White snakeroot) T—common
Euthamia graminifolia (L.) Nutt. ex Cass. (Lance-leaved goldenrod) Pms—infrequent
 #+*Gaillardia pulchella* Foug. (Blanket flower) Pms—sparse
 **Galinsoga parviflora* Cav. (Peruvian daisy) Our,cr—infrequent
 **Galinsoga quadriradiata* Ruiz & Pavon (Peruvian daisy) Wrp; Our—infrequent
Grnaphalium obtusifolium L. (Sweet everlasting) Oof—infrequent
Gnindelia squarrosa (Pursh) Dunal (Gumweed) Pdr—sparse
Helenium autumnale L. (Sneezeweed) Pms,wt—infrequent
Helianthus annuus L. (Common sunflower) Ocr—frequent
Helianthus grosseserratus Martens (Saw-tooth sunflower) P—common
Helianthus maximiliana Schrader (Maximilian's sunflower) Orw—infrequent
Helianthus rigidus (Cass.) Desf. (Showy sunflower) Pms,wt—frequent
Helianthus strumosus L. (Pale-leaved sunflower) T—common
Helianthus tuberosus L. (Jerusalem artichoke) T; P; O—common
Heliopsis helianthoides (L.) Sweet (Ox-eye) Pms—frequent
Hieracium canadense Michx. (Canada hawkweed) Ted—sparse
Hieracium scabrum Michx. (Rough hawkweed) Tdf,wd—sparse
Iva xanthifolia Nutt. (Marsh elder) Orw—sparse
Lactuca canadensis L. (Wild lettuce) T; P; Wrp; O—common
Lactuca floridana (L.) Gaertner (Blue lettuce) T—common
Lactuca ludoviciana (Nutt.) Riddell (Prairie lettuce) Pwt—sparse
 **Lactuca serriola* L. (Prickly lettuce) T; P; W; O—common
 **Lapsana communis* L. (Nipplewort) Our—sparse
 **Leucanthemum vulgare* Lam. (Ox-eye daisy) O—infrequent
Liatris aspera Michx. (Rough blazing star) Pms—infrequent
Liatris pycnostachya Michx. (Prairie blazing star) Pwt—infrequent
 **Matricaria maritima* L. (Scentless chamomilla) Our—sparse
 **Matricaria matricarioides* (Less.) Porter (Pineapple weed) O—common
 ~*Nothocalais cuspidata* (Pursh) Greene (Prairie dandelion) Herb. photo, 1999
Prenanthes alba L. (White lettuce) T—common
Prenanthes aspera Michx. (Rough white lettuce) Pdr—sparse
Prenanthes racemosa Michx. (Glaucous white lettuce) Pwt—sparse
Ratibida columnifera (Nutt.) Wootton & Standley (Long-headed coneflower) Pms—sparse
Ratibida pinnata (Vent.) Barnh. (Gray-headed coneflower) Pms—common
Rudbeckia hirta L. (Black-eyed Susan) Pms; Orw,of—frequent
Rudbeckia laciniata L. (Green-headed coneflower) Twf,ed—common
Rudbeckia triloba L. (Branched coneflower) Twf,ed; Pwt—common
Senecio pauperculus Michx. (Prairie ragwort) Pms—sparse
Senecio plattensis Nutt. (Prairie ragwort) Tdf; Pdr,ms—frequent
Senecio pseud aureus Rydb. (Western heart-leaved groundsel) Pwt—sparse
 **Senecio vulgaris* L. (Common groundsel) Wrp—sparse
 +*Silphium integrifolium* Michx. (Rosinweed) Orw—sparse
Silphium laciniatum L. (Compass plant) Pms—infrequent
Silphium perfoliatum L. (Cup plant) T; P; W; O—common
Solidago canadensis L. (Tall goldenrod) T; P; O—common
Solidago flexicaulis L. (Zig-zag goldenrod) T—frequent
Solidago gigantea Aiton (Smooth goldenrod) Pms,wt; Wrp—common
Solidago missouriensis Nutt. (Missouri goldenrod) Pdr,ms—infrequent
Solidago nemoralis Aiton (Gray goldenrod) Tms,es—infrequent
Solidago riddellii Frank ex Riddell (Riddell's goldenrod) Pwt—sparse
Solidago rigida L. (Stiff goldenrod) P—common
Solidago speciosa Nutt. (Showy goldenrod) Tes—sparse
Solidago ulmifolia Muhl. ex Willd. (Elm-leaved goldenrod) T—infrequent
 **Sonchus arvensis* L. (Perennial sow thistle) Orw—frequent
 **Sonchus asper* (L.) Hill (Spiny-leaved sow thistle) O—frequent
 **Sonchus oleraceus* L. (Common sow thistle) O—infrequent
 **Tanacetum vulgare* L. (Tansy) Orw—sparse
 **Taraxacum laevigatum* (Willd.) DC. (Red-seeded dandelion) O—infrequent
 **Taraxacum officinale* Weber (Common dandelion) T; P; W; O—common
 **Trapopogon dubius* Scop. (Goat's beard) Orw,rc—common
Verbesina alternifolia (L.) Britton (Wingstem) Twf—sparse
Vernonia baldwinii Torrey (Baldwin's ironweed) Pwt—infrequent
Vernonia fasciculata Michx. (Western ironweed) Pwt—infrequent
 **Xanthium strumarium* L. (Cocklebur) Wrp; O—common
- BALSAMINACEAE**
Impatiens capensis Meerb. (Spotted jewel weed) Twf; Wsp—common
Impatiens pallida Nutt. (Pale jewel weed) Twf; Wsp—infrequent
- BERBERIDACEAE**
 **Berberis thunbergii* DC. (Japanese barberry) T—infrequent
Caulophyllum thalictroides (L.) Michx. (Blue cohosh) Tmf—infrequent
Podophyllum peltatum L. (Mayapple) Tmf—sparse
- BETULACEAE**
Carpinus caroliniana Walter (Blue beech) Tmf,wf—infrequent
Corylus americana Walter (Hazel) Twd,ed; Orw—frequent
Ostrya virginiana (P. Miller)K. Koch (Ironwood) Tdf,mf—common
- BIGNONIACEAE**
 #*Campsis radicans* (L.) Seem. ex Bureau (Trumpet creeper) Orw—sparse
 #*Catalpa speciosa* Warder (Cigar tree) Twf,ed—sparse
- BORAGINACEAE**
 **Cynoglossum officinale* L. (Hound's tongue) Ted; Ops—infrequent
Hackelia virginiana (L.) I.M. Johnston (Stickseed) T; P; O—common
 **Lappula echinata* Gilib. (Beggar's-lice) Oof,ps—infrequent
Lithospermum canescens (Michx.) Lehm. (Hoary puccoon) Twd; Pms—infrequent

Appendix A. Continued.

- Lithospermum incisum* Lehm. (Fringed puccoon) Twd; Pdr—infrequent
Lithospermum latifolium Michx. (American gromwell) Tms—sparse
Mertensia virginica (L.) Pers. ex Link (Virginia bluebell) Tmf—frequent
Onosmodium molle Michx. var. *occidentale* (Mack.) I.M. Johnston (False gromwell) Orc,ps—infrequent
- BRASSICACEAE**
 **Alliaria petiolata* (Bieb.) Carara & Grande (Garlic mustard) Twf,ed—frequent
Arabis canadensis L. (Sickle pod) Tmf—infrequent
Arabis glabra (L.) Bernh. (Tower mustard) Ocr,of—sparse
Arabis hirsuta (L.) Scop. (Hairy rock cress) Tes; Pdr; Orc—infrequent
Arabis shortii (Fern.) Gl. (Rock cress) T—frequent
 **Barbarea vulgaris* R. Br. (Yellow rocket) Wrp; Ocr—common
 **Berteroa incana* (L.) DC. (Hoary alyssum) Wrp; Orw,of—infrequent
 **Brassica campestris* L. (Field mustard) Orw—sparse
 **Brassica juncea* (L.) Czern. (Chinese mustard) Wez; Oof—frequent
 **Brassica nigra* (L.) W.D.J. Koch (Black mustard) O—common
 **Camelina microcarpa* Andr. ex DC. (Small-fruited false flax) Orw—sparse
 **Capsella bursa-pastoris* (L.) Medicus (Shepard's purse) O—common
Cardamine bulbosa (Schreber) BSP. (Spring cress) Tes; Wsp—infrequent
Cardamine pennsylvanica Muhl. ex Willd. (Bitter cress) Twf; Wrp—common
 ~**Cardaria draba* (L.) Desv. (Hoary cress) Herb., 1948
Dentaria laciniata Muhl. ex Willd. (Toothwort) Tmf,wf—common
Descurainia pinnata (Walter) Britton var. *brachycarpa* (Richardson) Fern. (Tansy mustard) Wrp; O—common
 **Descurainia sophia* (L.) Webb ex Prantl (Herb-Sophia) Twf—sparse
Draba reptans (Lam.) Fern. (Whitlow grass) Pdr—sparse
 #*Erysimum asperum* (Nutt.) DC. (Western wallflower) Our—sparse
Erysimum cheiranthoides L. (Wormseed mustard) Wrp; Orw,rc—frequent
 **Erysimum hieracifolium* L. (Tall wormseed) Our,rc—sparse
 **Erysimum repandum* L. (Bushy wallflower) Orw—sparse
 **Hesperis matronalis* L. (Dame's rocket) Twf,ed; O—infrequent
Iodanthus pinnatifidus (Michx.) Steudel (Purple rocket) Twf—sparse
 **Lepidium campestre* (L.) R. Br. (Field cress) Orc,ps—infrequent
Lepidium densiflorum Schrader (Peppergrass) Orw,rc—frequent
Lepidium virginicum L. (Poor-man's pepper) O—common
 **Nasturtium officinale* R. Br. (Watercress) Wez,sz—infrequent
Rorippa palustris (L.) Besser (Marsh cress) Wez,rp,md—common
 **Rorippa sylvestris* (L.) Besser (Creeping yellow cress) Wrp—frequent
 **Sinapis arvensis* L. (Charlock) Our—sparse
 **Sisymbrium altissimum* L. (Tumble mustard) Orw—infrequent
 **Sisymbrium loeselii* L. (Tall hedge mustard) Oof—sparse
 **Sisymbrium officinale* (L.) Scop. (Hedge mustard) Wrp; O—infrequent
 **Thlaspi arvense* L. (Field penny cress) Ocr—common
- CALLITRICHACEAE**
Callitriche heterophylla Pursh (Water-starwort) Wez,sz—sparse
- CAMPANULACEAE**
Campanula americana L. (Tall bellflower) Tmf,wf,es,ed—common
Campanula aparinoides Pursh (Marsh bellflower) Wez,sp—infrequent
 **Campanula rapunculoides* L. (Creeping bellflower) Tmf,ed—sparse
Lobelia inflata L. (Indian tobacco) Twd,es,ed—infrequent
Lobelia siphilitica L. (Great blue lobelia) Tes; Pwt; W—common
Lobelia spicata Lam. (Pale spiked lobelia) Pms—sparse
Triodanis perfoliata (L.) Nieuw. (Venus' looking-glass) Oof—infrequent
- CAPPARIDACEAE**
Polanisia dodecandra (L.) DC. var. *dodecandra* (Clammy weed) Orc—sparse
Polanisia dodecandra (L.) DC. var. *trachysperma* (T & G) Iltis (Clammy weed) Orc—sparse
- CAPRIFOLIACEAE**
 **Lonicera* × *bella* Zabel (*L. morrowii* Gray × *L. tatarica* L.) Ted—infrequent
Lonicera dioica L. var. *glaucescens* (Rydb.) Butters (Wild honeysuckle) Tdf,mf—common
 **Lonicera japonica* Thunb. (Japanese honeysuckle) Our—sparse
 **Lonicera maackii* (Rupr.) Herder (Amur honeysuckle) T; O—common
 ~**Lonicera morrowii* Gray (Morrow's honeysuckle) Herb., 1956
 **Lonicera tatarica* L. (Tartarian honeysuckle) T; O—common
 **Lonicera* × *xylostoides* Tausch (*L. tatarica* L. × *L. xylostium* L.) Ted—sparse
Sambucus canadensis L. (Elderberry) Ted; Orw—common
Symphoricarpos occidentalis Hooker (Wolfberry) Orw—infrequent
Symphoricarpos orbiculatus Moench (Coralberry) Tmf,ed—infrequent
Triosteum perfoliatum L. (Tinker's weed) Twd—common
 **Viburnum lantana* L. (Wayfaring bush) Twf—sparse
Viburnum lentago L. (Nannyberry) Tmf,es—frequent
 **Viburnum opulus* L. (Guelder-rose) Ted—infrequent
Viburnum rafinesquianum Schultes (Downy arrowwood) Tmf—frequent
- CARYOPHYLLACEAE**
 **Arenaria serpyllifolia* L. (Thyme-leaved sandwort) Wrp—sparse
 **Cerastium arvense* L. (Starry grasswort-cultivated variety) Our—sparse
Cerastium nutans Raf. (Nodding chickweed) Orc,of—sparse
 **Cerastium vulgatum* L. (Mouse-ear chickweed) Our,rw,ps—common
 **Dianthus armeria* L. (Deptford pink) Oof,ps—frequent
 **Dianthus deltoides* L. (Maiden pink) Our—sparse
 **Myosoton aquaticum* (L.) Moench (Giant chickweed) Twf; Wez,sp—common
Paronychia canadensis (L.) Wood (Tall forked chickweed) Tdf—infrequent
 **Saponaria officinalis* L. (Bouncing bet) O—frequent
Silene antirrhina L. (Sleepy catchfly) Orw,rc—frequent
 **Silene cserei* Baumg. (Biennial campion) Our—sparse
 **Silene noctiflora* L. (Night-flowering catchfly) Ted—infrequent
 **Silene pratensis* (Rafn) Gren. & Godron (White campion) Wrp; Orw,rc—common
Silene stellata (L.) Aiton f. (Starry campion) T—common

