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
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 1983" 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 (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 cropland 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, Trifolium 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.
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. (Widrlechner 1998). Nomenclature
Table 1. Codes used to describe preferred habitats of vascular plants in Hamilton County, Iowa.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Tree-dominated habitats</td>
</tr>
<tr>
<td>df</td>
<td>Dry forest—typically on ridgetops and on south and west-facing slopes</td>
</tr>
<tr>
<td>mf</td>
<td>Moist forest—typically on north and east-facing slopes</td>
</tr>
<tr>
<td>wf</td>
<td>Wet forest—typically in bottomlands</td>
</tr>
<tr>
<td>wd</td>
<td>Woodland—tree-dominated habitats with incomplete canopy closure</td>
</tr>
<tr>
<td>es</td>
<td>Escarpment—due to erosion or soil slumping (usually wet)</td>
</tr>
<tr>
<td>ed</td>
<td>Edge</td>
</tr>
<tr>
<td>P</td>
<td>Prairie habitats</td>
</tr>
<tr>
<td>dr</td>
<td>Dry prairie</td>
</tr>
<tr>
<td>ms</td>
<td>Moist prairie</td>
</tr>
<tr>
<td>wt</td>
<td>Wet prairie—includes 'wet meadow' vegetation from some wetland classification systems</td>
</tr>
<tr>
<td>W</td>
<td>Wetland habitats</td>
</tr>
<tr>
<td>ez</td>
<td>Emergent zone—typically dominated by bulrush, bur-reed and several deep to shallow water sedge species</td>
</tr>
<tr>
<td>sz</td>
<td>Submerged zone—typically dominated by pondweeds and duckweeds</td>
</tr>
<tr>
<td>rp</td>
<td>Riparian—includes grassy stream edges and sandbars</td>
</tr>
<tr>
<td>md</td>
<td>Mudflat—not associated with running water</td>
</tr>
<tr>
<td>sp</td>
<td>Seep</td>
</tr>
<tr>
<td>O</td>
<td>Open habitats—primarily associated with human disturbance</td>
</tr>
<tr>
<td>ur</td>
<td>Urban—sidewalks, lawns, etc.</td>
</tr>
<tr>
<td>cr</td>
<td>Cropfields, gardens, flowerbeds</td>
</tr>
<tr>
<td>rw</td>
<td>Rights-of-way—including fencerows, railroad embankments, and powerlines</td>
</tr>
<tr>
<td>rc</td>
<td>Rocky habitats—including railroad ballast, gravel pits, and sand</td>
</tr>
<tr>
<td>of</td>
<td>Old field, hayfield</td>
</tr>
<tr>
<td>ps</td>
<td>Pasture</td>
</tr>
</tbody>
</table>

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 each 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 cropfields 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 Shinners 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, but 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.

<table>
<thead>
<tr>
<th>Major Groups</th>
<th>Species + (Hybrids)</th>
<th>Genera</th>
<th>Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pteridophytes</td>
<td>19 + (1)</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Gymnosperms</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Dicots</td>
<td>675 + (16)</td>
<td>316</td>
<td>82</td>
</tr>
<tr>
<td>Monocots</td>
<td>285 + (4)</td>
<td>108</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>980 + (21)</td>
<td>438</td>
<td>108</td>
</tr>
</tbody>
</table>

B. Current and Previous years taxa

<table>
<thead>
<tr>
<th>Origin</th>
<th>Current</th>
<th>Previous</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native to United States</td>
<td>761</td>
<td>25</td>
<td>786</td>
<td>78</td>
</tr>
<tr>
<td>Non-native</td>
<td>212</td>
<td>3</td>
<td>215</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>973</td>
<td>28</td>
<td>1001</td>
<td>100</td>
</tr>
</tbody>
</table>

C. Ten largest families

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

D. Eleven largest genera

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

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

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>No. of Taxa</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree-dominated</td>
<td>455</td>
<td>47</td>
</tr>
<tr>
<td>Prairie</td>
<td>283</td>
<td>29</td>
</tr>
<tr>
<td>Wetland</td>
<td>253</td>
<td>26</td>
</tr>
<tr>
<td>Open</td>
<td>371</td>
<td>38</td>
</tr>
<tr>
<td>More than one type</td>
<td>280</td>
<td>29</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Abundance</th>
<th>No. of taxa</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sparse</td>
<td>318</td>
<td>33</td>
</tr>
<tr>
<td>Infrequent</td>
<td>177</td>
<td>18</td>
</tr>
<tr>
<td>Frequent</td>
<td>125</td>
<td>13</td>
</tr>
<tr>
<td>Common</td>
<td>353</td>
<td>36</td>
</tr>
</tbody>
</table>

DISCUSSION

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 1001 plant taxa places Hamilton County fourth in total number of taxa among published floral inventories conducted in Iowa since 1950 (Table 7).

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).

<table>
<thead>
<tr>
<th>Genus</th>
<th>Habitat Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brasiensia Schroederi J. F. Gmelin (Watershield Herb.) SC</td>
<td></td>
</tr>
<tr>
<td>Baculina dactylidae (Nutt.) Engelm. (Buffalo grass) C, SC</td>
<td></td>
</tr>
<tr>
<td>Callitriche heterophylla Pursh (Water-starwort) C, SC</td>
<td></td>
</tr>
<tr>
<td>Carex aggregata Mack (Sedge) C, SC</td>
<td></td>
</tr>
<tr>
<td>Carex crawei Dewey (Sedge) C, SC</td>
<td></td>
</tr>
<tr>
<td>Carex tenera Dewey var. tenera (Sedge) C, SC</td>
<td></td>
</tr>
<tr>
<td>Carex umellata Schkuhr ex Willd. (Sedge) C, SC</td>
<td></td>
</tr>
<tr>
<td>Chenopodium Missouriense Aellen (Missouri goosefoot) C, SC</td>
<td></td>
</tr>
<tr>
<td>Cirsinum billii (Canby) Fern. (Hollow-rooted thistle) Herb., SC</td>
<td></td>
</tr>
<tr>
<td>Cypripedium candidum Muhl. ex Willd. (Small white lady's slipper orchid) C, SC</td>
<td></td>
</tr>
<tr>
<td>Cypripedium reginae Walter (Showy lady's slipper orchid) C, T</td>
<td></td>
</tr>
<tr>
<td>Echinacea purpurea (L.) Moench (Purple coneflower) C, SC</td>
<td></td>
</tr>
<tr>
<td>Erionorus angustifolium Honck. (Tall cotton-grass) C, SC</td>
<td></td>
</tr>
<tr>
<td>Euphorbia lophocaenia L. (Toad rush) C, SC</td>
<td></td>
</tr>
<tr>
<td>Menyanthes trifoliata L. (Buckbean) Herb., SC</td>
<td></td>
</tr>
<tr>
<td>Platyanthus praecoxa Shevki &amp; Bowles (Western prairie fringed orchid) Herb., T</td>
<td></td>
</tr>
<tr>
<td>Potentilla anserina L. (Silverweed) Herb., T</td>
<td></td>
</tr>
<tr>
<td>Prunus nigra Aiton (Canada plum) C, E</td>
<td></td>
</tr>
<tr>
<td>Salix candida Fluegge ex Willd. (Sage willow) C, SC</td>
<td></td>
</tr>
<tr>
<td>Salix lucida Muhl. (Shining willow) C, T</td>
<td></td>
</tr>
<tr>
<td>Scrophularia paniculata L. (Tumble grass) C, SC</td>
<td></td>
</tr>
<tr>
<td>Senecio pseudarvensis Rydb. (Western heart-leaved groundsel) C, SC</td>
<td></td>
</tr>
<tr>
<td>Spiranthes magnicamporum Shevki (Great plains ladies'-tresses orchid) C, SC</td>
<td></td>
</tr>
<tr>
<td>Spiranthes ovalis Lindley (Oval ladies'-tresses orchid) C, T</td>
<td></td>
</tr>
</tbody>
</table>

Appendix B. The map in Fig. 3 shows the location of each of these significant plant communities.
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 doorways, 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), Rhamnus cathartica L. (Tatarian honeysuckle), 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 albus Medicus (white sweet clover) and Melilotus officinalis (L.) Pallais (yellow sweet clover) were planted as hay crops. The sweet clovers were also planted for honeybees for the production of honey, as was Lythrum 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 effects on human health from the use of herbicides in the attempt to control invasive plants.
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 *Rhamnus cathartica* as a winter host for the soybean aphid, a new insect pest of soybeans grown in the United States. Also, *Rhamnus 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>
<thead>
<tr>
<th>Location (County unless specified)</th>
<th>Author &amp; Year</th>
<th>Total Taxa</th>
<th>Based on*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emmet</td>
<td>Wolden 1956</td>
<td>1013</td>
<td>Field, lit.</td>
</tr>
<tr>
<td>Hamilton</td>
<td>Current Study</td>
<td>1001</td>
<td>Mainly field, herb., &amp; lit.</td>
</tr>
<tr>
<td>Johnson</td>
<td>Thorne 1955</td>
<td>966</td>
<td>Field, herb., lit. as verified</td>
</tr>
<tr>
<td>Lee</td>
<td>Peck et al. 1981</td>
<td>876</td>
<td>Field, herb., lit. as verified</td>
</tr>
<tr>
<td>Des Moines</td>
<td>Lammers 1983</td>
<td>809</td>
<td>Field, herb.</td>
</tr>
<tr>
<td>Dickinson</td>
<td>Grant 1950, 1953</td>
<td>800</td>
<td>Lit., herb. (ILH), some field</td>
</tr>
<tr>
<td>Cedar</td>
<td>Fay 1951, Fay and Thorne 1953</td>
<td>775</td>
<td>Mainly field, some herb.</td>
</tr>
<tr>
<td>Guthrie</td>
<td>Roosa et al. 1991</td>
<td>748</td>
<td>Field, herb., lit.</td>
</tr>
<tr>
<td>Page</td>
<td>Wilson 1992</td>
<td>746</td>
<td>Mainly field</td>
</tr>
<tr>
<td>Poweshiek</td>
<td>Russell 1956</td>
<td>699</td>
<td>Mainly herb. (GRI)</td>
</tr>
<tr>
<td>Iowa</td>
<td>Easterly 1951</td>
<td>679</td>
<td>Mainly field, some herb., lit.</td>
</tr>
<tr>
<td>Washington</td>
<td>Wagenknecht 1954</td>
<td>677</td>
<td>Mainly field</td>
</tr>
<tr>
<td>Lyon</td>
<td>Peck et al. 1984</td>
<td>561</td>
<td>Field, herb., lit. as verified</td>
</tr>
<tr>
<td>Fremont</td>
<td>Peck et al. 1978</td>
<td>550</td>
<td>Field, lit., some herb.</td>
</tr>
<tr>
<td>Sioux</td>
<td>Peck et al. 1984</td>
<td>506</td>
<td>Field, herb., lit. as verified</td>
</tr>
<tr>
<td>Cherokee</td>
<td>Carter 1962</td>
<td>401</td>
<td>Field</td>
</tr>
</tbody>
</table>

*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.

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.