Appendix A. Continued.

- Stellaria longifolia* Muhl. ex Willd. (Stitchwort) Twf; Wsp-frequent
 **Stellaria media* (L.) Vill. (Common chickweed) Twf; Our-common
 **Vaccaria pyramidata* Medicus (Cow cockle) Our-sparse
- CELASTRACEAE**
 **Celastrus orbiculatus* Thunb. (Round-leaved bittersweet) Pdr; Orw-sparse
Celastrus scandens L. (Bittersweet) T; Orw-common
Euonymus atropurpureus Jacq. (Wahoo) T-frequent
- CERATOPHYLLACEAE**
Ceratophyllum demersum L. (Coontail) Wsz-frequent
- CHENOPODIACEAE**
Atriplex patula L. (Spearscale) O-frequent
 **Chenopodium album* L. (Lamb's quarters) T; P; O-common
Chenopodium berlandieri Moq. (Pitseed goosefoot) Ted-infrequent
Chenopodium desiccatum A. Nelson (Narrow-leaved goosefoot) Ted-frequent
Chenopodium hybridum L. (Maple-leaved goosefoot) O-frequent
Chenopodium missouriensis Aellen (Missouri goosefoot) Wrp-sparse
Chenopodium standleyanum Aellen (Woodland goosefoot) Tmf-common
 **Kochia scoparia* (L.) Schrader (Summer cypress) Our,rc-frequent
 #*Monolepis nuttalliana* (Roemer & Schultes) Greene (Poverty weed) Our-sparse
 **Salsola collina* Pallas (Katune) Pdr; Orw-sparse
- CISTACEAE**
Helianthemum bicknellii Fern (Rockrose- Frostweed) Tdf,wd-sparse
- CONVOLVULACEAE**
Calystegia sepium (L.) R. Br. (Morning glory) Orw,rc-common
 **Convolvulus arvensis* L. (European bindweed) O-common
Cuscuta coryli Engelm. (Hazel dodder) Wrp-sparse
Cuscuta cuspidata Engelm. (Dodder) Twf-sparse
Cuscuta glomerata Choisy (Rope dodder) Ted-sparse
Cuscuta gronovii Willd. (Common dodder) Twf-sparse
Cuscuta pentagona Engelm. (Field dodder) Twf-frequent
 ~*Cuscuta polygonorum* Engelm. (Smartweed dodder) Herb., 1949
 **Ipomoea hederacea* (L.) Jacq. (Ivy-leaved morning glory) Orw-infrequent
 **Ipomoea purpurea* (L.) Roth (Annual morning glory) Orw-sparse
- CORNACEAE**
 **Cornus alba* L. (Tatarian dogwood) Wez-sparse
Cornus alternifolia L.f. (Pagoda dogwood) Tmf,es-frequent
Cornus amomum P. Miller ssp. *obliqua* (Raf.) J.S. Wilson (Silky dogwood) Tmf,wf; Wsp-infrequent
Cornus drummondii C.A. Meyer (Rough-leaved dogwood) Tmf,wf; Wsp-frequent
Cornus foemina P. Miller ssp. *racemosa* (Lam.) J.S. Wilson (Gray dogwood) Tmf-common
Cornus rugosa Lam. (Round-leaved dogwood) Tmf,es-sparse
- CUCURBITACEAE**
Sicyos angulatus L. (Bur-cucumber) Twf-common
- DIPSACACEAE**
 **Dipsacus sylvestris* Hudson (Common teasel) Twf; Our-sparse
- ELAEAGNACEAE**
 **Elaeagnus umbellata* Thunb. (Autumn olive) Twd,ed; Oof-common
- ERICACEAE**
Monotropa uniflora L. (Indian pipe) Tmf-common
- EUPHORBIACEAE**
Acalypha rhomboidea Raf. (Rhombic three-seeded mercury) Wrp-common
Acalypha virginica L. (Virginia three-seeded mercury) Oof-sparse
Croton capitatus Michx. (Hogwort) Orw-sparse
Euphorbia corollata L. (Flowering spurge) Pwt-sparse
Euphorbia cyathophora Murray (Wild poinsettia) Twd,ed-frequent
 **Euphorbia cyparissias* L. (Cypress spurge) Pdr,ms-infrequent
Euphorbia dentata Michx. (Toothed spurge) Orw,rc-common
 **Euphorbia esula* L. (Leafy spurge) Orw-frequent
Euphorbia glyptosperma Engelm. (Ridge-seed spurge) Pdr; Orc-infrequent
Euphorbia maculata L. (Carpet spurge) O-common
Euphorbia nutans Lag. (Nodding spurge) O-common
Euphorbia prostrata Aiton (Prostrate spurge) Our-sparse
Euphorbia serpens HBK. (Round-leaved spurge) Our-sparse
- FABACEAE**
Amorpha canescens Pursh (Lead plant) Twd; Pdr,ms-frequent
Amorpha fruticosa L. (Indigo bush) Pwt; Wez-frequent
Amphicarpaea bracteata (L.) Fern (Hog peanut) Tes-common
Apios americana Medicus (Ground-nut) Tmf,wf,es; Wsp-common
Astragalus canadensis L. (Milk vetch) Tes; Wsp-common
Astragalus crassicaarpus Nutt. (Ground plum) Pdr-sparse
Baptisia bracteata Muhl. ex Ell. var. *glabrescens* (Larisey) Isely (Cream wild indigo) Pdr,ms-sparse
Baptisia lactea (Raf.) Thieret (White wild indigo) Twd-sparse
Chamaecrista fasciculata (Michx.) Greene (Partridge pea) Orw,rc-frequent
 **Coronilla varia* L. (Crown vetch) Twf,ed; Wrp; O-common
Dalea candida Willd. (White prairie clover) Pdr,ms-infrequent
Dalea purpurea Vent. (Purple prairie clover) Pdr,ms-frequent
Desmanthus illinoensis (Michx.) MacM. ex B.L. Robinson & Fern. (Illinois bundle flower) Pwt-sparse
Desmodium canadense (L.) DC. (Showy tick-trefoil) Twd,es; Pms-frequent
Desmodium canescens (L.) DC. (Hoary tick-trefoil) Ted; Orw-sparse
Desmodium cuspidatum (Muhl. ex Willd.) Loudon (Bracted tick-trefoil) Tes-sparse
Desmodium glutinosum (Muhl. ex Willd.) Wood (Pointed tick-trefoil) T-common
Desmodium illinoense Gray (Illinois tick-trefoil) Ted-sparse
Gleditsia triacanthos L. (Honey locust) T-common
Glycyrrhiza lepidota Pursh (Wild licorice) Orw,of-sparse
Gymnocladus dioica (L.) K. Koch (Kentucky coffee tree) Twf-infrequent
Lathyrus ochroleucus Hooker (Wild pea) Tmf,es-infrequent
Lathyrus palustris L. (Marsh vetchling) Wsp-sparse
Lathyrus venosus Muhl. ex Willd. (Veiny pea) Tmf; Pms-infrequent

Appendix A. Continued.