<table>
<thead>
<tr>
<th>Common and aggressive weeds</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliaria petiolata (Bieb.) Cavara &amp; Grande (Garlic mustard)</td>
<td>Brassicaceae</td>
</tr>
<tr>
<td>Bromus inermis Leysser (Smooth brome)</td>
<td>Poaceae</td>
</tr>
<tr>
<td>Cirsium arvense (L.) Scop. (Canada thistle)</td>
<td>Asteraceae</td>
</tr>
<tr>
<td>Coronilla varia L. (Crown vetch)</td>
<td>Fabaceae</td>
</tr>
<tr>
<td>Euphorbia esula L. (Leafy spurge)</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>Lythrum salicaria L. (Purple loosestrife)</td>
<td>Lythraceae</td>
</tr>
<tr>
<td>Melilotus albus Medicus (White sweet clover)</td>
<td>Fabaceae</td>
</tr>
<tr>
<td>Melilotus officinalis (L.) Pallas (Yellow sweet clover)</td>
<td>Fabaceae</td>
</tr>
<tr>
<td>Rhamnus cathartica L. (European buckthorn)</td>
<td>Rhamnaceae</td>
</tr>
<tr>
<td>Elaeagnus umbellata Thunb. (Autumn olive)</td>
<td>Elaeagnaceae</td>
</tr>
<tr>
<td>Rosa multiflora Thunb. ex Murray (Multiflora rose)</td>
<td>Rosaceae</td>
</tr>
<tr>
<td>Lonicera tatarica L. (Tartarian honeysuckle)</td>
<td>Caprifoliaceae</td>
</tr>
<tr>
<td>Lonicera maackii Maxim. (Amur honeysuckle)</td>
<td>Caprifoliaceae</td>
</tr>
<tr>
<td>Potamogeton crispus L. (Curly-leaf pondweed)</td>
<td>Potamogetonaceae</td>
</tr>
</tbody>
</table>
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 Sylwestor 1959). This sun-loving perennial thistle is common in Hamilton County and is a major problem of open areas of the country, 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 (Thuinhorst 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 Spiranthus oswalti Lindley are on the 2002 Iowa Natural Resource Commission (NRC) threatened species list. Cypripedium candidum Muhl. ex Wild., and Spiranthus magnificus Shvaik 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-see 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 neglecta 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., Lilium lilifolium (L.) C. Rich ex Lindley, Polygonum sonora L., Praucus penyiaviana L. f., and Stellaria longiseta Muhl. ex Willd.

I found several populations of *Spiranthus oswalti* (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 platyphyton (L.) Oakes ex D. C. Eaton, Betriuchium dissectum Sprengel f. dissectum, Betriuchium dissectum Sprengel f. obliquum (Muhl.) Fern., Galuris spectabilis (L.) Raf., and Liparis loeselii (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 *Spiranthus magnificus* (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*, *Liatris pycnostachya* Michx., and *Salix L.*
Cyriepedium 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, Caeloglossum 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. obliquum, Cystopteris halbfiera (L.) Bernh., Dryopteris carthusiana (Vill.) H.P. Fuchs, Dryopteris cristata (L.) Gray, Mattsia struthbiotis (L.) Todara var. pensylvanica (Willd.) Morton, and Woodia 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-distance 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 the 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.

ACKNOWLEDGEMENTS

I greatly appreciate the expertise of Deborah Q. Lewis, the Curator of the Ada Hayden Herbarium at Iowa State University, for the majority of the plant identifications for this inventory.

Many thanks to William R. Norris for his many reviews and suggestions for change of each new version of this manuscript up to the final edition. Thanks to Donald R. Farrar and Jack L. Carter for their reviews and suggestions for changes of this paper.

I also express my appreciation for the expertise of William R. Norris and Scott C. Zager for their many hours of identification work on the very difficult Carex genus; Mark Widrlechner's identification of species in many woody genera (Rubus, Salix, Loniceria, Cornus, Rosa, Crataegus, Viburnum); Lynn Clark and Anna Gardner, identification of the Poaceae family specimens; Donald
R. Farrar, trees and ferns; and Donald Pratt, *Amaranthaceae* and *Chenopodiaceae* families.

Many thanks go to Brian Holt, Executive Director of the Hamilton County Conservation Department, and Brian Fankhauser, Natural Resources Coordinator of the Hamilton County Conservation Department, for contributing to this project by alerting me to new plant species. Also, Brian Fankhauser made a fantastic find in May, 2002, of a huge population of many hundreds of *Cypripedium candidum* (small white lady’s slipper orchids).

Thanks to Jean Bells for alerting me to significant native prairie communities that I wasn’t aware of, where I found dozens of additional species to add to this inventory.

I also appreciate the contributions of the following people to this project; Gene Barrick, Arnold Bechel, Catherine Bergman, Jack L. Carter, Lloyd Crim, Jan and John Essig, Wayne Fuhlbregge, Gary Harris, Mary Jane Hatfield, R. Peter Kollasch, Carl and Linda Kurtz, Mark Loeschke, Mike Mason, Cathy Mabry McMullen, Harris, Mary Jane Hatfield, R. EASTERLY, DARLINGTON, B. M. FARRAR, D. R. NANCY THOMPSON (wife), Jeannette Walker, Lori Westrum, candidum Phipps, FLORA OF NORTH Iowa. Many thanks go to Brian Holt, Executive Director of the Iowa Academy of Science 58:71-95.


**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.


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 from 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. Parry (1988) 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.

<table>
<thead>
<tr>
<th>PTERIDOPHYTES</th>
<th>ANGIOSPERMS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADIANTACEAE</strong></td>
<td><strong>DICOTYLEDONS</strong></td>
</tr>
<tr>
<td>Adiantum pedatum L. (Northern maidenhair fern) Tmf-common</td>
<td><em>Acer ginnala</em> Maxim. (Amur maple) Orw-frequent</td>
</tr>
<tr>
<td>Asplenium platyneuron (L.) Oakes ex D.C. Eaton (Ebony spleenwort) Twd, ed-in frequent</td>
<td><em>Acer negundo</em> L. (Box elder) Twf, Orw-of-common</td>
</tr>
<tr>
<td><strong>ASPLENIACEAE</strong></td>
<td><em>Acer nigrum</em> Michx. f. (Black maple) Tmf-common</td>
</tr>
<tr>
<td>Asplenium bulbiferum (L.) Bernh. (Bulblet bladder fern) Tmf-sparse</td>
<td><em>Acer platanoides</em> L. (Norway maple) Twf; Orw-sparse</td>
</tr>
<tr>
<td>Cystopteris protonosa (Weath.) B.'saldel (Creeping fragile fern) Tmf-common</td>
<td><em>Acer rubrum</em> L. (Red maple) Twf; Orw-sparse</td>
</tr>
<tr>
<td>Cystopteris tenuis (Michx.) Desv. (Fragile fern) Tmf-sparse</td>
<td><em>Acer rubrum X A. saccharinum</em> L. (Red maple X silver maple) Our-sparse</td>
</tr>
<tr>
<td><strong>DROXYPTERIDACEAE</strong></td>
<td><em>Acer saccharinum</em> L. (Silver maple) Twf-common</td>
</tr>
<tr>
<td>Athyrium felix-femina (L.) Roth var. angustum (Willld.) Moore (Northern lady fern) Tmf-in frequent</td>
<td><strong>AIZOACEAE</strong></td>
</tr>
<tr>
<td>Dryopteris carthusiana (Sprengel) Bernh. (Bulblet bladder fern) Tmf-sparse</td>
<td><em>Mallugo verticillata</em> L. (Cat's-ear) Twf; Ocr,rc-common</td>
</tr>
<tr>
<td>Cystopteris protrusa (Weath.) B.'saldel (Creeping fragile fern) Tmf-common</td>
<td><strong>AMARANTHACEAE</strong></td>
</tr>
<tr>
<td><em>Cystopteris bulbifera</em> (L.) Desv. (Fragile fern) Tmf-sparse</td>
<td><em>Amaranthus albus</em> L. (Tumble pigweed) Our, rw-frequent</td>
</tr>
<tr>
<td>Dryopteris carthusiana (Sprengel) Bernh. (Bulblet bladder fern) Tmf-sparse</td>
<td><em>Amaranthus blitoides</em> Moq. (Redroot pigweed) Orw-sparse</td>
</tr>
<tr>
<td><em>Dryopteris carthusiana</em> (Spreng. ex Willd.) Fuchs (Spinulose wood fern) Tmf,wf-frequent</td>
<td><em>Amaranthus hybridus</em> L. (Green amaranth) Orw-sparse</td>
</tr>
<tr>
<td><em>Dryopteris cristata</em> (L.) Gray (Crested wood fern) Tmf-sparse</td>
<td><em>Amaranthus powellii</em> S. Watson (Smooth pigweed) Orw-sparse</td>
</tr>
<tr>
<td>Mattuccia struthiopteris (L.) Todaro var. pselidonicola (Willld.) Morton (Ostrich fern) Twf,ed-sparse</td>
<td><em>Amaranthus retroflexus</em> L. (Redroot pigweed) Ocr-common</td>
</tr>
<tr>
<td><em>Osmunda sensibilis</em> L. (Sensitive fern) Ted-sparse</td>
<td><em>Amaranthus tuberculatus</em> (Moq.) Sauer (Water hemp) Ocr-common</td>
</tr>
<tr>
<td>Woodsia obtusa (Spreng.) Todaro var. protrusa (Northern lady fern) Tmf-sparse</td>
<td><strong>ANACARDIACEAE</strong></td>
</tr>
<tr>
<td><strong>EQUISETACEAE</strong></td>
<td><em>Cicuta</em> L. (Water hemlock) Herb., 1924, 1930</td>
</tr>
<tr>
<td>Equisetum arvense L. (Common horsetail) Tmf, wf, es; Pms, wrc- common</td>
<td><em>Cicuta</em> L. (Water hemlock) Herb., 1924, 1930</td>
</tr>
<tr>
<td><em>Equisetum × ferrissii</em> Clute (E. hyemale X E. laevigatum) Pms; Orw-common</td>
<td><em>Conium</em> L. (Water hemlock) Herb., 1924, 1930</td>
</tr>
<tr>
<td><em>Equisetum fluviatile</em> L. (Swamp horsetail) Wcf,sz-in frequent</td>
<td><em>Daucus carota</em> L. (Queen Anne's lace) Twd,ed; P; Ocr-common</td>
</tr>
<tr>
<td><em>Equisetum hyemale</em> L. var. affinis var. affinis (Engelm.) A.A. Eaton (Common scouring-rush) Twf, es; Orw-common</td>
<td><em>Daucus carota</em> L. (Queen Anne's lace) Twd,ed; P; Ocr-common</td>
</tr>
<tr>
<td><em>Equisetum laevigatum</em> A. Br. (Smooth scouring-rush) P; Orw-common</td>
<td><em>Eryngium yuccifolium</em> (L.) C.B. Clarke (Sweet cicely) Tmf-common</td>
</tr>
<tr>
<td><strong>OPHIOGLOSSACEAE</strong></td>
<td><em>Eryngium yuccifolium</em> (L.) C.B. Clarke (Sweet cicely) Tmf-common</td>
</tr>
<tr>
<td>Botrychium dissectum Sprengel f. dissecatum (Dissected grape fern) Twf,wd-in frequent</td>
<td><em>Eryngium yuccifolium</em> (L.) C.B. Clarke (Sweet cicely) Tmf-common</td>
</tr>
<tr>
<td><em>Botrychium dissectum</em> Sprengel f. obliquum (Muhl.) Fern. (Oblique grape fern) Tmf,wd-in frequent</td>
<td><strong>APLICEAE</strong></td>
</tr>
<tr>
<td><em>Botrychium virginianum</em> (L.) Sw. (Rattlesnake fern) T-mf-common</td>
<td><em>Chaerophyllum procumbens</em> (L.) Crantz (Chervil) Twf—in frequent</td>
</tr>
<tr>
<td><strong>OSMUNDACEAE</strong></td>
<td><em>Cicuta</em> L. (Water hemlock) Herb., 1924, 1930</td>
</tr>
<tr>
<td>Osmunda claytoniana L. (Interrupted fern) Tmf-sparse</td>
<td><em>Cicuta</em> L. (Water hemlock) Herb., 1924, 1930</td>
</tr>
<tr>
<td><strong>GYMNOSPERMS</strong></td>
<td><em>Cicuta</em> L. (Water hemlock) Herb., 1924, 1930</td>
</tr>
<tr>
<td><strong>CUPRESSACEAE</strong></td>
<td><em>Citrus sinensis</em> L. (Sweet orange) P; Ocr-common</td>
</tr>
<tr>
<td>Juniperus virginiana L. (Red cedar) Twf; O-cr-common</td>
<td><em>Citrus sinensis</em> L. (Sweet orange) P; Ocr-common</td>
</tr>
<tr>
<td><em>Thuja occidentalis</em> L. (Northern white cedar) Oof-sparse</td>
<td><em>Citrus sinensis</em> L. (Sweet orange) P; Ocr-common</td>
</tr>
<tr>
<td><strong>PINACEAE</strong></td>
<td><em>Citrus sinensis</em> L. (Sweet orange) P; Ocr-common</td>
</tr>
<tr>
<td>Pinus strobus L. (Eastern white pine) Oof-sparse</td>
<td><em>Citrus sinensis</em> L. (Sweet orange) P; Ocr-common</td>
</tr>
</tbody>
</table>
Appendix A. Continued.