- Lespedeza capitata* Michx. (Round-headed bush clover) Twd; Pms—frequent
 *+*Lespedeza cuneata* (Dum.- Cours.) G. Don (Silky bush clover) Pdr—sparse
 **Lotus corniculatus* L. (Bird's-foot trefoil) O—common
 **Medicago falcata* L. (Yellow alfalfa) Orw—sparse
 **Medicago lupulina* L. (Black medic) T; O—common
 **Medicago sativa* L. (Alfalfa) Ocr,rw,of—common
 **Melilotus alba* Medicus (White sweet clover) T; P; W; O—common
 **Melilotus officinalis* (L.) Pallas (Yellow sweet clover) T; P; O—common
Pedimelum argophyllum (Pursh) Grimes (Silvery scurf-pea) Pdr—sparse
Psoraleidum batesii Rydb. (Scurfy pea) Twd,es—sparse
 #*Robinia pseudoacacia* L. (Black locust) Twf—infrequent
Strophostyles helvula (L.) Ell. (Wild bean) Wrp—sparse
 **Trifolium campestre* Schreber (Low hop-clover) Oof,ps—sparse
 **Trifolium hybridum* L. (Alsike clover) Orw,of—common
 **Trifolium pratense* L. (Red clover) T; P; O—common
 **Trifolium repens* L. (White clover) O—common
Vicia americana Muhl. ex Willd. (American vetch) Tes; Pms—common
 **Vicia villosa* Roth (Hairy vetch) Orw—frequent
- FAGACEAE**
Quercus alba L. (White oak) Tdf,mf—common
Quercus bicolor Willd. (Swamp white oak) Twf—sparse
Quercus borealis Michx. f. var. *maxima* (Marsh.) Ashe (Northern red oak) T—common
Quercus ellipsoidalis E. J. Hill (Hill's oak, northern pin oak) T—sparse
Quercus × *hawkinsii* Sudw. (Northern red oak × black oak) Tdf—sparse
Quercus macrocarpa Michx. (Bur oak) Tdf,mf—common
Quercus muehlenbergii Engelm. (Chinquapin oak) Twf,es—common
- GENTIANACEAE**
Gentiana alba Muhl. (Yellow gentian-pale gentian) Twd,ed; Oof—common
 ~*Gentiana alba* Muhl. X *G. andrewsii* Griseb. (Pale X bottle gentian) Herb., 1933, 1934, 1935
Gentiana andrewsii Griseb. (Bottle gentian) Pwt; Wsp—infrequent
Gentiana puberulenta J. Pringle (Downy gentian) Pdr,ms—infrequent
Gentianella quinquefolia (L.) Small ssp. *occidentalis* (A. Gray) J. Gillett (Stiff gentian) Tes; Wsp—infrequent
 ~*Gentianopsis crinita* (Froel.) Ma (Fringed gentian)[*Gentiana crinita* Froel.] P, 1898
- GERANIACEAE**
Geranium maculatum L. (Wild geranium) Tmf,wf—infrequent
 **Geranium sibiricum* L. (Siberian geranium) Pms; Orw—sparse
- HALORAGIDACEAE**
 ~*Myriophyllum exalbescens* Fern. (American water milfoil) Herb., 1961
 ~**Myriophyllum spicatum* L. (Spiked water milfoil) H, 1890
- HIPPOCASTANACEAE**
Aesculus glabra Willd. (Ohio buckeye) Twf—sparse
- HYDROPHYLLACEAE**
Ellisia nyctelea L. (Wild tomato) Twf; Orw,rc—common
Hydrophyllum appendiculatum Michx. (Appendaged waterleaf) Tmf,wf—frequent
Hydrophyllum virginianum L. (Virginia waterleaf) Tmf,wf—common
- HYPERICACEAE**
Hypericum majus (Gray) Britton (Greater St. John's wort) Wmd—sparse
 **Hypericum perforatum* L. (Common St. John's wort) Orw,rc,of—frequent
Hypericum punctatum Lam. (Spotted St. John's wort) Tes—sparse
Hypericum pyramidatum Aiton (Giant St. John's wort) Twd; Oof—frequent
- JUGLANDACEAE**
Carya cordiformis (Wang.) K. Koch (Bitternut hickory) T—common
Carya ovata (P. Miller) K. Koch (Shagbark hickory) T—common
Juglans cinerea L. (Butternut) Tmf,wf—infrequent
Juglans nigra L. (Black walnut) T; Orw—common
- LAMIACEAE**
Agastache nepetoides (L.) Kuntze (Yellow giant hyssop) T—common
Agastache scrophulariifolia (Willd.) Kuntze (Purple giant hyssop) Twd,ed—frequent
Blephilia hirsuta (Pursh) Bentham (Wood mint) Ted—sparse
Dracocephalum parviflorum Nutt. (Dragonhead) Wrp; Oof—sparse
 **Glechoma hederacea* L. (Creeping Charlie) T; P; W; O—common
Hedeoma hispida Pursh (Rough pennyroyal) Orc—frequent
Hedeoma pulegioides (L.) Pers. (American pennyroyal) Tdr; Ops—sparse
 **Lamium amplexicaule* L. (Henbit) Our—sparse
 **Leonurus cardiaca* L. (Common motherwort) T; Orc—common
 **Leonurus marrubiastrum* L. (Horehound motherwort) Twf; Wrp—infrequent
Lycopus americanus Muhl. ex Barton (Water horehound) Twf; Pwt; Wez—frequent
Lycopus asper Greene (Western water horehound) Wez—sparse
 Lycopus × *Sherardii* Steele (*L. uniflorus* × *L. virginicus*) Pwt; Wrp—common
Lycopus uniflorus Michx. (Northern bugleweed) Wez,rp—common
Lycopus virginicus L. (Virginia water horehound) Wez—sparse
Mentha arvensis L. (Wild mint) Twf; Pwt; Wez,md—common
Monarda fistulosa L. (Bergamot) T; P; O—common
 **Nepeta cataria* L. (Catnip) T; P; O—common
Physostegia parviflora Nutt. ex Gray (Obedient plant) Twf—infrequent
Physostegia virginiana (L.) Bentham (False dragonhead) Twf; Wrp,md—frequent
 **Prunella vulgaris* L. (Self heal) T; P; W; O—common
 +*Pycnanthemum tenuifolium* Schrader (Slender mountain mint) Pwt—sparse
Pycnanthemum virginianum (L.) Dur. & Jackson (Common mountain mint) Pms,wt—common
 +*Salvia pitcheri* Torrey ex Bentham (Pitcher's sage) Pms—sparse
 ~*Salvia reflexa* Hornem. (Rocky Mountain sage) Herb., 1944
Scutellaria galericula L. (Marsh skullcap) Wez—infrequent

Appendix A. Continued.

- Scutellaria lateriflora* L. (Mad-dog skullcap) Twf; Wez,rp,md—common
Scutellaria leonardii Epling (Small skullcap) Tdf; Pdr—common
Stachys palustris L. (Woundwort) Pwt; Orw—common
Stachys tenuifolia Willd. (Smooth hedge nettle) Twf—common
Teucrium canadense L. (Germander) Twf,ed—common
Teucrium canadense L. var. *boreale* (Bickn.) Shinners (Wood sage-germander) Tmf,wf; Pms; Wrp,md—common
- LENTIBULARIACEAE**
Utricularia vulgaris L. (Common bladderwort) Wsz—infrequent
- LINACEAE**
 *+*Linum perenne* L. (Flax) Pms—sparse
Linum sulcatum Riddell (Wild flax) Tdf—sparse
- LYTHRACEAE**
Ammannia coccinea Rottb. (Tooth cup) Wmd—infrequent
Didiplis diandra (DC.) Wood (Water purslane) Wez,sz—sparse
Lythrum alatum Pursh (Winged loosestrife) Tes; Pwt; Wmd,sp—frequent
 **Lythrum salicaria* L. (Purple loosestrife) Wez; Orw,of—infrequent
- MALVACEAE**
 **Abutilon theophrasti* Medicus (Velvet leaf) Wrp; O—common
 **Hibiscus trionum* L. (Flower-of-an-hour) Wrp; O—common
 **Malva neglecta* Wallr. (Cheeses) Wrp; O—infrequent
 **Malva rotundifolia* L. (Round-leaved mallow) Wrp; O—infrequent
- MENISPERMACEAE**
Menispermum canadense L. (Moonseed) T—common
- MENYANTHACEAE**
 ~*Menyanthes trifoliata* L. (Buckbean) Herb., 1892
- MORACEAE**
 **Cannabis sativa* L. (Hemp-marijuana) O—common
 **Humulus japonicus* Sieb. (Japanese hops) Tmf,wf—sparse
Humulus lupulus L. (Common hops) Twf,wd,ed; Pms; Orw—common
 **Morus alba* L. (White mulberry) T; P; O—common
- NYCTAGINACEAE**
Mirabilis albida (Walter) Heimerl (Pale four-o'clock) Tdf,wd,ed; Pdr—infrequent
Mirabilis nyctaginea (Michx.) Mac M. (Wild four-o'clock) O—common
- NYMPHAEACEAE**
 ~*Brasenia schreberi* J. F. Gmelin (Watershield) Herb., 1924
Nuphar luteum (L.) Sibth. & Smith ssp. *variegatum* (Engelm. ex Dur.) E.O.Beal (Yellow water lily) Wsz—sparse
Nymphaea tuberosa Paine (White water lily) Wsz—sparse
- OLEACEAE**
Fraxinus americana L. (White ash) Tdf,mf—common
Fraxinus nigra Marsh. (Black ash) Tmf—common
Fraxinus pennsylvanica Marsh. (Red ash) Tmf—sparse
Fraxinus pennsylvanica Marsh. var. *lanceolata* (Borkh.) Sarg. (Green ash) Tmf,wf—common
 **Ligustrum obtusifolium* Siebold & Zucc. (Privet) Twf—sparse
- ONAGRACEAE**
Calylophus serrulatus (Nutt.) Raven (Toothed evening primrose) Pdr—sparse
Circaea lutetiana L. ssp. *canadensis* (L.) Ascherson & Magnus (Enchanter's nightshade) Tmf,wf—common
 ~*Epilobium ciliatum* Raf. (American willow herb)[*E. adenocaulon* Hassk.] P, 1898
- Epilobium coloratum* Biehler (Cinnamon willow herb) Pwt; Wrp,sp—common
Epilobium leptophyllum Raf. (Bog willow herb) Pwt—sparse
Ludwigia polycarpa Short & Peter (False loosestrife) Wmd—sparse
Oenothera villosa Thunb. (Gray evening primrose) P; Wrp; O—common
- OROBANCHACEAE**
Orobanche uniflora L. (One-flowered cancer-root) Pms—sparse
- OXALIDACEAE**
Oxalis dillenii Jacq. (Yellow wood sorrel) Our—sparse
Oxalis stricta L. (Lady's sorrel) T; P; W; O—common
Oxalis violacea L. (Violet wood sorrel) Pdr,ms—infrequent
- PAPAVERACEAE**
Corydalis micrantha (Engelm.) Gray (Slender fumewort) Ocr,rw,rc—common
Dicentra canadensis (Goldie) Walp. (Squirrel corn) Tmf—sparse
Dicentra cucullaria (L.) Bernh. (Dutchman's breeches) Tmf—common
Sanguinaria canadensis L. (Bloodroot) Tmf—common
- PHRYMACEAE**
Phryma leptostachya L. (Lopseed) T—common
- PLANTAGINACEAE**
 **Plantago lanceolata* L. (Buckthorn plantain) Our—common
 **Plantago major* L. (Common plantain) T; P; W; O—common
Plantago rugelii Dcne. (Rugel's plantain) T; P; W; O—common
- POLEMONIACEAE**
Pblox divaricata L. (Sweet Williams) T—common
Pblox maculata L. (Meadow phlox) Pwt—sparse
 #*Pblox paniculata* L. (Garden phlox) Twf,ed—sparse
Pblox pilosa L. (Prairie phlox) P—infrequent
- POLYGALACEAE**
Polygala senega L. (Seneca snakeroot) Tes—sparse
Polygala verticillata L. (Whorled milkwort) Twd—infrequent
- POLYGONACEAE**
Polygonum achoreum Blake (Striate knotweed) Orw,cr—frequent
Polygonum amphibium L. var. *emersum* Michx. (Water smartweed) Wez,sz,md—frequent
Polygonum amphibium L. var. *stipulaceum* (Coleman) Fern. (Water smartweed) Wsz—sparse
 **Polygonum aviculare* L. (Knotweed) O—common
 **Polygonum convolvulus* L. (Black bindweed) Twf; Wrp; O—common
 **Polygonum cuspidatum* Sieb. & Zucc. (Japanese bamboo) Orw—infrequent
Polygonum erectum L. (Erect knotweed) Orc,of—infrequent
Polygonum hydroppiper L. (Water-pepper) Twf; Wrp,md—frequent
Polygonum lapathifolium L. (Dock-leaved smartweed) Pwt; Wez,rp; Ocr—frequent
Polygonum pensylvanicum L. var. *laevigatum* Fern. (Pennsylvania smartweed) Pwt; Wez,rp—common
 **Polygonum persicaria* L. (Lady's thumb) Wmd; Ocr,rw—common
Polygonum punctatum Ell. (Water smartweed) Pwt; Wrp,md—frequent
Polygonum ramosissimum Michx. (Bushy knotweed) O—infrequent
Polygonum scandens L. (Climbing false buckwheat) Twf; Wrp; O—common

Appendix A. Continued.

- Polygonum virginianum* L. (Jumpseed) Twf—common
 **Rumex acetosella* L. (Red sorrel) Twd; O—common
Rumex altissimus Wood (Pale dock) Twf—common
 **Rumex crispus* L. (Curly dock) Pwt; Wrp; Ocr,of—common
 **Rumex maritimus* L. var. *fueginus* (Phil.) Dusen (Golden dock)
 Wez,rp,md—infrequent
Rumex mexicanus Meisner (Dock) Wrp; Orw—infrequent
Rumex obtusifolius L. (Bitter dock) Wrp—sparse
Rumex orbiculatus Gray (Great water-dock) Wez—sparse
 **Rumex stenophyllus* Ledeb. (Narrow-leaf dock) Wmd—infrequent
Rumex verticillatus L. (Swamp dock) Wez—sparse
- PORTULACACEAE**
Claytonia virginica L. (Spring beauty) Tdf,mf—common
 **Portulaca oleracea* L. (Common purslane) Wrp; O—common
- PRIMULACEAE**
Androsace occidentalis Pursh (Rock jasmine) Orw,rc—infrequent
 ~*Dodecatheon meadia* L. (Shooting star) Herb photo, no date
Lysimachia ciliata L. (Fringed loosestrife) Pwt; Orw—frequent
Lysimachia hybrida Michx. (Mississippi Valley loosestrife)
 Pwt—sparse
 **Lysimachia nummularia* L. (Moneywort) Twf—common
Lysimachia quadriflora Sims (Prairie loosestrife) Pwt—infrequent
Lysimachia terrestris (L.) BSP. (Swamp candle) Wez—sparse
Lysimachia thyrsoflora L. (Swamp loosestrife) Wez—sparse
- RANUNCULACEAE**
Actaea pachypoda Ell. (White baneberry) Tmf—infrequent
Actaea rubra (Aiton) Willd. (Red baneberry) Tmf—infrequent
 **Adonis annua* L. (Fall adonis) Our—sparse
Anemone canadensis L. (Canada anemone) Pwt; Orw—common
Anemone cylindrica Gray (Thimbleweed) Pdr,ms—common
Anemone quinquefolia L. (Wood anemone) Tmf,wf—frequent
Anemone virginiana L. (Tall anemone) Pdr,ms—frequent
Aquilegia canadensis L. (Columbine) Tmf—common
Caltha palustris L. (Marsh marigold) Wez,sp—sparse
Clematis virginiana L. (Virgin's bower) Twf,es,ed—common
 **Consolida ambigua* (L.) Ball & Heywood (Rocket larkspur)
 Ocr—sparse
Delphinium virescens Nutt. (Prairie larkspur) Pms—infrequent
Hepatica nobilis (P. Miller) var. *acuta* (Pursh) Steyerem.
 (Liverleaf) Tmf—common
Isopyrum biternatum (Raf.) T. & G. (False rue anemone)
 Tmf,wf—common
Pulsatilla patens (L.) P. Miller ssp. *multifida* (Pritz.) Zamels
 (Pasque flower) Pdr—sparse
Ranunculus abortivus L. (Kidney-leaved buttercup) T; W; O—common
 ~*Ranunculus aquatilis* L. var. *capillaceus* (Thuill.) DC. (White
 water crowfoot) [*R. aquatilis* L. var. *trichophyllus*] P, 1898
 **Ranunculus bulbosus* L. (Bulbous buttercup) Orc—sparse
 ~*Ranunculus cymbalaria* Pursh (Seaside crowfoot) Herb., 1891,
 1909, 1928
Ranunculus fascicularis Muhl. (Early buttercup) Tmf—sparse
Ranunculus flabellaris Raf. (Yellow water crowfoot) Wsz—sparse
Ranunculus longirostris Godron (White water crowfoot) Wsz—
 sparse
 ~*Ranunculus pensylvanicus* L. f. (Bristly crowfoot) H, 1890
Ranunculus rhomboideus Goldie (Prairie buttercup) Pdr—sparse
Ranunculus sceleratus L. (Cursed crowfoot) Twf; Wmd,sp—
 common
- Ranunculus septentrionalis* Poiret (Swamp buttercup) Tmf,wf—
 common
Thalictrum dasycarpum Fischer & Ave-Lall. (Purple meadow-
 rue) Pms—frequent
Thalictrum dioicum L. (Early meadow-rue) Tmf—common
Thalictrum thalictroides (L.) Eames & Boivin (Rue anemone)
 Tmf—sparse
- RHAMNACEAE**
Ceanothus americanus L. var. *pitcheri* T. & G. (New Jersey tea)
 Tdf; Pdr,ms—infrequent
 **Rhamnus cathartica* L. (European buckthorn) T—common
- ROSACEAE**
Agrimonia gryposepala Wallr. (Tall agrimony) Twd,ed—common
Agrimonia parviflora Aiton (Swamp agrimony) Ted; Pms—
 sparse
Agrimonia pubescens Wallr. (Soft agrimony) T—frequent
Agrimonia striata Michx. (Road-side agrimony) T—sparse
Amelanchier arborea (Michx.) Fern. (Serviceberry-Juneberry)
 Tmf—common
Crataegus calpodendron (Ehrh.) Medicus (Pear hawthorn)
 Twd,ed—infrequent
Crataegus crus-galli L. (Cockspur hawthorn) Twd,ed; Pdr—
 sparse
Crataegus mollis (T. & G.) Scheele (Downy hawthorn) T; Ops—
 common
Crataegus punctata Jacq. (Dotted hawthorn) Twd,ed; Ops—
 frequent
Crataegus succulenta Schrader ex Link (Fleshy hawthorn)
 Twd,ed—frequent
Fragaria vesca L. var. *americana* Porter (Woodland strawberry)
 Tdf,mf—common
Fragaria virginiana Duchesne (Wild strawberry) T; P; O—
 common
Geum canadense Jacq. (White avens) Tmf,wf; Pms,wt—common
Geum laciniatum Murray (Rough avens) Orw—sparse
Geum macrophyllum Willd. (Big-leaved avens) Our—sparse
Malus ioensis (Wood) Britton (Wild crab apple) Tdf,mf; Ops—
 frequent
 **Malus sylvestris* (L.) P. Miller (Apple) Ted; Ops—sparse
Physocarpus opulifolius (L.) Maxim. (Ninebark) Tes—sparse
 ~*Potentilla anserina* L. (Silverweed) H, 1890
 **Potentilla argentea* L. (Silvery cinquefoil) Twd—sparse
Potentilla arguta Pursh (Tall cinquefoil) Twd; Oof—frequent
 **Potentilla intermedia* L. (Intermediate cinquefoil) Our—sparse
Potentilla norvegica L. (Norwegian cinquefoil) Oof—frequent
 **Potentilla recta* L. (Sulphur cinquefoil) Ops—common
Potentilla rivalis Nutt. (Brook cinquefoil) Pwt—sparse
Potentilla simplex Michx. (Common cinquefoil) Twd,ed; Pms—
 frequent
Prunus americana Marsh. (Wild plum) Twd,ed; Orw—common
 **Prunus cerasus* L. (Dwarf cherry-sour cherry) Orw—sparse
Prunus mexicana S. Watson (Big-tree plum) Orw—sparse
Prunus nigra Aiton (Canada plum) Tes—sparse
Prunus pensylvanica L. (Pin cherry) Tmf—sparse
Prunus serotina Ehrh. (Wild black cherry) Twd,ed; Orw—
 common
Prunus virginiana L. (Choke cherry) Twd,ed; Orw—common
Rosa arkansana Porter var. *suffulta* (Greene) Cockerell
 (Sunshine rose) Orw—infrequent
Rosa blanda Aiton (Meadow rose) Ted; Pms; Orw—common

Appendix A. Continued.

- Rosa carolina* L. (Pasture rose) Ted; Pms; Orw-frequent
 **Rosa multiflora* Thunb. ex Murray (Multiflora rose) T; P; O-common
Rosa × *rudiocula* Greene (*R. arkansana* × *R. carolina*) Orw-infrequent
Rubus ablatius Bailey (Dewberry) Tmf,wd,ed-infrequent
Rubus allegheniensis Porter ex Bailey (Blackberry) Twd,ed; Orw,of-common
 **Rubus caesius* L. (European dewberry) Orw-sparse
Rubus frondosus Bigel. (Dewberry) Ted; Oof-infrequent
 **Rubus idaeus* L. var. *idaeus* (Cultivated red raspberry) Orw-sparse
Rubus idaeus L. var. *strigosus* Michx. (Wild red raspberry) Ted; Orw-frequent
Rubus × *neglectus* Peck (*R. idaeus* var. *strigosus* × *R. occidentalis*) Ted; Orw-infrequent
Rubus occidentalis L. (Black raspberry) T; P; W; O-common
 **Rubus parvifolius* L. (Asian dewberry) Ted; Ops-sparse
Rubus wisconsinensis L.H. Bailey (Wisconsin dewberry) Pms-sparse
Spiraea alba Du Roi (Meadowsweet) Pms-sparse
- RUBIACEAE**
Galium aparine L. (Cleavers) Tmf,wf-common
Galium boreale L. (Northern bedstraw) Tdf,wd-common
Galium circaezans Michx. (White wild licorice) Tdf,wd-frequent
Galium concinnum T. & G. (Shining bedstraw) T-common
 *+*Galium mollugo* L. (Hedge bedstraw) Pwt-sparse
Galium obtusum Bigelow (Wild madder) T; Pms-frequent
Galium tinctorium L. (Stiff bedstraw) Orw-infrequent
Galium triflorum Michx. (Sweet-scented bedstraw) T-common
- RUTACEAE**
Ptelea trifoliata L. (Wafer ash) Twd,ed-sparse
Zanthoxylum americanum P. Miller (Prickly ash) T-common
- SALICACEAE**
 **Populus alba* L. (Silver poplar) Ted-infrequent
Populus deltoides Bartram ex Marsh. (Cottonwood) Twf; Pwt; Wez-common
Populus grandidentata Michx. (Big-tooth aspen) T-frequent
Populus tremuloides Michx. (Quaking aspen) Twd,ed-frequent
 **Salix alba* L. (White willow) Orw-sparse
Salix bebbiana Sarg. (Beaked willow) Wrp-sparse
Salix candida Fluegge ex Willd. (Sage willow) Pwt-sparse
Salix discolor Muhl. (Pussy willow) Tes; Pwt; Wsp; Orw-common
Salix exigua Nutt. ssp. *interior* (Rowlee) Cronq. (Sandbar willow) Twf,es; Pwt; Wrp-common
 **Salix fragilis* L. (Crack willow) Wrp-sparse
Salix humilis Marsh- *Salix candida* Fluegge (Intermediate willow) Pms-sparse
Salix humilis Marsh. (Prairie willow) Pdr,ms-infrequent
Salix lucida Muhl. (Shining willow) Pwt; Wez-sparse
Salix nigra Marsh. (Black willow) Twf; Pwt; Wrp-common
Salix petiolaris Smith (Meadow willow) Wez-sparse
Salix rigida Muhl. (Diamond willow) Twf,es; Pwt; Wrp-common
 **Salix* × *rubens* Schrank (*S. alba* × *S. fragilis*) Twf-sparse
- SANTALACEAE**
Comandra umbellata (L.) Nutt. (Bastard toadflax) Tdf; Pdr,ms-frequent
- SAXIFRAGACEAE**
- Heuchera richardsonii* R. Br. (Alumroot) Tmf-sparse
Mitella diphylla L. (Bishop's cap-mitrewort) Tmf,es; Wsp-common
Penthorum sedoides L. (Ditch stonecrop) Twf; Wez,md,sp-common
Ribes americanum P. Miller (Wild black currant) Twf; Pwt; Wsp-frequent
Ribes cynosbati L. (Prickly gooseberry) Tmf-infrequent
Ribes missouriense Nutt. ex T. & G. (Wild gooseberry) T-common
 ~*Ribes odoratum* Willd. (Buffalo currant) Herb., no date
- SCROPHULARIACEAE**
Agalinis purpurea (L.) Pennell (Purple false foxglove) Pwt-sparse
Agalinis tenuifolia (Vahl) Raf. (Slender false foxglove) Tes; Wsp-infrequent
 **Chaenorhinum minus* (L.) Lange (Dwarf snapdragon) Our-sparse
Dasistoma macrophylla (Nutt.) Raf. (Mullen foxglove) Twd,ed; Oof-infrequent
Gratiola neglecta Torrey (Hedge hyssop) Wez,rp-sparse
 **Linaria vulgaris* Hill (Butter & eggs) Orw-sparse
Lindernia anagallidea (Michx.) Pennell (False pimpernel) Wez,md-sparse
Lindernia dubia (L.) Pennell (False pimpernel) Wez,rp,md-common
Mimulus ringens L. (Monkey flower) Twf; Wmd,sp-common
Pedicularis canadensis L. (Wood betony) Tmf,es; Pms-frequent
Pedicularis lanceolata Michx. (Swamp lousewort) Tes; Wez,sp-infrequent
 +*Penstemon digitalis* Nutt. (Foxglove penstemon) Pms; Orw-infrequent
Scrophularia lanceolata Pursh (Figwort) Ted; Orw-sparse
Scrophularia marilandica L. (Figwort) Twf; Wrp-common
 **Verbascum thapsus* L. (Common mullein) T; P; O-common
 **Veronica anagallis-aquatica* L. (Water speedwell) Wrp-sparse
 **Veronica arvensis* L. (Corn speedwell) Our,cr,rc,ps-infrequent
Veronica catenata Pennell (Water speedwell) Wrp-frequent
Veronica peregrina L. (Purslane speedwell) Twf; Wrp; Ocr-common
 **Veronica polita* Fries (Gray field speedwell) Wrp; Our-sparse
Veronicastrum virginicum (L.) Farw. (Culver's root) T; P-common
- SOLANACEAE**
 **Datura stramonium* L. (Jimsonweed) Our-sparse
 **Lycium chinense* P. Mill. (Matrimony vine) Orw-sparse
Physalis heterophylla Nees (Ground cherry) Twd,ed; Pms; O-common
Physalis virginiana P. Miller (Ground cherry) Twd,ed; Pms; O-common
Solanum americanum P. Miller (Black nightshade) T; O-common
Solanum carolinense L. (Horse nettle) T; P; O-common
 **Solanum dulcamara* L. (European bitter-sweet) Twf; Orw-infrequent
 #*Solanum rostratum* Dunal (Buffalo bur) Wrp; Ops-infrequent
- STAPHYLEACEAE**
Staphylea trifolia L. (Bladdernut) Tmf,wf,es-frequent
- THYMELAEACEAE**
Dircia palustris L. (Leatherwood) Tmf-infrequent
- TILIACEAE**

Appendix A. Continued.