**APOCYNACEAE**

Sanicula canadensis L. (Black snakeroot) T–common
Sanicula gregaria (Bickn. (Common snakeroot) Tdf,wd–common
Sanicula marilandica L. (Black snakeroot) Tdf,wd–es–infrared
Sium suave Walter (Water parsnip) Twf; Pwt; –sparce
Taubenia integrerima (L.) Drude (Yellow pimpernel) Tdf,wd–infrared
Zizia aurea (L.) Koch (Golden Alexander) T; P–common

**ASCLEPIADACEAE**

Asclepias viridiflora (Michx.) Hall & Clem. [Prairie milkweed] Tmf,ms–frequent
Asclepias verticillata (Michx.) Hall & Clem. [Purple milkweed] Tmf,wd–common
Asclepias syriaca L. [Common milkweed] Tdf; Wrp; Oof,ps–infrequent
Asclepias tuberosa L. ssp. interior Woodson (Butterfly milkweed) Pms–infrared
Asclepias tuberosa L. [Smooth blue aster] Tdf; Pms–infrared
Asclepias curassavica L. (Panicked aster) Twf; Wez–infrared
Asclepias incarnata L. (Side-flowered aster) Tdf,wd–infrared
Asclepias novae-angliae L. (New England aster) P–infrared

**ARALIACEAE**

Aralia nudicaulis L. (Wild sarsaparilla) Tmf–frequent
Aralia racemosa L. (Spikenard) Tmf–infrared
Panax quinquefolius L. (Common periwinkle) Orw–sparse

**ASTERACEAE**

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–infrared
Aster lateriflorus (L.) Britton (Side-flowered aster) Tdf,wd– infrared
Aster novae-angliae L. (New England aster) P–frequent
Aster obovatus L. (Aromatic aster) Pdr–sparce
Aster onanitios L. (Ontario aster) Twf–common
Aster pilosus Willd. (Hairy aster) Twf; P; O–common
Aster praehensilis Poir. (Willow aster) Wez–infrared
Aster prenanthoides Muhl. ex Willd. (Crooked-stem aster) Tmf– common
Aster punctatus L. (Swamp aster) Pwt; Wez–infrared
Aster sericus Vent. (Silky aster) Pdr–sparce
Bidens cernua L. (Nodding bur marigold) Wrp,md–common
Bidens coronata Muhl. ex Willd. (Purple-stem beggar-ticks) Pwt; Wrp,md; Orw–common
Bidens frondosa L. (Devil’s beggar-ticks) Pwt; Wrp,md–sparce

+Bidens polydipsis Blake (Osark tickseed-sunflower) Orw–sparce
Bidens tripartita L. (Strawstem beggar-tick) Wrp,md–frequent
Bidens vulata Greene (Tall beggar-tick) Wrp,md; Orw– frequent
Boltonia asteroides (L.) Her. (False aster) Wez,ss–sparce
Brickellia capanterioides (L.) Shinniers (False boneset) Tdf; Pdr; Oft–common
Cacalia plantaginea (Raf.) Shinniers (Tuborous Indian plantain) Pms–sparce

*Cardus acanthoides L. (Plumeless thistle) Pms; Ops–infrared
*Cardus nutans L. (Musk thistle) Ted; Wrp; Oof,ps–infrequent
*Cardus marianus L. (Star thistle) Pms–infrared
*Centaurea mollis L. (Hawksbeard) Ore–sparce
*Centaurea maculosa Lam. (Star thistle) Pdr–sparce
*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 floridinum (Rydby.) Arthur (Prairie thistle) Herb., 1901, 1908
*Cirsium illin (Canby) Fern. (Hollow-rooted thistle) Herb., 1926, 1928
*Cirsium vulgare (Savi) Tenore (Bull thistle) O–common
Conyza canadensis (L.) Cronq. (Horseweed) O–common
Conyza arvensis (L.) Cronq. (Dwarf horseweed) Herb., 1927
*Coreopsis lanceolata L. (Tickseed coreopsis) Pms–sparce
*Coreopsis palmata Nutt. (Prairie coreopsis) Pms–infrared
*Coreopsis tinctoria Nutt. (Golden coreopsis) Pdr–sparce
*Coreopsis tripteris L. (Tall tickseed) Ted–sparce
*Crepis tectorum L. (Hawksbeard) Orc–sparce
*Dirysis puppea (Vent.) A.S. Hitchc. (Fetid marigold) Orc– sparce
Echinacea pallida Nutt. (Pale purple coneflower) Twf; Pdr– sparce
Echinacea purpurea (L.) Moench (Purple coneflower) Pdr–sparce
Erechtites hieracifolia L. (Hawksbeard) Orc–sparce
Erigeron annus (L.) Pers. (Annual fleabane) O–common
Appendix A. Continued.

*Erigeron philadelphicus* L. (Philadelphia 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) Twf,wf-common

*Eupatorium rugosum* Houtt. (White snakeroot) T-common

*Euthenia graminifolia* (L.) Nutt. ex Cass. (Lance-leaved goldenrod) Pms-infrequent

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*Grindelia squarrosa*

*Matricaria maritima*

*Liatris pycnostachya*

*Liatris aspera*

*Prenanthes*

*Prenanthes*

*Hieracium scabrum*

*Hieracium canadense*

*Helianthus strumosus*

*Helianthus rigidus*

*Helianthus maximiliana*

*Helianthus rigidosus* (Cass.) Desf. (Showy sunflower) Pms,wt-frequency

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*Galinsoga quadriradiata*

*Leucanthemum vulgare*

*Galinsoga parviflora*

*Senecio pauperculus*

*Senecio plattensis* Nutt. (Prairie ragwort) Tdf; Pdr,ms-frequent

*Senecio oeadasus* Rydb. (Western heart-leaved goldenrod) Pwt-sparse

*Senecio vulgaris* L. (Common groundsel) Wrp-sparse

+Silphium integrifolium* Michx. (Rosinweeds) 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 flexuosa 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 virgaurea L. ex Willd. (Elm-leaved goldenrod) T-infrequent

*Sonchus arvensis* L. (Perennial sow thistle) Orw-frequent

*Sonchus asper* (L.) Hill (Spiny-leaved sow thistle) O-infrequent

*Sonchus oleraceus* L. (Common sow thistle) O-infrequent

*Taraxacum vulgare* L. (Daisies) Orw-sparse

*Taraxacum tomentosum* var. (Willd.) DC. (Red-seeded dandelion) O-infrequent

*Taraxacum officinale* Weber (Common dandelion) T; P; W; O-common

*Tragopogon dubius* Scop. (Goat’s beard) Orw-recommon

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 jewelweed) Twf; Wsp-common

*Impatiens pallida* Nutt. (Pale jewelweed) Twf; Wsp-infrequent

**BERBERIDACEAE**

*Berberis thunbergii* DC. (Japanese barberry) T-infrequent

Caesalpinioides (L.) Michx. (Blue cohosh) Tmf-infrequent

Podophyllum petasitum L. (Mayapple) Twf-sparse

**BETULACEAE**

*Carpinus caroliniana* Walter (Blue beech) Twf,wf-infrequent

*Corylus americana* Walter (Hazelnut) Twd;ed; Orw-frequent

Ostrya virginiana (P. Miller)K. Koch (Ironwood) Twf,ms-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) Twd; Osp-infrequent

Hackelia virginiana (L.) I.M. Johnston (Stickseed) T; P; O-common

*Lappula echinata* Gilib. (Beggars’-lice) Oof,ps-infrequent

Lithospermum canescens (Michx.) Lehm. (Hoary puccoon) Twd; Pms-infrequent
Appendix A. Continued.

**BRASSICACEAE**

*Aliaria petiolaris* (Bieb.) Carara & Grande (Garlic mustard) Twf,ed-frequent
*Arabidopsis thaliana* L. (Cress) Tmf-sparse
*Arabidopsis hirsuta* (L.) Bernh. (Tower mustard) Ocr,of-sparse
*Arabis hirsuta* (L.) Scop. (Hairy rock cress) Tes; Pdr; Orc; Of-sparse
*Arabis shortii* (Michx.) Michx. var. occidentale (Mack.) I.M. Johnston (False gromwell) Orc,ps-in frequent

**Lithospermum latifolium** Michx. (American gromwell) Tms-sparse

**Callitrichaceae**

*Callitriche heterophylla* Pursh (Water-starwort) Wez,sp-sparse

**Campanulaceae**

*Campanula americana* L. (Tall bellflower) Tmf,es,ed-common
*Campanula aparinoides* Pursh (Marsh bellflower) Wez,sp-in frequent
*Campanula rapunculoides* L. (Creeping bellflower) Tmf,ed-sparse

**Lobelia inflata** L. (Indian tobacco) Twd,es,ed-in frequent
*Lobelia siphilitica* L. (Great blue lobelia) Tes; Pwt; W-common
*Lobelia spicata* Lam. (Pale spiked lobelia) Pms-sparse

**Triadanthus perfoliata** (L.) Nieuw. (Venus’ looking-glass) Oof-in frequent

**Capparidaceae**

*Polanisia dodecandra* (L.) DC. var. dodecandra (Clammy weed) Orc–sparse
*Polanisia dodecandra* (L.) DC. var. trachysperma (T & G) Ilits (Clammy weed) Orc–sparse

**Caprifolaceae**

*Lonicera × bella* Zabel (L. morrowii Gray × L. tatarica L.) Ted–in frequent
*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 × xylotrephes* Tausch (L. tatarica L. × L. xylotoma L.) Ted–sparse

**Sambucus canadensis** L. (Elderberry) Ted; Orw–common
*Symphoricarpos occidentalis* Hooker (Wolfberry) Orw–in frequent
*Symphoricarpos orbiculatus* Moench (Coralberry) Tmf,ed–in frequent

**Triosteum perfoliatum** L. (Tinker’s weed) Twd–common
*Viburnum lantana* L. (Wayfaring bush) Twf–sparse
*Viburnum lentago* L. (Nannyberry) Tmf,es–sparse
*Viburnum opulus* L. (Guilder-rose) Ted–in frequent
*Viburnum rufinervis* Schultes (Downy arrowwood) Twf–in frequent

**Caryophyllaceae**

*Anthericum ramosum* L. (Thyme-leaved sandwort) Wrp–sparse
*Cardamine arvense* L. (Starry grasswort-cultivated variety) Orc–sparse
*Cardamine pratensis* L. (Field chickweed) Orc,ps–common
*Diplotaxis erucoides* L. (Deftford pink) Oof,ps–frequent
*Diplotaxis deltoidea* L. (Maiden pink) Orw–sparse
*Myosoton aquaticum* (L.) Moench (Giant chickweed) Twd; Wez–sp–common
*Paronychia canadensis* L. (Wood chickweed) Tdf–in frequent

*Silene armeria* L. (Bouncing bet) Oof–frequent
*Silene antirrhina* L. (Sleepy catchfly) Orw,rc–frequent
*Silene cernua Baumg. (Biennial campion) Orc–sparse
*Silene noctiflora* L. (Night-flowering catchfly) Ted–in frequent
*Silene pratensis* (Rafn) Gren. & Godron (White campion) Wrp; Orc,rc–common
*Silene stellata* L. (Starry campion) T–common
Appendix A. Continued.