- Tilia americana* L. (Basswood) Tmf,wf—common
- ULMACEAE**
- Celtis occidentalis* L. (Hackberry) T; Orw—common
- Ulmus americana* L. (American elm) T—common
- **Ulmus pumila* L. (Siberian elm) Orw,rc,of,ps—frequent
- **Ulmus pumila* L. × *U. rubra* Muhl. (Siberian elm × red elm) T—infrequent
- Ulmus rubra* Muhl. (Red elm) T—common

- URTICACEAE**
- Boehmeria cylindrica* (L.) SW. (Bog hemp) Twf—common
- Laportea canadensis* (L.) Wedd. (Wood nettle) Twf—common
- Parietaria pensylvanica* Muhl. ex Willd. (Pellitory) Wrp; Or,rc—common
- Pilea pumila* (L.) Gray (Clearweed) Twf; Wrp,sp—common
- Urtica dioica* L. (Stinging nettle) Tmf,wf—common

- VERBENACEAE**
- Phyla lanceolata* (Michx.) Greene (Fogfruit) Twf; Wrp,md—common
- Verbena bracteata* Lag. & Rodr. (Creeping vervain) Orw,rc—common
- Verbena* × *engelmannii* Moldenke (*V. urticifolia* × *V. hastata*) Twf—sparse
- Verbena hastata* L. (Blue vervain) Pms,wt; Wrp—common
- Verbena* × *rydbergii* Moldenke (*V. hastata* × *V. stricta*) Wez,rp; Ops—frequent
- Verbena stricta* Vent (Hoary vervain) Pdr,ms; Orc,ps—common
- Verbena urticifolia* L. (White vervain) Pwt; Wrp—common

- VIOLACEAE**
- Viola* × *bernardii* Greene (*V. pedatifida* × *V. sororia*) Pdr—sparse
- Viola canadensis* L. var. *rugulosa* (Greene) C. L. Hitchc. (Tall white violet) Twf—sparse
- Viola pedatifida* G. Don (Prairie violet) Pdr,ms—infrequent
- Viola pratensis* Greene (Common blue violet) Pwt—infrequent
- Viola pubescens* Aiton (Downy yellow violet) Tmf,wf—common
- Viola sagittata* Aiton (Arrow-leaved violet) Ted—sparse
- Viola sororia* Willd. (Hairy blue violet) T; P; W; O—common

- VITACEAE**
- Parthenocissus quinquefolia* (L.) Planchon (Virginia creeper) T; Orw—common
- Parthenocissus vitacea* (Knerr) A.S. Hitchc. (Woodbine) T; Orw—common
- Vitis riparia* Michx. (Riverbank grape) T; P; O—common

MONOCOTYLEDONS

- ALISMATACEAE**
- Alisma plantago-aquatica* L. (Water plantain) Wez,md—infrequent
- Sagittaria brevirostra* Mack. & Bush (Midwestern arrowhead) W; Orw—common
- Sagittaria calycina* Engelm. (Mississippi arrowhead) W—infrequent
- Sagittaria cuneata* Sheldon (Northern arrowhead) W—sparse
- Sagittaria graminea* Michx. (Grassy arrowhead) Wsz—sparse
- Sagittaria latifolia* Willd. (Common arrowhead) W—infrequent
- Sagittaria rigida* Pursh (Sessile-fruited arrowhead) Wsz—sparse

- ARACEAE**
- Acorus americanus* (Raf.) Raf. (Sweet flag) Twf; Wez,sz—sparse
- Arisaema dracontium* (L.) Schott (Green dragon) Tmf—infrequent
- Arisaema triphyllum* (L.) Schott (Jack-in-the-pulpit) Tmf,wf—common

COMMELINACEAE

- **Commelina communis* L. (Day-flower) Our—infrequent
- Tradescantia bracteata* Small (Long-bracted spiderwort) Pms; Orw—frequent
- +*Tradescantia obiensis* Raf. (Smooth spiderwort) Pms—infrequent

CYPERACEAE

- Bolboschoenus fluviatilis* (Torr.) Sojak [*Scirpus fluviatilis* (Torrey) Gray] (River bulrush) Wez,sz—common
- Carex aggregata* Mack.—Ted—sparse
- Carex albursina* Sheldon—Tmf,wf—common
- Carex alopecoidea* Tuckerman—Pwt—sparse
- Carex annectens* (Bickn.) Bickn.—Twf—sparse
- Carex atherodes* Sprengel—Orw—common
- Carex atherodes* Sprengel × *C. trichocarpa* Schkuhr—Wez—sparse
- Carex bebbii* (Bailey) Fern.—Orw—common
- Carex bicknellii* Britton—Pms—common
- Carex blanda* Dewey—Tdf,mf—common
- Carex brevior* (Dewey) Mack. ex Lunell—Ted—frequent
- Carex buxbaumii* Wahl.—Pwt—sparse
- Carex cephalophora* Willd.—Tdf,mf—frequent
- Carex comosa* Boott—Wez,sz—sparse
- Carex conjuncta* Boott—Wez—frequent
- Carex crawei* Dewey—Pdr,ms—sparse
- Carex cristatella* Britton—Orw,of—common
- Carex davisii* Schwein. & Torrey—T—common
- Carex eburnea* Boott—Tdf,mf—frequent
- Carex emoryi* Dewey—Pwt; Wez,rp—common
- Carex frankii* Kunth—Pwt—sparse
- Carex gravida* Bailey—Pms—frequent
- Carex grayi* Carey—Twf—infrequent
- Carex grisea* Wahlenb.—Tmf—common
- Carex hirtifolia* Mack.—Tdf,mf—frequent
- Carex hitchcockiana* Dewey—Tdf,mf—frequent
- Carex hystericina* Muhl. ex Willd.—Wez,sp—infrequent
- Carex inops* L.H. Bailey subsp. *heliophila* (Mack.) Crins—Pdr—sparse
- Carex interior* Bailey—Wsp—sparse
- Carex jamesii* Schwein.—Tdf,mf—common
- Carex lacustris* Willd.—Wez—sparse
- Carex laeviconica* Dewey—Pwt; Wez—sparse
- Carex leavenworthii* Dewey—Twd,ed—sparse
- Carex lupulina* Muhl. ex Willd.—Twf—sparse
- Carex meadii* Dewey—Pdr,ms—frequent
- Carex mesochorea* Mack.—Twd,ed—sparse
- Carex molesta* Mack.—Ted—sparse
- Carex muhlenbergii* Schkuhr ex Willd. var. *enervis* Boott—Our—sparse
- Carex normalis* Mack.—Twd,ed—infrequent
- Carex oligocarpa* Willd.—Tmf—common
- Carex pellita* Muhl. ex Willd.—Pms,wt; Orw—common
- Carex pensylvanica* Lam.—Tdf,mf—common
- Carex praegracilis* W. Boott—Orw—sparse
- Carex projecta* Mack.—Tmf,ed—sparse
- Carex retrorsa* Schwein.—Pwt; Wez—sparse
- Carex rosea* Schkuhr ex Willd.—Tmf,wf—common
- Carex sartwellii* Dewey—Wez—infrequent
- Carex scoparia* Schkuhr ex Willd.—Wez,sz—sparse
- Carex sparganioides* Muhl. ex Willd.—Tmf,ed—infrequent
- Carex spengelii* Dewey ex Sprengel—Tmf,wf—frequent

Appendix A. Continued.

- Carex stipata* Muhl. ex Willd.—Wez,sp—sparse
Carex stricta Lam.—Wez—frequent
Carex suberecta (Olney) Britton—Pwt—sparse
Carex tenera Dewey var. *echinodes* (Fernald) Wiegand—Wsp—infrequent
Carex tenera Dewey var. *tenera*—Pwt—sparse
Carex tetanica Schkuhr—Pms—sparse
Carex tribuloides Wahl.—Twf—infrequent
Carex trichocarpa Schkuhr—Orw—sparse
Carex umbellata Schkuhr ex Willd.—Pdr,ms—sparse
Carex vesicaria L.—Wsp—sparse
Carex vulpinoidea Michx.—Orw,of—common
 ~*Cyperus acuminatus* Torrey & Hooker (Tapertip flatsedge) Herb., 1902
Cyperus bipartitus Torrey [*C. rivularis* Kunth](Shining flatsedge) Wez—frequent
Cyperus erythrorhizos Muhl. (Red-rooted flatsedge) Wez—infrequent
Cyperus esculentus L. (Yellow nutgrass) Wez—frequent
Cyperus odoratus L. [*C. odoratus* L. var. *squarrosus* (Britton) Gilly] (Rusty flatsedge) Wez—frequent
Cyperus squarrosus L. [*C. aristatus* Rottb.] Wrp—sparse
Cyperus strigosus L. (False nutsedge) Wez—frequent
Eleocharis acicularis (L.) R. & S. (Needle spike-rush) Wez—infrequent
Eleocharis engelmannii Steudel (Engelmann's spike-rush) Wez—infrequent
Eleocharis erythropoda Steudel (Spike-rush) Wez—infrequent
Eleocharis macrostachya Britton (Spike-rush) Wmd—sparse
Eleocharis obtusa (Willd.) Schultes (Blunt spike-rush) Wez—infrequent
Eriophorum angustifolium Honck. (Tall cotton-grass) Wsp—sparse
Hemicarpha micrantha (Vahl) Pax—Wrp—frequent
Schoenoplectus acutus (Muhl. ex Bigelow) A. Love & D. Love [*Scirpus acutus* Muhl. ex Bigelow] (Hard-stem bulrush) Wez—common
Schoenoplectus pungens (Vahl) Palla [*Scirpus pungens* Vahl] (Common three-square) Orw—sparse
Schoenoplectus tabernaemontani (C. C. Gmel.) Palla [*Scirpus validus* Vahl] (Soft-stem bulrush) Wez,sz,md—common
Scirpus atrovirens Willd. (Dark green bulrush) Pwt; Orw—common
Scirpus georgianus R.M. Harper (Common bulrush) Wez—common
Scirpus pendulus Muhl. (Bulrush) Pms,wt—infrequent
- DIOSCOREACEAE**
Dioscorea villosa L. (Wild yam) Tmf,wf—common
- HYDROCHARITACEAE**
Elodea canadensis Michx. (Common water-weed) Wsz—sparse
Elodea nuttallii (Planchon) St. John (Free-flowered waterweed) Wsz—frequent
 ~*Vallisneria americana* Michx. (Eel grass)[*V. spiralis* L. Spec.] H, 1890
- IRIDACEAE**
Iris virginica L. [*Iris sbrveii* Small] (Blue flag) Pwt; Wez,sz,md—common
Sisyrinchium campestre Bickn. (Blue-eyed grass) Pms—frequent
- JUNCACEAE**
Juncus balticus Willd. var. *littoralis* Engelm. (Bog rush) Pwt—sparse
Juncus bufonius L. (Toad rush) Our—sparse
Juncus dudleyi Wieg. (Path rush) Pwt—infrequent
Juncus nodosus L. (Knotted rush) Pwt—sparse
Juncus tenuis Willd. (Path rush) Twd,ed; Oof,ps—common
Juncus torreyi Cov. (Torrey's rush) Pwt; Wez; Orw—common
- LEMNACEAE**
Lemna minor L. (Duckweed) Wsz—common
Lemna trisulca L. (Star duckweed) Wsz—sparse
Spirodela polyrhiza (L.) Schleiden (Greater duckweed) Wsz—infrequent
Wolffia columbiana Karsten (Watermeal) Wsz—sparse
- LILIACEAE**
Allium canadense L. (Wild onion) Pms—common
Allium tricoccum Aiton (Wild leek) Tmf—common
 **Asparagus officinalis* L. (Asparagus) Pms; Orw—frequent
 **Convallaria majalis* L. (Lily-of-the-valley) Twf—sparse
Erythronium albidum Nutt. (Dog tooth violet) Tmf,wf—common
 **Hemerocallis fulva* (L.) L. (Day lily) Ted; O—common
Hypoxis hirsuta (L.) Cov. (Yellow stargrass) Pms—sparse
 **Lilium lancifolium* Thunb. (Tiger lily) Tmf; Orw—sparse
Lilium michiganense Farw. (Michigan lily) Tmf,wf; Pms,wt—common
Lilium philadelphicum L. [*L. philadelphicum* L. var. *andinum* (Nutt.) Ker-Gawl.] (Wood lily) Pms—sparse
Maianthemum racemosum (L.) Link [*Smilacina racemosa* (L.) Desf.] (False Solomon's seal) T—common
Maianthemum stellatum (L.) Link [*Smilacina stellata* (L.) Desf.] (Starry false Solomon's seal) T—common
Polygonatum biflorum (Walters) Ell. (Solomon's seal) T—common
Smilax ecirrhata Engelm. ex Kunth (Carrion flower) Tmf—common
Smilax herbacea L. (Carion flower) T; Pms—frequent
Smilax hispida Muhl. (Greenbrier) T—common
Trillium nivale Riddell (Snow trillium) Tdf,mf—common
Uvularia grandiflora Small (Bellwort) Tmf—common
Zigadenus elegans Pursh (White camass) Pwt—infrequent
- NAJADACEAE**
Najas flexilis (Willd.) Rostk. & Schmidt (Northern naiad) Wsz—sparse
Najas quadrilupensis L. (Southern naiad) Wsz—infrequent
- ORCHIDACEAE**
Coeloglossum viride (L.) Hartman [*C. viride* (L.) Hartman var. *virescens* (Muhl. ex Willd.) Luer] (Bracted orchid) Tmf—infrequent
Corallorhiza odontorhiza (Willd.) Nutt. (Fall coral-root orchid) Tdf,mf—common
Cypripedium candidum Muhl. ex Willd. (Small white lady's-slipper orchid) Pwt—sparse
Cypripedium parviflorum Salisbury var. *pubescens* (Willd.) O.W. Knight [*C. calceolus* L. var. *pubescens* (Willd.) Correll] (Yellow lady's-slipper orchid) Tmf—sparse
Cypripedium reginae Walter (Showy lady's-slipper orchid) photo—Tes—sparse
Galearis spectabilis (L.) Raf. (Showy orchis) Tmf,wd,ed—frequent
Liparis liliifolia (L.) L.C. Rich. ex Lindley (Lily twayblade orchid) Tmf,wd,ed—infrequent
Liparis loeselii (L.) L.C. Rich. (Bog twayblade orchid) Tmf,wd,ed—frequent