Stellaria longifolia Muhl. ex Willd. (Stitchwort) Twf; Wsp–frequent
*Stellaria media (L.) Vill. (Common chickweed) Twf; Orw–common
*Vaccaria pyramidata Medicus (Cow cockle) Orw–sparse

CELASTRACEAE
*Celastrus orbiculatus Thunb. (Round-leaved bittersweet) Pdr; Orw–sparse
Celastrus scandens L. (Bittersweet) T; Orw–common
Euonymus arutopurpureus Jacq. (Wahoo) T–frequent

CERATOPHYLLACEAE
Ceratophyllum demersum (L.) (Spearscale) 0–frequent

CISTACEAE
Cistus monspeliensis L. (Mediterranean rockrose) T–frequent
*Cistus salvifolius L. (Spurge-creeping) Ted–frequent

CHENOPODIACEAE
*Chenopodium album L. (Common goosefoot) Tmf; Our–frequent
Chenopodium hybridum L. (Lamb’s quarters) 0–common
Chenopodium leptocephalum Moq. (Fatseed goosefoot) Ted–infrequent
Chenopodium murale L. (Weed) Orw–sparse
*Chenopodium quinoa Willd. (Quinoa) Ted–frequent

*Chenopodium quinoa Willd. (Pigweed) Orw–sparse

CORNACEAE
*Cornus alternifolia L. (Pagoda dogwood) Tmf,es–frequent
*Cornus canadensis L. (Tatarian dogwood) Wez–frequent
*Cornus sericea L. (Red-osier dogwood) Tmf,es–frequent
*Coronaria varia L. (Cream wild indigo) Pdr,ms–sparse

CUCURBITACEAE
*Corchorus olitorius L. (Vegetable silk) Pdr,es–frequent

CUCURBITACEAE
*Corchorus olitorius L. (Vegetable silk) Pdr,es–frequent

EUPHORBIACEAE
Euphorbia helioscopia L. (Sun spurge) Twf; Wsp–frequent
Euphorbia heterophylla L. (Spiny spurge) Pdr,ms–frequent

FABACEAE
Phaseolus vulgaris L. (Common bean) Tmf,es–frequent

ERICACEAE
Monotropa uniflora L. (Indian pipe) Tmf–common

EUPHORBIACEAE
Euphorbia helioscopia L. (Sun spurge) Twf; Wsp–frequent

ERICACEAE
Monotropa uniflora L. (Indian pipe) Tmf–common

FABACEAE
Phaseolus vulgaris L. (Common bean) Tmf,es–frequent

ERICACEAE
Monotropa uniflora L. (Indian pipe) Tmf–common

FABACEAE
Phaseolus vulgaris L. (Common bean) Tmf,es–frequent
Appendix A. Continued.

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GERANIACEAE</strong></td>
<td><em>Geranium maculatum</em></td>
<td>Michx. (Round-headed bush clover)</td>
<td>Twd; Pms-frequent</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Geranium robustum</em></td>
<td>(Dum. - Cours.) G. Don (Silky bush clover)</td>
<td>Pdr-sparse</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Lotus corniculatus</em></td>
<td>L. (Bird's-foot trefoil)</td>
<td>O-common</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Medicago falcata</em></td>
<td>L. (Yellow alfalfa)</td>
<td>Orw-sparse</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Medicago lupulina</em></td>
<td>L. (Black medic)</td>
<td>T; O-common</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Medicago sativa</em></td>
<td>L. (Alfalfa)</td>
<td>Or, rw, of-common</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Melilotus alba</em></td>
<td>Medicalago falcata</td>
<td>T; P; W- common</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Melilotus officinalis</em></td>
<td>(1.)</td>
<td>T; P- common</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Trifolium repens</em></td>
<td>(1.)</td>
<td>T; P- common</td>
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</tr>
<tr>
<td></td>
<td><em>Trifolium pratense</em></td>
<td>(1.)</td>
<td>T; P- common</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Trifolium hybridum</em></td>
<td>(1.)</td>
<td>T; P- common</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Trifolium repens</em></td>
<td>L. (White clover)</td>
<td>O-common</td>
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</tr>
<tr>
<td></td>
<td><em>Vicia americana</em></td>
<td>(1.)</td>
<td>Tmf, wf-infrequent</td>
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</tr>
<tr>
<td></td>
<td><em>Vicia villosa</em></td>
<td>Roth (Hairy vetch)</td>
<td>Orw-frequent</td>
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<tr>
<td></td>
<td><em>Vicia argophyllum</em></td>
<td>J. Pringle (Downy vetch)</td>
<td>Tmf, wf-infrequent</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Vicia villosa</em></td>
<td>Roth (Hairy vetch)</td>
<td>Orw-frequent</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Vicia villosa</em></td>
<td>Roth (Hairy vetch)</td>
<td>Orw-frequent</td>
<td></td>
</tr>
</tbody>
</table>

**FAGACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Quercus alba</em></td>
<td>L. (White oak)</td>
<td>Tdf, mf-common</td>
<td></td>
</tr>
<tr>
<td><em>Quercus bicolor</em></td>
<td>Willd. (Swamp white oak)</td>
<td>Tfw-sparse</td>
<td></td>
</tr>
<tr>
<td><em>Quercus borealis</em></td>
<td>Michx. f. var. maxima (Marsh.) Ashe (Northern red oak)</td>
<td>T- common</td>
<td></td>
</tr>
<tr>
<td><em>Quercus ellipsoidalis</em></td>
<td>E. J. Hill (Oak's oak, norther pin oak)</td>
<td>T- sparse</td>
<td></td>
</tr>
<tr>
<td><em>Quercus × hawkinsii</em></td>
<td>Sudw. (Northern red oak × black oak)</td>
<td>Tdf-sparse</td>
<td></td>
</tr>
<tr>
<td><em>Quercus macrocarpa</em></td>
<td>Michx. (Bur oak)</td>
<td>Tdf, mf-common</td>
<td></td>
</tr>
<tr>
<td><em>Quercus muehlenbergii</em></td>
<td>Engel. (Chinquapin oak)</td>
<td>Tfw, es-common</td>
<td></td>
</tr>
<tr>
<td><em>Gentiana alba</em></td>
<td>Muhl. (Yellow gentian-pale gentian)</td>
<td>Twd, ed; Oof-common</td>
<td></td>
</tr>
<tr>
<td><em>Gentiana andrewsii</em></td>
<td>Griseb. (Bottle gentian)</td>
<td>Pwt; Wsp-infrequent</td>
<td></td>
</tr>
<tr>
<td><em>Gentiana puberulenta</em></td>
<td>J. Pringle (Downy gentian)</td>
<td>Pdr, ms-infrequent</td>
<td></td>
</tr>
<tr>
<td><em>Gentianella quinquefolia</em></td>
<td>L. Small ssp. occidentalis (A. Gray) J. Gillett (Stiff gentian)</td>
<td>Tes; Wsp-infrequent</td>
<td></td>
</tr>
<tr>
<td>~<em>Gentianopsis crinita</em></td>
<td>(Froel.) Ma (Fringed gentian)</td>
<td>[Gentiana crinita Froel.] P, 1898</td>
<td></td>
</tr>
</tbody>
</table>

**GERANIACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Geranium maculatum</em></td>
<td>L. (Wild geranium)</td>
<td>Tmf, wf-infrequent</td>
<td></td>
</tr>
<tr>
<td>~<em>Geranium sibiricum</em></td>
<td>L. (Siberian geranium)</td>
<td>Pms; Orw-sparse</td>
<td></td>
</tr>
</tbody>
</table>

**HALORAGIDACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Myriophyllum exalbescens</em></td>
<td>Fern. (American water milfoil)</td>
<td>Herb., 1961</td>
<td></td>
</tr>
<tr>
<td>~<em>Myriophyllum spicatum</em></td>
<td>L. (Spiked water milfoil)</td>
<td>H, 1890</td>
<td></td>
</tr>
</tbody>
</table>

**HIPPOCASTANACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Aesculus glabra</em></td>
<td>Willd. (Ohio buckeye)</td>
<td>Tfw-sparse</td>
<td></td>
</tr>
</tbody>
</table>

**HYDROPHYLLACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Elitisia nyctelae</em></td>
<td>L. (Wild tomato)</td>
<td>Tfw; Orw, rc-common</td>
<td></td>
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</tbody>
</table>

**HYPERICACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Hypericum majus</em></td>
<td>(Gray) Britton (Greater St. John's wort)</td>
<td>Wrd-infrequent</td>
<td></td>
</tr>
<tr>
<td><em>Hypericum perforatum</em></td>
<td>L. (Common St. John's wort)</td>
<td>Orw, rc-of-frequent</td>
<td></td>
</tr>
<tr>
<td><em>Hypericum punctatum</em></td>
<td>Lam. (Spotted St. John's wort)</td>
<td>Tse-sparse</td>
<td></td>
</tr>
<tr>
<td><em>Hypericum pyramidatum</em></td>
<td>Aiton (Giant St. John's wort)</td>
<td>Twd; Oof-infrequent</td>
<td></td>
</tr>
</tbody>
</table>

**JUGLANDACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Carya cordiformis</em></td>
<td>Wang. (Bitternut hickory)</td>
<td>T-common</td>
<td></td>
</tr>
<tr>
<td><em>Carya ovata</em></td>
<td>(P. Miller) K. Koch (Shagbark hickory)</td>
<td>T-common</td>
<td></td>
</tr>
<tr>
<td><em>Juglans cinerea</em></td>
<td>Willd. (Butternut)</td>
<td>Tmf, wf-infrequent</td>
<td></td>
</tr>
<tr>
<td><em>Juglans nigra</em></td>
<td>L. (Black walnut)</td>
<td>T; Orw-common</td>
<td></td>
</tr>
</tbody>
</table>