Appendix A. Continued.

- ~*Platanthera praeclara* Sheviak & Bowles (Western prairie fringed orchid) Herb., 1940
 ~*Spiranthes cernua* (L.) L.C. Rich. (Nodding ladies' tresses orchid) P, 1898
Spiranthes magnicamporum Sheviak (Great plains ladies' tresses orchid) Pms-sparse
Spiranthes ovalis Lindley (Oval ladies' tresses orchid) Twd,ed; Orc-sparse
- POACEAE**
- **Aegilops cylindrica* Host (Goat grass) Orw-sparse
 **Agrostis gigantea* Roth (Redtop) T; P; W; O-common
Agrostis hiemalis (Walter) BSP. [*A. hiemalis* (Walter) BSP.] (Ticklegrass) Pms-sparse
Agrostis perennans (Walter) Tuckerman (Upland bentgrass) Tdf,mf-frequent
 **Agrostis stolonifera* L. [*A. stolonifera* L. var. *palustris* (Hudson) Farw.] (Creeping bentgrass) Our-infrequent
Alopecurus aequalis Sobol. (Short awn foxtail) Wez,sz-sparse
Alopecurus carolinianus Walter (Common foxtail) Wez-sparse
 **Alopecurus pratensis* L. (Meadow foxtail) Orw-sparse
Andropogon gerardii Vitman (Big bluestem) Pms; Orw-common
Aristida basiramea Engelm. ex Vasey (Fork-tip three-awned grass) Orc-sparse
Aristida oligantha Michx. (Prairie three-awned grass) Pdr-sparse
 **Avena fatua* L. (Wild oats) Orw-sparse
Bouteloua curtipendula (Michx.) Torrey (Side-oats grama) Pdr-frequent
Bouteloua hirsuta Lag. (Hairy grama) Pdr-sparse
Brachyelytrum erectum (Schreber) Beauv. (Bearded shorthusk) Tdf,mf-common
 **Bromus catharticus* Vahl (Rescue grass) Orw-sparse
 **Bromus commutatus* Schrader (Hairy chess) Orw,rc-infrequent
 **Bromus hordeaceus* L. subsp. *hordeaceus* [*B. mollis* L.] (Lop grass) Our-sparse
 **Bromus inermis* Leysser (Smooth brome) T; P; W; O-common
 **Bromus japonicus* Thunb. ex Murray (Japanese brome) Ocr,rw-common
Bromus latiglumis (Shear) A.S. Hitchc. (Hairy woodbrome) Twf,es-infrequent
Bromus pubescens Muhl. ex Willd. (Canada brome) Tmf,wf-common
 **Bromus secalinus* L. (Cheat grass) Orw-sparse
 **Bromus tectorum* L. (Downy chess) Ocr,rw-common
Buchloe dactyloides (Nutt.) Engelm. (Buffalo grass) Our-sparse
Calamagrostis canadensis (Michx.) Beauv. (Bluejoint grass) Wez-common
Calamagrostis stricta (Timm.) Koeler subsp. *inexpansa* (A. Gray) C.W. Greene [*C. inexpansa* Gray] (Northern reed grass) Pms-sparse
Cenchrus longispinus (Hackel) Fern. (Sandbur) Wrp; Ocr,rw,rc-common
 **Chloris verticillata* Nutt. (Windmill grass) Our-sparse
Cinna arundinacea L. (Wood reed) Twf-common
 **Dactylis glomerata* L. (Orchard grass) T; O-common
Danthonia spicata (L.) Beauv. ex R. & S. (Poverty oat grass) Tdf,wd-sparse
Diarrhena abovata (Gleason) Brandenburg [*D. americana* Beauv. var. *obovata* Gl.] (Obovate beakgrain) T-common
Dichanthelium acuminatum (SW.) Gould & C.A. Clark subsp. *acuminatum* [*D. acuminatum* (SW.) Gould & Clark] (Tapered rosette grass) T-common
Dichanthelium acuminatum (SW.) Gould & Clark subsp. *implicatum* (Scribner) Gould & Clark (Western panic grass) Tes,ed-common
Dichanthelium latifolium (L.) Gould & Clark (Broad-leaved panic grass) Tmf-infrequent
Dichanthelium leibergii (Vasey) Freckm. (Leiberg's panic grass) Pms-sparse
Dichanthelium oligosanthos (Schultes) Gould subsp. *oligosanthos* (Few-flowered panic grass) Pdr-infrequent
Dichanthelium oligosanthos (Schultes) Gould subsp. *scribnerianum* (Nash) Gould (Scribner's panic grass) T; P; O-common
Dichanthelium wilcoxianum (Vasey) Freckmann [*D. oligosanthos* (Schultes) Gould var. *wilcoxianum* (Vasey) Gould & Clark] (Wilcox's panic grass) Pdr-sparse
 **Digitaria ischaemum* (Schreber ex Schweigger) Schreber ex Muhl. (Smooth crabgrass) Our,cr,rw-common
 **Digitaria sanguinalis* (L.) Scop. (Common crabgrass) Wrp; Our,cr-common
Distichlis spicata (L.) Greene [*D. spicata* (L.) Greene var. *stricta* (Torrey) Beetle] (Salt grass) Orw-sparse
 **Echinochloa crusgalli* (L.) Beauv. (Barnyard grass) Wrp; Ocr,rw-common
Echinochloa muricata (Beauv.) Fern. (American barnyard grass) Wrp; Ocr,rw-common
 **Eleusine indica* (L.) Gaertner (Goose grass) Our-common
 ×*Elyhordeum macounii* (Vasey) Barkworth & Dewey (*Elymus trachycaulus* (Link) Gould ex Shinners × *Hordeum jubatum* L.) (Macoun's barley) Pwt-sparse
 ×*Elyhordeum montanense* (Scribner ex Beal) Bowden (*Elymus virginicus* L. × *Hordeum jubatum* L.) (Mountain barley) Pwt-sparse
Elymus canadensis L. var. *canadensis* [*E. canadensis* L.] (Canada wild rye) T; P; Wrp; Orw-common
Elymus hystrix L. var. *hystrix* [*Hystrix patula* Moench] (Bottlebrush grass) Tdf,mf-common
 **Elymus repens* (L.) Gould [*Agropyron repens* (L.) Beauv.] (Quack grass) T; P; W; O-common
Elymus riparius Wieg. (Eastern riverbank wild rye) Twf; Wrp-infrequent
Elymus trachycaulus (Link) Gould ex Shinners [*Agropyron trachycaulum* (Link) Malte] (Slender wheatgrass) Orw-sparse
Elymus villosus Muhl. var. *villosus* [*E. villosus* Muhl. ex Willd.] (Slender wild rye) Tdf,mf-common
Elymus virginicus L. var. *virginicus* [*E. virginicus* L.] (Virginia wild rye) T; P; W; O-common
Elymus wiegandii Fern. (Wiegand's wild rye) Twf-sparse
 **Eragrostis cilianensis* (All.) Link ex E. Mosher (Stinkgrass) Wrp; O-common
Eragrostis frankii C.A. Meyer ex Steudell (Lacegrass) Wrp-sparse
Eragrostis hypnoides (Lam.) BSP. (Pony grass) Wrp,md-common
Eragrostis pectinacea (Michx.) Nees (Carolina lovegrass) Wrp; O-common
Eragrostis pilosa (L.) Beauv. (India lovegrass) Wrp-sparse

Appendix A. Continued.

- Eragrostis spectabilis* (Pursh) Steudel (Purple lovegrass) Pdr; Orc—sparse
 **Eriochloa villosa* (Thunb.) Kunth (Cup grass) Ocr,rw,of—common
 **Festuca rubra* L. (Red fescue) Wez; Our—common
Festuca subverticillata (Pers.) E.B. Alexeev [*F. obtusa* Biehler] (Nodding fescue) T—common
Glyceria grandis S. Watson (American manna grass) Wsz—sparse
 ~*Glyceria septentrionalis* A.S. Hitchc. (Eastern manna grass) Herb., 1891
Glyceria striata (Lam.) A.S. Hitchc. (Fowl manna grass) Twf,es,ed; Wez,sp; Orw—common
Hesperostipa spartea Trin. [*Stipa spartea* Trin.] (Porcupine grass) Pms; Orw—frequent
Hierochloa odorata Beauv. (Holy grass) Pms; Orw—infrequent
Hordeum jubatum L. (Squirrel-tail barley) O—common
 #*Hordeum pusillum* Nutt. (Little barley) Orc—infrequent
Koeleria macrantha (Ledeb.) Schultes (June grass) Pms—sparse
Leersia oryzoides (L.) SW. (Rice cut-grass) Twf; Wrp,md,sp—common
Leersia virginica Willd. (White cut-grass) Twf; Wrp,md,sp—common
Leptochloa fusca (L.) Kunth subsp. *fascicularis* (Lam.) N. Snow [*L. fascicularis* (Lam.) Gray] (Salt meadow grass) Orw,rc—frequent
 **Lolium multiflorum* Lam. [*L. perenne* L. var. *italicum* Parn] (Annual rye grass) Our—infrequent
 **Lolium perenne* L. (Perennial rye grass) Wrp; Orw,rc—frequent
 **Miscanthus sacchariflorus* (Maxim.) Hackel (Plume grass) Orw—infrequent
Muhlenbergia bushii Pohl (Nodding muhly) Twf—infrequent
Muhlenbergia cuspidata (Torrey) Rydb. (Plains muhly) Pdr—sparse
Muhlenbergia frondosa (Poiret) Fern. (Wirestem muhly) T; P; W; O—common
Muhlenbergia glomerata (Willd.) Trin. (Marsh muhly) Pms—sparse
Muhlenbergia mexicana (L.) Trin. (Mexican muhly) Twf,es—sparse
Muhlenbergia racemosa (Michx.) BSP. (Green muhly) Tes; Pdr; Orw—common
Muhlenbergia schreberi J.F. Gmelin (Nimblewill) T; P; W; O—common
Muhlenbergia sylvatica (Torrey) Torrey ex Gray (Forest muhly) Tdf,wf—sparse
Muhlenbergia tenuiflora (Willd.) BSP. (Slender muhly) T—frequent
Panicum capillare L. subsp. *capillare* [*P. capillare* L.] (Witchgrass) Wrp; Ocr,rw,rc—common
Panicum dichotomiflorum Michx. subsp. *dichotomiflorum* [*P. dichotomiflorum* Michx.] (Knee grass) Wrp; O—common
 **Panicum miliaceum* L. subsp. *miliaceum* [*P. miliaceum* L.] (Proso millet) Our—sparse
Panicum virgatum L. (Switchgrass) P; Wrp; Orw—common
Pascopyrum smithii (Rydb.) A. Love [*Agropyron smithii* Rydb.] (Western wheatgrass) Orw—common
Paspalum setaceum Michx. var. *stramineum* (Nash) D. Banks (Bead grass) Pdr—sparse
Phalaris arundinacea L. (Canary grass) Twf; Pwt; W; O—common
 **Pbleum pratense* L. (Timothy) Wez; Ocr,rw,of—common
Pbragmites australis (CAV.) Trin. ex Steudel (Reed grass) Pwt; Wez; Orw—frequent
Piptatherum racemosum (Sm.) Easton [*Oryzopsis racemosa* (Smith) Ricker] (Black-seeded rice-grass) Tdf,mf—infrequent
 **Poa annua* L. (Annual bluegrass) Wrp; O—common
 **Poa bulbosa* L. (Bulbous bluegrass) Orw—sparse
 **Poa compressa* L. (Canadian bluegrass) T; P; W; O—common
 **Poa nemoralis* L. (Wood bluegrass) Pwt—sparse
Poa palustris L. (Fowl meadow grass) Pwt—infrequent
 **Poa pratensis* L. (Kentucky bluegrass) T; P; W; O—common
Poa sylvestris Gray (Woodland bluegrass) Twf—infrequent
 **Puccinellia distans* Parl. (European alkali grass) Orw—sparse
Schedonardus paniculatus (Nutt.) Trel. (Tumble grass) Our—sparse
 **Schedonorus phoenix* (Scop.) Holub [*Festuca arundinacea* Schreber] (Alta fescue) Ted; O—common
Schizachyrium scoparium (Michx.) Nash (Little bluestem) Pdr—frequent
 **Setaria faberi* Herrm. (Giant foxtail) Ocr,rw—common
 **Setaria italica* (L.) Beauv. (Foxtail millet) Pms—sparse
 **Setaria pumila* (Poir.) Roem. & Schult. subsp. *pumila* [*S. glauca* (L.) Beauv.] (Yellow foxtail) Ocr,rw—common
 **Setaria verticillata* (L.) Beauv. (Bristly foxtail) Our,cr—infrequent
 **Setaria viridis* (L.) P. Beauv. var. *major* (Gaud.) Posp. (Giant green foxtail) Orw—infrequent
 **Setaria viridis* (L.) P. Beauv. var. *viridis* [*S. viridis* (L.) Beauv.] (Green foxtail) Ocr,rw—common
Sorghastrum nutans (L.) Nash (Indian grass) Pms; Orw—common
 **Sorghum bicolor* (L.) Moench subsp. *bicolor* [*S. bicolor* (L.) Moench] (Sorghum) Our—sparse
Spartina pectinata Link (Prairie cord grass) Pwt; Orw—common
Sphenopholis intermedia Rydb. [*S. obtusata* (Michx.) Scribner var. *major* (Torrey) K.S. Erdman] (Slender wedge grass) T—common
Sphenopholis obtusata (Michx.) Scribner (Prairie wedge grass) Pwt—sparse
Sporobolus compositus (Poir.) Merr. [*S. asper* (Michx.) Kunth] (Tall dropseed) Pdr; Orw,rc—common
Sporobolus cryptandrus (Torrey) Gray (Sand dropseed) Orw,rc—infrequent
Sporobolus heterolepis (Gray) Gray (Prairie dropseed) Pdr,ms—infrequent
Sporobolus neglectus Nash (Puffsheath dropseed) Orc—infrequent
Sporobolus vaginiflorus (Torrey ex Gray) Wood (Poverty dropseed) Orw,rc—frequent
 +*Trident flavus* (L.) A. S. Hitchc. (Purple top) Pms—sparse
 **Triticum aestivum* L. (Cultivated wheat) Orw—sparse
Zizania palustris L. var. *interior* (Fassett) Dore [*Z. aquatica* L.] (Interior wild rice) Wsz—sparse
- PONTEDERIAACEAE**
Heteranthera dubia (Jacq.) Mac M (Water star-grass) Wez,sz—sparse
Pontederia cordata L. (Pickerel-weed) Wsz—sparse
- POTAMOGETONACEAE**
 **Potamogeton crispus* L. (Curly pondweed) Wsz—sparse
Potamogeton foliosus Raf. (Leafy pondweed) Wsz—infrequent
 ~*Potamogeton friesii* Rupr. (Frie's pondweed) Herb., 1961
Potamogeton illinoensis Morong (Illinois pondweed) Wsz,md—infrequent

Appendix A. Continued.

Potamogeton nodosus Poiret (Long-leaf pondweed) Wsz,md–infrequent
Potamogeton pectinatus L. (Sago pondweed) Wsz–frequent
Potamogeton pusillus L. (Slender pondweed) Wsz–frequent
Potamogeton zosteriformis Fern. (Flat-stemmed pondweed) Wsz–sparse
SPARGANIACEAE
Sparganium chlorocarpum Rydb. (Greenfruit bur-reed) Wsz–sparse

Sparganium eurycarpum Engelm. (Giant bur-reed) Wsz–infrequent
TYPHACEAE
Typha angustifolia L. (Narrow-leaved cattail) Pwt; W; Orw–common
Typha × *glauca* Godron (*T. angustifolia* × *T. latifolia*) Pwt; W; Orw–common
Typha latifolia L. (Common cattail) Pwt; W; Orw–common
ZANNICHELLIACEAE
Zannichellia palustris L. (Horned pondweed) Wsz–sparse

Appendix B

(See Fig. 3). Sites containing significant plant taxa in Hamilton County, Iowa, with the legal location, general habitat and size of the sites, and some of the taxa found at each of these sites.

(1) Anderson Lake 3271 Saratoga Ave. Lyon Township (T87N-R24W) Section 27 SE1/4 Pwt; Wez,sz; Oof; 200 ac (80.9 ha) Lake; small native areas adjacent

Acalypha virginica, *Agalinis purpurea*, *Agrimonia parviflora*, *Alliaria petiolata*, *Boehmeria cylindrica*, *Campanula aparinoides*, *Carex sartwellii*, *Chenopodium missouriensis*, *Cuscuta gronovii*, *Desmanthus illinoensis*, *Glyceria grandis*, *Lathyrus palustris*, *Lilium michiganense*, *Lysimachia terrestris*, *Lysimachia thyrsoflora*, *Muhlenbergia mexicana*, *Nuphar luteum* ssp. *variegatum*, *Nymphaea tuberosa*, *Pedicularis lanceolata*, *Phlox maculata*, *Polanisia dodecandra*, *Pontederia cordata*, *Potamogeton pusillus*, *Sagittaria rigida*, *Scutellaria galericulata*, *Sium suave*, *Solidago riddellii*, *Utricularia vulgaris*, *Zizania palustris* var. *interior*

(2) Bauer Slough 2574 Kantor Ave. Independence Township (T88N-R25W) Section 21 P; Wez,sz,md; Orw; 260 ac (105.2 ha); of that 30–40 ac (12.1–16.1 ha) is native

Ammania coccinea, *Campanula aparinoides*, *Carex frankii*, *Carex interior*, *Cypripedium candidum*, *Desmanthus illinoensis*, *Dracocephalum parviflorum*, × *Elybordeum macounii*, × *Elybordeum montanense*, *Equisetum fluviatile*, *Eriophorum angustifolium*, *Lindernia anagallidea*, *Lilium michiganense*, *Pedicularis lanceolata*, *Potamogeton nodosus*, *Potamogeton pectinatus*, *Pycnanthemum tenuifolium*, *Ratibida columnifera*, *Rosa* × *rudiuscula*, *Salix petiolaris*, *Scutellaria galericulata*, *Utricularia vulgaris*

(3) Private property east of Bell's Mill County Park Webster Township (T87N-R26W) Parts of Section 15-16-21-22 T; Wrp,sp; Oof; Approx. 380 ac (153.8 ha)

Agrostis hyemalis, *Asclepias purpurascens*, *Asplenium platyneuron*, *Athyrium filix-femina* var. *angustum*, *Botrychium dissectum* f. *dissectum*, *Botrychium dissectum* f. *obliquum*, *Cacalia plantaginea*, *Caulophyllum thalictroides*, *Dasistoma macrophylla*, *Dirca palustris*, *Dryopteris carthusiana*, *Eragrostis spectabilis*, *Galearis spectabilis*, *Gymnocladus dioica*, *Lilium michiganense*, *Liparis liliifolia*, *Liparis loeselii*, *Panax quinquefolius*, *Psoralidium batesii*, *Rubus frondosus*, *Rubus wisconsinensis*

(4) Bjorkboda Marsh 1791 400th St. Marion Township (T86N-R26W) Section 36 SE1/4 Pms,wt; Wez,sz; 36 ac (14.6 ha)

Ambrosia psilostachya, *Caltha palustris*, *Carex stricta*, *Carex suberecta*, *Juncus nodosus*, *Lemna trisulca*, *Lycopus* × *sberardii*, *Potamogeton pectinatus*, *Sagittaria* sp., *Scutellaria galericulata*, *Sium suave*, *Sparganium eurycarpum*, *Verbena* × *rydbergii*

(5) Boone Forks Wildlife Area Bellville Road West Marion Township (T86N-R26W) Section 6 NW1/4 T; Wez,sz; 70 ac (28.3 ha)

Dicentra canadensis, *Galearis spectabilis*, *Lathyrus ochroleucus*, *Liparis loeselii*, *Lobelia inflata*, *Lythrum salicaria*

(6) Boone Forks Wildlife Area Tunnell Mill Road West Webster Township (T87N-R26W) Section 15 T; Wrp,sp; 560 ac (226.6 ha)