**LAMIACEAE**

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Agastache nepetoides</em></td>
<td>L. Kuntze (Yellow giant hyssop)</td>
<td>T-common</td>
<td></td>
</tr>
<tr>
<td><em>Agastache scrophularisifolia</em></td>
<td>(Willd.) Kuntze (Purple giant hyssop)</td>
<td>T-ed, rd-frequent</td>
<td></td>
</tr>
<tr>
<td><em>Blephilia hirsuta</em></td>
<td>(Pursh) Bentham (Wood mint)</td>
<td>Ted-sparse</td>
<td></td>
</tr>
<tr>
<td><em>Dracocephalum parviflorum</em></td>
<td>Nutt. (Dragonhead)</td>
<td>Wrp; Oof-infrequent</td>
<td></td>
</tr>
<tr>
<td>~<em>Glechoma hederacea</em></td>
<td>L. (Creeping Charlie)</td>
<td>T; P; W; O-common</td>
<td></td>
</tr>
<tr>
<td><em>Hedoma hispida</em></td>
<td>Pursh (Rough pennroyal)</td>
<td>Or-c-frequent</td>
<td></td>
</tr>
<tr>
<td><em>Hedoma pulegioides</em></td>
<td>L. Pers. (American pennroyal)</td>
<td>Tdr; Osp-infrequent</td>
<td></td>
</tr>
<tr>
<td>~<em>Lamium amplexicaule</em></td>
<td>L. (Henbit)</td>
<td>Ours-sparse</td>
<td></td>
</tr>
<tr>
<td><em>Leonurus cardiaca</em></td>
<td>L. (Common motherwort)</td>
<td>T; Orc-common</td>
<td></td>
</tr>
<tr>
<td>~<em>Leonurus marrubiastrum</em></td>
<td>L. (Horehound motherwort)</td>
<td>Twf; Wrinfrequent</td>
<td></td>
</tr>
<tr>
<td><em>Lycopus americanus</em></td>
<td>Muhl. ex Barton (Water horehound)</td>
<td>Tfw; Pwt; Wez-frequent</td>
<td></td>
</tr>
<tr>
<td>~<em>Lycopus asper</em></td>
<td>Greene (Western water horehound)</td>
<td>Wez-sparse</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENUS</th>
<th>SPECIES</th>
<th>COMMON NAME</th>
<th>ABUNDANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lycopus × sherardii</em></td>
<td>Steele (L. uniflorus × L. virginicus)</td>
<td>Pwt; Wtp-common</td>
<td></td>
</tr>
<tr>
<td><em>Lycopus uniflorus</em></td>
<td>Michx. (Northern bugleweed)</td>
<td>Wez, rp-common</td>
<td></td>
</tr>
<tr>
<td><em>Lycopus virginicus</em></td>
<td>L. (Virginia water horehound)</td>
<td>Wez-sparse</td>
<td></td>
</tr>
<tr>
<td><em>Mentha arvensis</em></td>
<td>L. (Wild mint)</td>
<td>Tfw; Pwt; Wez-md-common</td>
<td></td>
</tr>
<tr>
<td><em>Monarda fistulosa</em></td>
<td>L. (Bergamot)</td>
<td>T; P; O-common</td>
<td></td>
</tr>
<tr>
<td>~<em>Nigella cataria</em></td>
<td>L. (Catnip)</td>
<td>T; P- O-common</td>
<td></td>
</tr>
<tr>
<td><em>Physotheca parviflora</em></td>
<td>Nutt. ex Gray (Obedient plant)</td>
<td>Tfw-infrequent</td>
<td></td>
</tr>
<tr>
<td>~<em>Prista virginiana</em></td>
<td>L. Bentham (False dragonhead)</td>
<td>Tfw; Wtp-md-frequent</td>
<td></td>
</tr>
<tr>
<td><em>Pruellia vulgaris</em></td>
<td>L. (Self heal)</td>
<td>T; P; O-common</td>
<td></td>
</tr>
<tr>
<td>~<em>Pycnanthemum argophyllum</em></td>
<td>(Self heal)</td>
<td>T; P; O-common</td>
<td></td>
</tr>
<tr>
<td>~<em>Pycnanthemum tenuifolium</em></td>
<td>Schrader (Slender mountain mint)</td>
<td>Pwt-sparse</td>
<td></td>
</tr>
<tr>
<td><em>Pycnanthemum virginianum</em></td>
<td>L. Dur. &amp; Jackson (Common mountain mint)</td>
<td>Pms, wr-common</td>
<td></td>
</tr>
<tr>
<td>~<em>Salvia reflexa</em></td>
<td>Hornem. (Rocky Mountain sage)</td>
<td>Herb., 1944</td>
<td></td>
</tr>
<tr>
<td><em>Saturelia galericala</em></td>
<td>L. (Marsh skullcap)</td>
<td>Wez-infrequent</td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>Species</td>
<td>Common Names</td>
<td>Infrequency</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>LINACEAE</strong></td>
<td>Scutellaria lateriflora</td>
<td>Common bladerwort</td>
<td>Wsz-sparse</td>
</tr>
<tr>
<td></td>
<td>Lythrum alatum</td>
<td>Common germander</td>
<td>Tdf,ed-common</td>
</tr>
<tr>
<td></td>
<td>Didiplis diandra</td>
<td>Common toothcup</td>
<td>Wmd-infrequent</td>
</tr>
<tr>
<td></td>
<td>Linum sulcatum</td>
<td>Common blue flax</td>
<td>Tdf-sparse</td>
</tr>
<tr>
<td></td>
<td>Ammania coccinea</td>
<td>Common mad-dog skullcap</td>
<td>Tmf,sparse</td>
</tr>
<tr>
<td><strong>LYTHRACEAE</strong></td>
<td>Lythrum salicaria</td>
<td>Common purple loosestrife</td>
<td>Wmd-infrequent</td>
</tr>
<tr>
<td></td>
<td>Mirabilis nyctaginea</td>
<td>Common mad-dog skullcap</td>
<td>Tdf,wd,ed-common</td>
</tr>
<tr>
<td><strong>MALVACEAE</strong></td>
<td>*Malva rotundifolia</td>
<td>Common white mulberry</td>
<td>Wmd-sparse</td>
</tr>
<tr>
<td></td>
<td>*Malva neglecta</td>
<td>Common hemp-marijuana</td>
<td>Wrp-sparse</td>
</tr>
<tr>
<td></td>
<td>*Abutilon theophrasti</td>
<td>Common Japanese bamboo</td>
<td>Wmd-infrequent</td>
</tr>
<tr>
<td><strong>MENISPERMACEAE</strong></td>
<td>Moneses trifoliata</td>
<td>Common Buckbean</td>
<td>Tdf-sp-sparse</td>
</tr>
<tr>
<td><strong>MORACEAE</strong></td>
<td>*Humulus japonicus</td>
<td>Common Japanese hops</td>
<td>Tdf; W; P; Orw-infrequent</td>
</tr>
<tr>
<td></td>
<td>*Morus alba</td>
<td>Common White mulberry</td>
<td>Tdf-sp-sparse</td>
</tr>
<tr>
<td><strong>NYCTAGINACEAE</strong></td>
<td>Mirabilis alba</td>
<td>Common Garden phlox</td>
<td>Wmd-sparse</td>
</tr>
<tr>
<td></td>
<td>Mirabilis nyctaginea</td>
<td>Common White mulberry</td>
<td>Tdf,wd,ed; Pms; Orw-infrequent</td>
</tr>
<tr>
<td><strong>NYMPHAECENAE</strong></td>
<td>~Brassica threberi</td>
<td>Common Water-pepper</td>
<td>W; P; O-common</td>
</tr>
<tr>
<td></td>
<td>Naphar laetus</td>
<td>Common Water-pepper</td>
<td>W; O-common</td>
</tr>
<tr>
<td><strong>OLACEAE</strong></td>
<td>Fraxinus americana</td>
<td>Common White ash</td>
<td>Tdf,sp-common</td>
</tr>
<tr>
<td></td>
<td>*Fraxinus nigra</td>
<td>Common (Black ash)</td>
<td>Tmf-common</td>
</tr>
<tr>
<td></td>
<td>*Fraxinus pennsylvanica Marsh. (Red ash)</td>
<td>Common Marsh (Red ash)</td>
<td>Tmf-sp-sparse</td>
</tr>
<tr>
<td></td>
<td>*Fraxinus pennisylvanica Marsh. var. lanceolata (Borkh.) Sarg. (Green ash)</td>
<td>Common (Green ash)</td>
<td>Tmf,sp-common</td>
</tr>
<tr>
<td></td>
<td>*Ligustrum obtusifolium</td>
<td>Common Silver privet</td>
<td>Tdf-sp,sp-common</td>
</tr>
<tr>
<td><strong>ONAGRACEAE</strong></td>
<td>Calylophus serrulatus</td>
<td>Common Toothed evening primrose</td>
<td>Pdr-sp,sp-common</td>
</tr>
<tr>
<td></td>
<td>Circius lutetiana ssp. canadensis (L.) Ascherson &amp; Magnus</td>
<td>Common (Enchanter's nighshade)</td>
<td>Tmf,sp-sp-common</td>
</tr>
<tr>
<td></td>
<td>~Epilobium ciliatum</td>
<td>American willow herb[E. adenocaulon Hassk.] P, 1898</td>
<td>Tmf-sp-sp-common</td>
</tr>
<tr>
<td><strong>PAPAVERACEAE</strong></td>
<td>Oxytropis cancerosa</td>
<td>Common (Cinnamon willow herb)</td>
<td>Pmd-sp-sp-common</td>
</tr>
<tr>
<td></td>
<td>Oxytropis stricta</td>
<td>Common Lady's thumb</td>
<td>T; P; W; O-common</td>
</tr>
<tr>
<td><strong>PAPYRACEAE</strong></td>
<td>Crab Grass</td>
<td>Common Grass</td>
<td>Tmf-sp-sp-common</td>
</tr>
<tr>
<td><strong>POLYGONACEAE</strong></td>
<td>Polygala parry</td>
<td>Common <em>Brasenia</em></td>
<td>Pdr-infrequent</td>
</tr>
<tr>
<td></td>
<td>*Polygonum persicaria</td>
<td>Common Lady's thumb</td>
<td>P; W; O-common</td>
</tr>
<tr>
<td><strong>POLYGRACAE</strong></td>
<td>Polygala verticillata</td>
<td>Common <em>Menyanthes</em></td>
<td>Pdr-infrequent</td>
</tr>
<tr>
<td><strong>POLYHARMACEAE</strong></td>
<td>Phlox divaricata</td>
<td>Common Prairie phlox</td>
<td>T-mf-common</td>
</tr>
<tr>
<td><strong>POLYPODACEAE</strong></td>
<td>*Polygala major</td>
<td>Common (Water-pepper)</td>
<td>Wrp-sparse</td>
</tr>
<tr>
<td><strong>POLYPODIACEAE</strong></td>
<td>*Polygonum ciliatum</td>
<td>Common Whorled milkwort</td>
<td>T-wd-infrequent</td>
</tr>
<tr>
<td><strong>POLYPODIACEAE</strong></td>
<td>*Polygonum punctatum</td>
<td>Common Ell (Water smartweed)</td>
<td>W; Wrp-sp,sp-common</td>
</tr>
<tr>
<td><strong>POLYPODIACEAE</strong></td>
<td>*Polygonum ramosissimum</td>
<td>Common Polygonum ramosissimum</td>
<td>W; Wrp-sp,sp-common</td>
</tr>
<tr>
<td><strong>POLYPODIACEAE</strong></td>
<td>*Polygonum scandens</td>
<td>Common Polygonum scandens</td>
<td>W; Wrp-sp,sp-common</td>
</tr>
</tbody>
</table>

Appendix A. Continued.
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; Orc–of–common
*Rumex maritimus L. var. flaginus (Phl.) Dunen (Golden dock) Wetz, rp; md–infrequent
Rumex mexicanus Meisner (Dock) Wrp; Orw–infrequent
Rumex obtusifolius L. (Bitter dock) Wrp–sparse
Rumex orbicularis Gray (Great water-dock) Wez–sparse
*Rumex stemphyllus 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 media L. (Shooting star) Herb, photo, no date
Lysimachia ciliata L. (Fringed loosestrife) Pwt; Orw–frequent
Lysimachia hybridra 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 thyrsiflora L. (Swamp loosestrife) Wez–sparse