Agalinis tenuifolia, *Athyrium filix-femina* var. *angustum*, *Campanula aparinoides*, *Carex aggregata*, *Carex interior*, *Carex leavenworthii*, *Caulophyllum thalictroides*, *Coeloglossum viride*, *Corallorhiza odontorhiza*, *Cornus rugosa*, *Cypripedium parviflorum*, *Cypripedium reginae*, *Cystopteris tenuis*, *Eriophorum angustifolium*, *Eupatorium maculatum*, *Galearis spectabilis*, *Gentianella quinquefolia* ssp. *occidentalis*, *Hypericum majus*, *Lathyrus ochroleucus*, *Lathyrus palustris*, *Lilium michiganense*, *Liparis liliifolia*, *Liparis loeselii*, *Lysimachia hybrida*, *Matteucia struthiopteris* var. *pennsylvanica*, *Pedicularis lanceolata*, *Polygala senega*, *Prunus pennsylvanica*, *Rorippa sylvestris*, *Rubus ablutus*, *Spiranthes ovalis*, *Stellaria longifolia*

(7) Boone Forks Wildlife Area Hwy R21 Access Webster Township (T87N-R26W) Section 19 SW1/4 T; 64 ac (25.9 ha)

Astragalus crassicaarpus, *Botrychium dissectum* f. *dissectum*, *Botrychium dissectum* f. *obliquum*, *Carex mesochorea*, *Coeloglossum viride*, *Onoclea sensibilis*, *Psoralidium batesii*, *Rubus wisconsinensis*, *Salix bebbiana*, *Salix fragilis*, *Stellaria longifolia*

(8) Boone Forks Wildlife Area Big Bear Road Access Webster Township (T87N-R26W) Section 20 T; Wrp; Approx. 70 ac (28.3 ha)

Agastache scrophulariifolia, *Arisaema dracontium*, *Asplenium platyneuron*, *Blephilia hirsuta*, *Botrychium dissectum* f. *dissectum*, *Botrychium dissectum* f. *obliquum*, *Corallorhiza odontorhiza*, *Liparis liliifolia*, *Liparis loeselii*, *Rubus frondosus*, *Spiranthes ovalis*, *Veronica catenata*

(9) Boone Forks Wildlife Area Hwy R21 Access Webster Township (T87N-R26W) Section 30 T; Wrp; 300+ ac (121+ ha)

Actea pachypoda, *Actea rubra*, *Agalinis tenuifolia*, *Aralia nudicaulis*, *Aralia racemosa*, *Asplenium platyneuron*, *Botrychium dissectum* f. *dissectum*, *Botrychium dissectum* f. *obliquum*, *Carex aggregata*, *Carex hitchcockiana*, *Carex lupulina*, *Carex molesta*, *Carex sparganioides*, *Coeloglossum viride*, *Corallorhiza odontorhiza*, *Galearis spectabilis*, *Gentianella quinquefolia* ssp. *occidentalis*, *Hemicarpha micrantha*, *Hypericum punctatum*, *Iodanthus pinnatifidus*, *Lilium michiganense*, *Liparis liliifolia*, *Liparis loeselii*, *Lythrum salicaria*, *Panax quinquefolius*, *Prunus nigra*, *Ribes cynosbati*, *Sium suave*, *Taenidia integerrima*, *Verbena* × *rydbergii*

(10) Boone Forks Wildlife Area Shiloh Road-Bellville Road South Webster Township (T87N-R26W) Section 31 SW1/4 Tes; Orw; 10 ac (4 ha)

Elymus trachycaulis, *Galearis spectabilis*, *Liparis loeselii*, *Lobelia inflata*, *Lythrum salicaria*, *Viburnum lentago*

(11) Briggs Woods County Park Independence Township (T88N-R25W) Sections 8-17-18 T; P; W; O; 555 ac (224.6 ha); additional 70 ac (28.3 ha) lake

Acorus calamus, *Aristida basiramea*, *Artemisia dracunculoides*, *Astragalus crassicaulis*, *Carex stipitata*, *Caulophyllum thalictroides*, *Corallorhiza odontorhiza*, *Cuscuta cuspidata*, *Dyssodia papposa*, *Elodea nuttallii*, *Elymus riparius*, *Elymus wiegandii*, *Eragrostis spectabilis*, *Heteranthera dubia*, *Lilium michiganense*, *Liparis liliifolia*, *Liparis loeselii*, *Muhlenbergia sylvatica*, *Oxalis violacea*, *Potamogeton crispus*, *Ptelea trifoliata*, *Ranunculus longirostris*, *Rubus idaeus* var. *strigosus*, *Rubus* × *neglectus*, *Ruellia humilis*, *Viola canadensis* var. *rugulosa*

(12) Gordon's Marsh 1476 270th St. Freedom Township (T88N-R26W) Section 33 NW1/4-NE1/4 Pms,wt; Wez,sz; 283 ac (114.5 ha) reconstruction

Carex frankii, ×*Elybordeum macounii*, ×*Elybordeum montanense*, *Galium mollugo*, *Lactuca ludoviciana*, *Najas flexilis*, *Polygonum amphibium* var. *emersum*, *Polygonum amphibium* var. *stipulaceum*, *Potamogeton pectinatus*, *Zanichellia palustris*

(13) Kendall Young Webster City Park 611 Kendall Young Road Cass Township (T89N-R25W) Section 33 NW1/4 T; Wsp; Our

Cardamine bulbosa, *Cystopteris tenuis*, *Ranunculus fascicularis*, *Rubus idaeus* var. *strigosus*, *Woodsia obtusa*

(14) Little Wall Lake and Surrounding Area Ellsworth Township (T86N-R24W) Sections 9-10-15-16 Wez,sz; 275 ac (111.3 ha) lake; 61 ac (24.7 ha) Park

Amaranthus powellii, *Amorpha fruticosa*, *Carex atherodes* × *C. trichocarpa*, *Carex hystericina*, *Carex lupulina*, *Carex praegracilis*, *Carex sartwellii*, *Cynanchum laeve*, *Elodea nuttallii*, *Helenium autumnale*, *Heteranthera dubia*, *Najas flexilis*, *Sagittaria calycina*, *Sagittaria latifolia*, *Salix lucida*, *Verbena* × *rydbergii*, *Zanichellia palustris*

(15) Railroad Rights-of-way (Abandoned) Hwy 175-Wilson Ave. Lincoln Township (T87N-R23W) Section 29 SE1/4 Pms,wt; Approx. 20 ac (8 ha)

Aristida oligantha, *Calamagrostis stricta* subsp. *inexpansa*, *Carex umbellata*, *Cicuta maculata*, *Dichanthelium leibergii*, *Gentiana andrewsii*, *Gentiana puberulenta*, *Liatris aspera*, *Liatris pycnostachya*, *Lysimachia quadriflora*, *Oxypholis rigidior*, *Prenanthes racemosa*, *Spiranthes magnicamporum*, *Symphoricarpos occidentalis*, *Vernonia baldwinii*, *Vernonia fasciculata*

(16) Railroad and 210th St. Rights-of-way Williams Township (T89N-R23W) Sections 28-29 Pms,wt; Approx. 30 ac (12 ha)

Asclepias sullivantii, *Cacalia plantaginea*, *Euphorbia esula*, *Glyceria grandis*, *Liatris aspera*, *Liatris pycnostachya*, *Phlox maculata*, *Prenanthes racemosa*, *Spiraea alba*, *Zigadenus elegans*

(17) Railroad and 212th St. Rights-of-way Blairsburg Township (T89N-R24W) Section 36 Pms,wt; Approx. 30 ac (12 ha)

Asclepias sullivantii, *Asclepias tuberosa* ssp. *interior*, *Coreopsis palmata*, *Cypripedium candidum*, *Euphorbia esula*, *Gentiana andrewsii*, *Liatris aspera*, *Liatris pycnostachya*, *Lilium philadelphicum* var. *andinum*, *Phlox pilosa*, *Salix humilis*, *Spiraea alba*, *Spiranthes magnicamporum*, *Zigadenus elegans*

(18) Railroad and 221st St. Rights-of-way Freedom Township (T88N-R26W) Section 6 Pms,wt; Approx. 20 ac (8 ha)

Asclepias sullivantii, *Euphorbia esula*, *Gentiana andrewsii*, *Iva xanthifolia*, *Liatris aspera*, *Liatris pycnostachya*, *Lilium michiganense*, *Phlox pilosa*, *Sphenopholis obtusata*, *Spiranthes magnicamporum*

(19) Sketchley Webster City Park 891 E. Second St. Independence Township (T88N-R25W) Section 6 NE1/4-NE1/4 Ted; Orw

Aesculus glabra, *Coeloglossum viride*, *Rubus idaeus* var. *strigosus*, *Rubus* × *neglectus*

(20) Stumbo (Ray-Vivian) Moraine Pasture Prairie 3990 Inkpaduta Ave. Clear Lake Township (T86N-R25W) Section 31 SW1/4 Pdr; Approx. 30 ac (12.1 ha)

Artemisia campestris, *Aster oblongifolius*, *Baptisia bracteata* var. *glabrescens*, *Bouteloua hirsuta*, *Dichanthelium wilcoxianum*, *Draba reptans*, *Grindelia squarrosa*, *Lithospermum incism*, *Mirabilis albidia*, *Muhlenbergia cuspidata*, *Paspalum setaceum* var. *stramineum*, *Pulsatilla patens* ssp. *multifida*, *Ranunculus rhomboideus*

(21) Clear Lake-Ellsworth Township Cemetery Prairie 390th St. Ellsworth Township (T86N-R24W) Section 30 NW1/4-SE1/4-SW1/4 Pdr; 1 ac (.4 ha)

Amorpha canescens, *Asclepias viridiflora*, *Aster sericeus*, *Ceanothus americanus* var. *pitcheri*, *Coreopsis palmata*, *Dalea candida*, *Echinacea pallida*, *Gentiana puberulenta*, *Liatris aspera*, *Muhlenbergia cuspidata*, *Salix humilis*, *Solidago missouriensis*, *Sporobolus heterolepis*

(22) Homer Cemetery Prairie 1314 290th St. Webster Township (T87N-R26W) Section 8 NW1/4-NW1/4 Pdr,ms,wt; 2 ac (.8 ha)

Amorpha canescens, *Asclepias tuberosa* ssp. *interior*, *Ceanothus americanus* var. *pitcheri*, *Coreopsis palmata*, *Dalea candida*, *Eryngium yuccifolium*, *Muhlenbergia glomerata*, *Pycnanthemum virginianum*, *Sporobolus heterolepis*, *Veronicastrum virginicum*

(23) Liberty Center Cemetery Prairie 2449 Little Wall Lake Road (Hwy 69) Liberty Township (T88N-R24W) Section 16 NE1/4-SE1/4 Pdr; 1 ac (.4 ha)

Carex meadii, *Crataegus crus-galli*, *Gentiana puberulenta*, *Prenanthes aspera*, *Senecio plattensis*, *Sporobolus heterolepis*, *Viola pedatifida*

(24) Oakwood Cemetery and Private Property West 3419 Stagecoach Road Marion Township (T86N-R26W) Section 6 SW1/4-NE1/4-NE1/4 Tdf,mf,wd,es; 1 ac (.4 ha)

Apocynum androsaemifolium, *Asclepias viridiflora*, *Carex eburnea*, *Coreopsis tripteris*, *Echinacea pallida*, *Mirabilis albidia*, *Psoraleidium batesii*, *Ruellia humilis*, *Trillium nivale*

(25) Neese Cemetery Prairie 320th St. and Bell's Mill Road Webster Township (T87N-R26W) Section 28 NW1/4-NW1/4 Pdr,ms; 1 ac (.4 ha)

Baptisia bracteata var. *glabrescens*, *Euphorbia corollata*, *Euphorbia cyathophora*, *Gentiana puberulenta*, *Koeleria macrantha*, *Lilium michiganense*, *Lithospermum canescens*, *Lobelia spicata*, *Orobancha uniflora*, *Oxalis violacea*, *Prenanthes aspera*, *Rubus wisconsinensis*, *Sisyrinchium campestre*, *Solidago missouriensis*

(26) South Marion Cemetery and Prairie 3838 Fenton Ave. Marion Township (T86N-R26W) Section 27-28 Pms; Our,rw; 2 ac (.8 ha)

Bidens polyepis, *Buchloe dactyloides*, *Chamaecrista fasciculata*, *Glycyrrhiza lepidota*, *Schedonnardus paniculatus*, *Silphium integrifolium*