RANUNCULACEAE

Actaea arctophyoda Ell. (White baneberry) Tmwf–infrequent
Actaea rubra (Aiton) Willd. (Red baneberry) Twf–infrequent
*Adonis annua L. (Fall adonis) Our–sparse
Anemone canadensis L. (Canada anemone) Pwt; Orw–common
Anemone cylindrica Gray (Thimbleweed) Pdr, ms–common
Anemone quinquifolia L. (Wood anemone) Twf, mf–frequent
Anemone virginiana L. (Tall anemone) Pdr, ms–frequent
Aquilegia canadensis L. (Columbine) Twf–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 virens Nutt. (Prairie larkspur) Pms–infrequent
Hepatica nobilis (P. Miller) var. acuta (Pursh) Seyerm. (Liverleaf) Twf–common
Inopyrum bissetianum (Raf.) T. & G. (False rue anemone) Twf, mf–common
Pulsatilla patens (L.) P. Miller ssp. multifida (Prietz.) Zamels (Pasque flower) Pdr–sparse
Ranunculus abortivus L. (Kidney-leaved buttercup) T; W; O–common
~Ranunculus aquatilis L. var. capitillaceus (Thuill.) DC. (White water crowfoot) [R. aquatilis L. var. trichophylla] P, 1898
*Ranunculus bulbosus L. (Bulbous buttercup) Orc–sparse
~Ranunculus cymbalaria Pursh (Seaside crowfoot) Herb., 1891, 1909, 1928
Ranunculus fascicularis Muhl. (Early buttercup) Twf–sparse
Ranunculus flabellaris Raf. (Yellow water crowfoot) Wsz–sparse
Ranunculus longirostris Godron (White water crowfoot) Wsz–sparse
~Ranunculus palustrisus L. f. (Brystly crowfoot) H, 1890
Ranunculus rhomboideus Goldie (Prairie buttercup) Pdr–sparse
Ranunculus scepteratus L. (Cursed crowfoot) Twf; Wmd, sp–common
Ranunculus septentrionalis Poir. (Swamp buttercup) Twf, mf–common
Thalictrum dasyurum Fischer & Ave-Lall. (Purple meadow-rue) Pms–frequent
Thalictrum dioicum L. (Early meadow-rue) Twf–common
Thalictrum thalictroides (L.) Eames & Boiun (Rue anemone) Twf–sparse

RHAMNACEAE

Crataegus 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 parfoliata Aiton (Swamp agrimony) Ted; Pms–common
Agrimonia pubescens Wallr. (Soft agrimony) T–frequent
Agrimonia triflora Michx. (Road-side agrimony) T–sparse
Amelanchier arborea (Michx.) Fern. (Serviceberry-Juneberry) Twf–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) Twf, ed–frequent
Frangaria vesca L. var. americana Porter (Woodland strawberry) Twf, mf–common
Frangaria virginiana Duchesne (Wild strawberry) T; P; O–common
Geum canadense Jacq. (White avens) Twf, mf; Pms, wt–common
Geum lacinatum Murray (Rough avens) Orw–sparse
Geum macrophyllum Willd. (Big-leaved avens) Our–sparse
Malus iomnis (Wood) Britton (Wild crab apple) Twf, mf; Ops–frequent
*Malus sylvestris (L.) P. Miller (Apple) Ted; Ops–sparse
Physocarpus quillifolius (L.) Maxim. (Ninebark) Tes–sparse
~Potentilla anserina L. (Silverweed) H, 1890
*Potentilla argentea L. (Silver cinquefoil) Twd–sparse
Potentilla argyra 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 rica L. Nutt. (Brook cinquefoil) Pwt–sparse
Potentilla simplex Michx. (Common cinquefoil) Twf, ed; ms–frequent
*Prunus cerasus (L.) Miller (Cherry) Ted; Ops–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) Twf–sparse
Prunus serotina Ehrh. (Wild black cherry) Twd, ed; Orw–common
Prunus virginiana L. (Choke cherry) Twd, ed; Orw–common
Rosa arkanatana Porter var. suffulta (Greene) Cockerell (Sunshine rose) Orw–infrequent
Rosa blanda Aiton (Meadow rose) Ted; Pms; Orw–common
Appendix A. Continued.

*Rosa multiflora* Thunb. ex Murray (Multiflora rose) T; P; Orw—frequent

*Rosa × radiniscula* Greene (R. arkansana × R. carolina) Orw—infrequent

*Rubus abalatus* Bailey (Dewberry) Tfd,wd—infrequent

*Rubus alleghenensis* Porter ex Bailey (Blackberry) Twd,ed; Orw—of—common

*Rubus caesius* L. (European dewberry) Orw—sparse

*Rubus frondosus* Bigel. (Dewberry) Ted; Oof—infrared

*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; O—common

*Rubus parisiensis* Peck (Asian dewberry) Ted; Ops—sparse

*Rubus wicouensis* L.H. Bailey (Wisconsin dewberry) Pms—sparse

*Salix alba* Du Roi (Meadowsweet) Pms—sparse

*Salix candida* Michx. (White willow) Tfd—common

*Salix discolor* Muhl. (Pussy willow) T; Pwt; Wsp; Orw—common

*Salix exigua* Nutt. ssp. *interior* (Rowlee) Cronq. (Sandbar willow) T; Tfw,es; Pwt; Wsp—common

*Salix fragilis* L. (Crack willow) Wsp—common

*Salix humilis* Marsh—Salix *candida* Fluegge (Intermediate willow) Pms—sparse

*Salix lucida* Muhl. (Shining willow) Pwt; Wsp—common

*Salix nigra* Marsh. (Black willow) Tfw; P; Wep—common

*Salix petiolaris* Smith (Meadow willow) Wesp—sparse

*Salix rigida* Muhl. (Diamond willow) Tfw,es; Pwt; Wesp—common

*Salix × rubens* Schrank (S. *ala* × S. *fragilis*) Tfw—sparse

*Santalaceae*

*Comandra umbellata* (L.) Nutt. (Bastard toadflax) Tfd; Pdr,ms—infrequent

*Saxifragaceae*

*Spartium candidum* L. (Wild madder) Pms—frequent

*Staphylea trifolia* L. (Bladdernut) Tfw; Wep—common

*Thymelaeaceae*

*Dirca palustris* L. (Leatherwood) Tfw—infrequent

*Tiliaceae*
Appendix A. Continued.

**ULMACEAE**
- Ulmus americana L. (Basswood) Tmf, wf-common
- *Ulmus* rubra Muhl. (Red elm) T-common

**URTICACEAE**
- Boehmeria cylindrica (L.) SW. (Bog hemp) Tfw-common
- Laportea canadensis (L.) Wedd. (Wood nettle) Tfw-common
- Parietaria pensylvanica Muhl. ex Wild. (Pellitory) Wrp; Orc,rc-common
- Pilea pumila (L.) Gray (Clearweed) Tfw; Wrp,sp-common
- Urtica dioica L. (Stinging nettle) Tmwf-common

**VERBENACEAE**
- Phyllo lanceolata (Michx.) Greene (Fogfruit) Tfw; 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,wr; Wrp-common
- *Verbena* × rydbergii Moldenke (V. hastata × V. stricta) Wz,rp; Ops-frequent
- *Verbena stricta* Vent (Hoary vervain) Pdr,ms; Orc,ps-common
- *Verbena urticifolia* L. (White vervain) Pwt; Wrp-common

**VIOLACEAE**
- Viola × hernandezii Greene (V. pedatifida × V. sororia) Pdr-sparse
- *Viola canadensis* L. var. rugosa (Greene) C. L. Hitchc. (Tall white violet) Tfw-sparse
- *Viola pedatifida* G. Don (Prairie violet) Pdr,ms-infrequent
- *Viola pratina* Greene (Common blue violet) Pwt-infrequent
- *Viola pubescens* Aiton (Downy yellow violet) Tmwf,wf-common
- *Viola sagittata* Aiton (Arrow-leaved violet) Ted-sparse
- *Viola sororia* Willd. (Hairly blue violet) T; P; W; O-common

**VITACEAE**
- Parthenocissus quinquefolia (L.) Planchon (Virginia creeper) T; Orw-common
- *Parthenocissus vitacea* (Knorr) A.S. Hitchc. (Woodbine) T; Orw-common
- *Vitis riparia* Michx. (Riverbank grape) T; P; O-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 fluvatilis (Torr.) Sojak [Scirpus fluvatilis (Torray) Gray] (River bulrush) Wez,sz-common
- *Carex aggregata* Mack. –Ted-sparse
- *Carex alberensis* Sheldon –Tmf,wf-common
- *Carex alpestris* Tuckerman –Pwt-sparse
- *Carex annectens* (Bickn.) Bickn. –Tfw-sparse
- *Carex atherodes* Sprengel –Orw-common
- *Carex atherodes* Sprengel × *C. trichocarpa* Schkuhr –Wez-sparse
- *Carex bebbii* (Bailey) Fern. –Orw-common
- *Carex bicknelli* 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 comosus* Boott –Wsz-sz-common
- *Carex conjuncta* Boott –Wez-frequent
- *Carex crus-galli* Dewey –Pdr,ms-sparse
- *Carex crispatula* Britton & Torrey –Orw,of-common
- *Carex davidi* Schwein. –Orw,of-common
- *Carex echinata* Boott –Tdf,mf-frequent
- *Carex emoryi* Dewey –Wz,rp-common
- *Carex frankii* Kunth –Pwt-sparse
- *Carex gradiata* Bailey –Pms,wt; Wrp-common
- *Carex grayi* Carey –Tdf,md-frequent
- *Carex grisea* Wahlenb. –Tmf,ed-infrequent
- *Carex hirtifolia* Mack. –Tdf,mf-common
- *Carex hiteckiana* Dewey –Tdf,mf-frequent
- *Carex hyalocarpa* Mull. ex Willd. –Wz,rp-sparse
- *Carex kops* L.H. Bailey subsp. bissetii (Mack.) Crins –Pdr-sparse
- *Carex interior* Bailey –Wz-sp-sparse
- *Carex jamesii* Schwein. –Tmf,md-common
- *Carex laevigata* Willd. –Wez-sz-infrequent
- *Carex laevionyx* Dewey –Pwz-sparse
- *Carex laevivittata* Dewey –Tdf,md-sp-sparse
- *Carex leavenworthii* Dewey –Tdf,mf-sp-sparse
- *Carex lapulina* Mull. ex Willd. –Tdf,md-frequent
- *Carex madii* Dewey –Pdr,ms-common
- *Carex mesochorea* Mack. –Tdf,md-sp-sparse
- *Carex molesta* Mack. –Ted-sparse
- *Carex murnanii* Schkuhr ex Willd. var. variabilis Boott –Our-spase
- *Carex normalis* Mack. –Tdf,ed-infrequent
- *Carex oligocarpa* Willd. –Tmf,md-common
- *Carex pellita* Muhr. ex Willd. –Pms,wr; Orw-common
- *Carex pensylvanica* Lam. –Tdf,mf-common
- *Carex praegracilis* W. Boott –Orw-sparse
- *Carex projecta* Mack. –Tmf,ed-sp-sparse
- *Carex retroflexa* Schwein. –Pwt; Wez-sz-sparse
- *Carex rosacea* Schkuhr ex Willd. –Tdf,md,wf-common
- *Carex sartwellii* Dewey –Wez-infrequent
- *Carex scoparia* Schkuhr ex Willd. –Wez,sz-sparse
- *Carex sparganioides* Muhr. ex Willd. –Tmf,ed-infrequent
- *Carex sprengelii* Dewey ex Sprengel –Tmf,md-frequent

**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-infrequent
- Sagittaria graminea Michx. (Grassy arrowhead) Wsz-sp-sparse
- Sagittaria latifolia Willd. (Common arrowhead) W-infrequent
- Sagittaria rigida Pursh (Sessile-fruited arrowhead) Wsz-sp-sparse

**ARACEAE**
- Acorus americanus (Raf.) Raf. (Sweet flag) Tfw; Wez,sz-sp-sparse
- Arisaema dracontium (L.) Schott (Green dragon) Tmf,md-infrequent
- Arisaema triphyllum (L.) Schott (Jack-in-the-pulpit) Tmf,wf-common
Appendix A. Continued.

Cyperus erythrorhizos
Scirpus georgianus
Scirpus atrovirens
juncus balticus
Carex
Carex
Carex
Carex
Carex
Carex
Carex
Carex
Cyperus strigosus
Cyperus squarrosus L.
Cyperus odoratus
Cyperus esculentus L.
Cyperus bipartitus
Scirpus pendulus
Schoenoplectus pungens
Schoenoplectus acutus
Elodea nuttallii
Eleocharis macrostachya
Eleocharis erythropoda
Eleocharis engelmannii
Dioscorea villosa L.
Elodea canadensis
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,md-common
Scirpus auriculatus Willd. (Dark green bulrush) Pwt; Orw-common
Scirpus gorgianus R.M. Harper (Common bulrush) Wez-common
Scirpus pendulus Muhl. (Bulrush) Pms,wt-in frequent

DIOSCOREACEAE
Dioscorea villosa L. (Wild yam) Tmf,cf-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 shrevei Small] (Blue flag) Pwt; Wez,md-common
Sisyrinchium campestre Bickn. (Blue-eyed grass) Pms-frequent

JUNCACEAE
Juncus balticus Willd. var. littoralis Englcm. (Bog rush) Pwt-sparse
Juncus bufonius L. (Toad rush) Our-sparse
Juncus dudleyi Wieg. (Path rush) Pwt-in frequent
Juncus nodosus L. (Knotted rush) Pwt-sparse
Juncus tenuis Willd. (Path rush) Tmd,ed; Oof,ps-common
Juncus torreyi Cov. (Torrey's rush) Pwt; Wez; Orw-common

LEMNACEAE
Lemma minor L. (Duckweed) Wsz-common
Lemma trisulca L. (Star duckweed) Wsz-sparse
Sporoelora polyrhiza (L.) Schleiden (Greater duckweed) Wsz-in frequent
Wolfia columbiana Karsten (Watermeal) Wsz-sparse

LILACEAE
Allium canadense L. (Wild onion) Pms-common
Allium tricoccum Ayton (Wild leek) Tmf-common
*A* Asparagus officinalis L. (Asparagus) Pms; Orw-frequent
*Convallaria majalis* L. (Lily-of-the-valley) Twf-sparse
Erythronium albidum Nutt. (Dog tooth violet) Tmf,cf-common
*Hemerocallis fulva* L. (Day lily) Ted; O-common
Hypoxis hirsuta (L.) Cov. (Yellow stargrass) Pms-sparse
*Lilium lancifolium* Thumb. (Tiger lily) Tmf; Orw-common
*Lilium michiganense* Farw. (Michigan lily) Tmf,cf; Pms,wt-common
*Lilium philadelphicum* L. (Philadelphicum l. var. andinum (Nutt.) Ker-Gawl.) (Wood lily) Pms-sparse
Marsantennum racemosum (L.) Link [Smilacina racemosa (L.) Desf.] (False Solomon's seal) T-common
Marsantennum stellatum (L.) Link [Smilacina stellata (L.) Desf.] (Starry false Solomon's seal) T-common
Polygonatum biflorum (Walters) Ell. (Solomon's seal) T-common
Smilax cerniflora Englcm. ex Kunth (Carriion flower) Tmf-common
Smilax herbacea L. (Catton flower) T; Pms-frequent
Smilax hispida L. (Greenbrier) T-common
Trillium undulatum Riddell (Snow trillium) Tdf,mdf-common
Uvularia grandiflora Small (Bellwort) Tmf-common
Zigadenus elegans Pursh (White camass) Pwt-in frequent

NAJADACEAE
Najas flexilis (Willd.) Rostk. & Schmidt (Northern naiad) Wsz-sparse
Najas quadtalpensis L. (Southern naiad) Wsz-in frequent

ORCHIDACEAE
Coeloglossum viride (L.) Hartman [C. viride (L.) Hartman var. virescens (Muhl. ex Willd.) Luer] (Bracted orchid) Tmf-in frequent
Corallorhiza odontorhiza (Willd.) Nutt. (Fall coral-root orchid) Tdf,mf-common
Cypridium candidum Muhl. ex Willd. (Small white lady's-slipper orchid) Pwt-sparse
Cypridium parvicephalum Salisbury var. pubescens (Willd.) O.W. Knight [C. calceolus L. var. pubescens (Willd.) Correll] (Yellow lady's-slipper orchid) Tmf-sparse
Cypridium regale Walter (Showy lady's-slipper orchid) photo-Tes-sparse
Galardia specabilis (L.) Raf. (Showy orchis) Tmf,wd,ed-frequent
Liparis liliifolia (L.) L.C. Rich. ex Lindley (Lily twayblade orchid) Tmf,wd,ed-in frequent
Liparis loeselii (L.) L.C. Rich. (Bog twayblade orchid) Tmf,wd,ed-frequent
Appendix A. Continued.

~Platanthera praelata~ Sheviak & Bowles (Western prairie fringed orchid) Herbs, 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;

Orce–sparse

POACEAE

*Agrostis cylindrica~ Host (Goat grass) Orw–sparse

*Agrostis gigantea~ (Redtop) T; P; W; O–common

Agrostis hiemalis~ (Walter) BSP. [A. hyemalis~ (Walter) BSP.]

(Ticklegrass) Pms–sparse

Agrostis perennans~ (Walter) Tuckerman (Upland bentgrass)

Tdf, mf–frequent

*Agrostis stolonifera~ L. [A. stolonifera~ L. var. pauteus~ (Hudson) Farw.] (Creeping bentgrass) Our–infrequent

Alopecurus aequalis~ Sobol. (Short awn foxtail) Wez,ss–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) Orce–sparse

Aristida oligantha~ Michx. (Prairie three-awned grass) Pdr–sparse

*Avena fatua~ L. (Wild oats) Orw–sparse

Bouteloua cartipendula~ (Michx.) Torrey (Side-oats grama) Pdr–frequent

Bouteloua hirsuta~ Lag. (Hairy grama) Pdr–sparse

Brechyla trisectum~ (Schreber) Beauv. (Bearded thrushusk)

Tdf, mf–common

*Bromus catharticus~ Vahl (Rescue grass) Orw–sparse

*Bromus commutatus~ Schrader (Hairy chess) Orw,rc–infrequent

*Bromus bordeacus~ L. subsp. bordeacus[ B. mollis~ L.] (Lop grass)

Our–sparse

*Bromus inermis~ Leysser (Smooth brome) T; P; W; O–common

*Bromus japonicus~ Thumb. ex Murray (Japanese brome) Ocr, rw–common

Bromus latilimus~ (Shear) A.S. Hitchc. (Hairy woodbrome)

Twf, es–infrequent

Bromus pubescens~ Muhl. ex Willd. (Canada brome) Tmf, wf–common

*Bromus tectorum~ L. (Cheat grass) Orw–sparse

*Bromus tectorum~ L. (Downy cheat) 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

Cimina arundinacea~ L. (Wood reed) Twf–common

*Dactylis glomerata~ L. (Orchard grass) T; O–common

Dantonia scaposa~ (L.) Beauv. ex. R. & S. (Poverty oat grass)

Tdf, wd–sparse

Diarrhena absidata~ (Gleason) Brandenburg [D. americana~ Beauv. var. absidata~ 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 oligosanthes~ (Schultes) Gould subsp. oligosanthes~ (Few-flowered panic grass) Pdr–infrequent

Dichanthelium oligosanthes~ (Schultes) Gould subsp. scribnerianum~ (Nash) Gould (Scribner’s panic grass) T; P; O–common

Dichanthelium villosum~ (Vasey) Freckmann[D. oligosanthes~ (Schultes)] Gould var. villosum~ (Vasey) Gould & Clark[Wilcox’s

panic grass] Pdr–sparse

*Digitaria ischaemum~ (Schreber ex Schweig) 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 crus-galli~ (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 montanum~ (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 bistrigos~ L. var. bistrigos~ [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~ L. var. trachycaulus~ (Link) Gould ex Shinnex (Bottlebrush) Twf–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 ciliaris~ (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 spectabilis~ (Michx.) Nees (Carolina lovegrass) Wrp;

O–common

Eragrostis pilosa~ (L.) Beauv. (India lovegrass) Wrp–sparse
Appendix A. Continued.

*Pleioblastus viviparus* (L.) Steudel (Purple lovegrass) Pdr, Orw–sparse

*Rhytidosperma villosum* (Thunb.) Kunth (Bermegrass) Ocr, rw,of–common

*Festuca rubra* L. (Red fescue) Wez; Our–common

Festuca subverticillata (Pers.) E.B. Alexeev [F. obtusa Bieblich] (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

Hierochloe odorata Beauv. (Hairy grass) Pms; Orw–infrequent

Hordeum jubatum (Squill-rain barley) O–common

~Hordeum pusillum Nutr. (Little barley) Orw–infrequent

Koeleria macrantha (L.) A. Love (Switchgrass) Pdr–sparse

~Koeleria paniculata (Lam.) A.S. Hitchc. (Eastern manna grass) Herb., 1891

Leersia virginica (Canary grass) Twf,es,ed

Leersia oryzoides (1.) Willd. (Porcupine grass) Tdf, mf–infrequent

*Lolium multiflorum* (L.) Beauv. (Foxtail millet) Pms–sparse

*Lolium perenne* L. (Annual rye grass) Wrp; Orw, cr–frequent

*Setaria viridis* Poir. (Green foxtail) Orw–infrequent

~Setaria italicata (L.) Beauv. (Foxtail millet) Pms–sparse

~Setaria viridissima (L.) Beauv. (Little blue stem) Wrp–frequent

*Setaria viridis* (L.) P. Beauv. var. major (Gaud.) Posp. (Giant green foxtail) Orw–infrequent

*Setaria viridissima* (L.) Beauv. (Green foxtail) Ocr, rw–common

~Sorghum bicolor (L.) Moench subsp. bicolore (S. biolor) (Moench) (Sorghum) Our–sparse

Sparganium eurypetalum (Michx.) Nash (Chinese tamarisk) Orw, cr–frequent

Sporobolus neglectus Nash (Puffehead dropseed) Pdr, Orw, rc–common

Sporobolus venosiimorus (Torrey) Gray (Sand dropseed) Orw, rc–inrequent

~Sporobolus heterolepis (Gray) Gray (Prairie dropseed) Pdr, ms–sparse

~Sporobolus neglectus Nash (Puffehead dropseed) Orc–infrequent

~Sporobolus venosiimorus (Torrey) Gray (Prairie dropseed) Orw, rc–inrequent

~Triticeum aestivum L. (Cultivated wheat) Orw–sparse

~Zizania palustris L. var. intermedia (Fiss.) Dore [Z. aquatica L.] (Interior wild rice) Wsz–sparse

**PONTEDERIACEAE**

Heteranthera dubia (Jacq.) Mac M (Water star-grass) Wcz, 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 frigidus Rupr. (Fries's pondweed) Herb., 1861

Potamogeton illinoensis Morong (Illinois pondweed) Wsz, md–inquent
Appendix A. Continued.

<table>
<thead>
<tr>
<th>Potamogeton nodosus</th>
<th>Poiret (Long-leaf pondweed) Wsz., md—infrequent</th>
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<tbody>
<tr>
<td>Potamogeton pectinatus L.</td>
<td>(Sago pondweed) Wsz.—frequent</td>
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<tr>
<td>Potamogeton pusillus L.</td>
<td>(Slender pondweed) Wsz.—frequent</td>
</tr>
<tr>
<td>Potamogeton zosteriformis Fern.</td>
<td>(Flat-stemmed pondweed) Wsz.—sparse</td>
</tr>
</tbody>
</table>

**SPARGANIACEAE**

| Sparganium chlorocarpum | Rydb. (Greenfruit bur-reed) Wsz.—sparse |

**TYPHACEAE**

<table>
<thead>
<tr>
<th>Typha angustifolia</th>
<th>L. (Narrow-leaved cattail) Pwt; W; Orw.—common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typha × glauca Godron (T. angustifolia × T. latifolia)</td>
<td>Pwt; W; Orw.—common</td>
</tr>
<tr>
<td>Typha latifolia</td>
<td>L. (Common cattail) Pwt; W; Orw.—common</td>
</tr>
</tbody>
</table>

**ANNICHELIAEACEAE**

| Zannichellia palustris | L. (Horned pondweed) Wsz.—sparse |

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**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 5271 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 pilosa
- Allaria petiolata, Boehmeria cylindrica, Campanula aparinae
- Carex sartwellii, Cheiropodium missouriensis, Cuscuta gronovii
- Desmanthus illinoensis, Glycyrrhiza grandis
- Lithyrhus palustris, Lilium michiganense
- Lysimachia thyrsiflora, Malabanthergia mexicana
- Nathurium strictum, Lysimachia thyrsiflora, Malabanthergia mexicana
- Pedicularis lanceolata, Phlox maculata, Polanisia dodecandra
- Pontederia cordata, Potamogeton pusillus
- Sagittaria rigida, Scutellaria galericulata
- Sium suave, Solidago virgaera, Utricularia vulgaris
- Zizia aestivalis 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

- Ammannia coccinea, Canaanulud aperinae, Carex frankii
- Carex interior, Cyripedium candidum, Desmanthus illinoensis, Dracophyllum parviflorum
- × Elrodium macounii, × Elrodium montanense
- Equisetum fluviatile, Eriophorum angustifolium, Lindernia anagallidea
- Liatris michiganense, Pedicularis lanceolata, Potamogeton nodosus
- Potamogeton pectinatus, Pygmythemum tenuissimus, Rastibida columnifera
- Rosa × radiulca, Salix petetii, 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. 350 ac (153.8 ha)

- Agrostis hyemalis, Asclepias purpurascens, Asplenium platyneuron
- Athyrium filix-femina var. angustum, Botrychium dissectum f. obliquum, Carex leavenworthii, Carex pensylvanica
- Carex stricta, Carex leavenworthii
- Carex pensylvanica, Eriophorum angustifolium, Eupatorium reginae, Cystopteris tenuis, Eriophorum angustifolium
- Festuca rubra, Galearis spectabilis, Gentianella quinquoilis
- Hypericum majus, Lithyrhus angustifolius, Lysimachia thyrsiflora
- Malabarthergia mexicana
- Pedicularis lanceolata, Polygala senega, Prunus pensteelica
- Rubus albatis, Spiranthus ovalis, Stellaria longifolia

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

- Ambrosia pilosochrys, Callirhoe palustris, Carex intica, Carex suberecta
- Juncus nodosus, Lemna trisula, Lyopus × siberiidi
- Potamogeton pectinatus, Sagittaria sp., Scutellaria galericulata
- Sium suave, Sparganium eurycarpum, Verbena × rydbergii

(5) Boone Forks Wildlife Area 2574 Tunnell Mill Road West Webster Township (T86N-R26W) Section 6 NW1/4 T; Wez.,sz; 70 ac (28.3 ha)

- Dicentra canadensis, Galeurus spectabilis, Lithyrhus ohyracum, Lobelia inflate, Lythrum salicaria

(6) Boone Forks Wildlife Area 14.6 ha

- Agalinis tenuifolia, Athyrium filix-femina var. angustum, Campanula aparinae, Carex aggregata, Carex interior, Carex leavenworthii, Carex pensylvanica
- Cassiopha thyrsiflora, Cypripedium parviflorum, Cypripedium reginae, Cyrtoperis tenuis, Eriophorum angustifolium, Eutrophiurn maculatum, Galearri quinquoilis
- Gentianella quinquoilis, Hypericum majus, Lithyrhus ohyracum, Lysimachia thyrsiflora
- Lilium michiganense, Lysimachia thyrsiflora, Pedicularis lanceolata, Polygala senega, Prunus pensteelica
- Rubus albatis, Spiranthus ovalis, Stellaria longifolia

(7) Boone Forks Wildlife Area 2574 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 aparinae, Carex aggregata, Carex interior, Carex leavenworthii, Carex pensylvanica
- Cassiopha thyrsiflora, Cypripedium parviflorum, Cypripedium reginae, Cyrtoperis tenuis, Eriophorum angustifolium, Eutrophiurn maculatum, Galearri quinquoilis
- Gentianella quinquoilis, Hypericum majus, Lithyrhus ohyracum, Lysimachia thyrsiflora
- Lilium michiganense, Lysimachia thyrsiflora, Pedicularis lanceolata, Polygala senega, Prunus pensteelica
- Rubus albatis, Spiranthus ovalis, Stellaria longifolia

(8) Boone Forks Wildlife Area 2574 Tunnell Mill Road West Webster Township (T87N-R26W) Section 20 T; Wrp; Approx. 70 ac (28.3 ha)

- Agastache scrophulariifolia, Arisaema dracontium, Asplenium platyneuron, Bist好吃 hirta, Botrychium dissectum f. obliquum, Botrychium dissectum f. obliquum
- Carex pensylvanica
- Carex stricta, Carex leavenworthii
- Carex pensylvanica, Cypripedium parviflorum, Cypripedium reginae, Cystopteris tenuis, Eriophorum angustifolium
- Festuca rubra, Galearis spectabilis, Gentianella quinquoilis
- Hypericum majus, Lithyrhus ohyracum, Lysimachia thyrsiflora
- Malabarthergia mexicana
- Pedicularis lanceolata, Polygala senega, Prunus pensteelica
- Rubus albatis, Spiranthus ovalis, Stellaria longifolia

(9) Boone Forks Wildlife Area 2574 Tunnell Mill Road West Webster Township (T87N-R26W) Section 30 T; Wrp; Approx. 350+ ac (121+ ha)

- Acta pachypoda, Acta rubra, Agalinis tenuifolia, Aralia nudicaulis, Aralia racemosa, Asplenium platyneuron, Botrychium dissectum f. obliquum, Carex aggregata, Carex bistochkiannia, Carex lapulina, Carex molesta, Carex leavenworthii, Carex pensylvanica
- Cypripedium parviflorum, Cypripedium reginae, Cystopteris tenuis, Eriophorum angustifolium
- Festuca rubra, Galearis spectabilis, Gentianella quinquoilis, Hypericum majus, Lactuca pensylvanica
- Malabarthergia mexicana
- Pedicularis lanceolata, Polygala senega, Prunus pensteelica
- Rubus albatis, Spiranthus ovalis, Stellaria longifolia

(10) Boone Forks Wildlife Area 2574 Tunnell Mill Road West Webster Township (T87N-R26W) Section 31 SW1/4 T; Orw; 10 ac (4 ha)
Elymus trachycaulus, Galaxias spectabilis, Lirishis lasellii, Lobelia inflata, Lythrum salicaria, Viscum lenoto
(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
Aversas calami, Aristida hastaria, Artemisia dracunculus, Astragalus crassicarpus, Carex stipata, Carephyllum thalictroides, Careolariza utendorhiza, Cynanchum pappos, Elymus nuttallii, Elymus riparius, Elymus virgatus, Erigeron spectabilis, Heteranthera dubia, Lilium michigiane, Lirishis lasellii, Lirishis lasellii, Muhlenbergia sylvatica, Oxalis violacea, Potamogoton cristas, Ptelea trifoliata, Ranunculas longirostris, Rubus idaeus var. irigusus, Rubii × neglectus
(12) Gordon's Marsh 1476 270th St. Freedom Township (T88N-R26W) Section 33 NW1/4-NE1/4 Pms,wt; Wee;sz; 283 ac (114.5 ha) reconstruction
Carex rankii, Elythorhdon marginatus, Elythorhdon montanumae, Gaioim mullago, Lactuta ludoviciana, Najas flexilis, Polygonum amphibium var. emersum, Polygonum amphibium var. sipulaceum, Potamogoton cristas, Ptelea trifoliata, Ranunculas longirostris, Rubus idaeus var. irigusus, Rubius × neglectus, Roelia humilis, Viola canadensis var. rugosa
(13) Kendall Young Western City Park 611 Kendall Young Road Cass Township (T89N-R23W) Section 35 NW1/4 T; Wsp; Our
Cardamine bulbosa, Cystopteris tenuiis, Ranunculas fisticarlis, Rubus idaeus var. irigusus, Woodia obtusa
(14) Little Wall Lake and Surrounding Area Ellsworth Township (T86N-R24W) Sections 9-10-15-16 Wee;sz; 275 ac (111.3 ha) lake; 61 ac (24.7 ha) Park
Amaranthus powellii, Amorpha canescens, Asclepias viridiflora, Ascer secreus, Caenius americanus var. paecilius, Carex castanea, Carex sartwellii, Cynanchum laeve, Elymus nuttallii, Heliconium automnale, Heteranthera dubia, Najas flexilis, Sagittaria calycina, Sagittaria latifolia, Salix lucida, Verbena × rydbergii, Zanichella palustris
(15) Railroad Rights-of-way (Abandoned) Hway 175 Wilson Ave. Lincoln Township (T87N-R23W) Section 29 SE1/4 Pms,wt; Approx. 20 ac (8 ha)
Ardisia eliganthi, Calamagrostis stricta subsp. inexpansa, Carex umbellata, Cicuta maculata, Dianthellium leibergii, Gentiana andrewsii, Gentiana puberulenta, Koeleria macrantha, Lilium michiganense, Muhlenbergia sylvatica, Oxalis violacea, Prenanthes magnicamporum, Symphoricarpos occidentalis, Vernonia baldwinii, Vernonio fuscata
(16) Railroad and 210th St. Rights-of-way Williams Township (T89N-R23W) Sections 28-29 Pms,wt; Approx. 30 ac (12 ha)
Asclepias sullivantii, Asclepias tuberosa ssp. interior, Ceanthus americanus var. paecilius, Carex castanea, Carex meadii, Crataegus crus-galli, Gentiana puberulenta, Koeleria macrantha, Lilium michiganense, Muhlenbergia sylvatica, Oxalis violacea, Prenanthes magnicamporum, Zanichella palustris
(17) Railroad and 212th St. Rights-of-way Blairsville Township (T89N-R24W) Section 36 Pms,wt; Approx. 30 ac (12 ha)
Asclepias sullivantii, Asclepias tuberosa ssp. interior, Ceanthus americanus var. paecilius, Carex castanea, Carex meadii, Crataegus crus-galli, Gentiana puberulenta, Koeleria macrantha, Lilium michiganense, Muhlenbergia sylvatica, Oxalis violacea, Prenanthes magnicamporum, Zygadenus 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, Lirishis aspera, Lirishis pycnostachya, Lilium michiganense, Phlox pilosa, Sphenosbolis obusatii, Sprentites magnicamporum
(19) Sketchley Webster City Park 891 E. Second St. Independence Township (T88N-R25W) Section 6 NE1/4-NE1/4 T; Orw
Asclepias glabra, Cogolotus viride, Phlox idaeus var. irigusus, Rubus × neglectus
(20) Stumbo (Ray-Vivian) Moraine Pasture Prairie 3990 Inkedpuda Ave. Clear Lake Township (T86N-R25W) Section 31 SW1/4 Pdr; Approx. 30 ac (12.1 ha)
Artemisia campetris, Aster oblongifolius, Baptisia bracteata var. glabrescens, Boarteloua bursata, Dianthellium ulicionarum, Draba reptans, Grindelia squarrosa, Liptophorum incisum, Mirabilis albida, Muhlenbergia cipidata, Pasplotium setaceum var. stramineum, Pulsatilla patens spss. multifida, Ranunculus rhomboides
(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)
Acorus camescens, Asclepias viridiflora, Ascer secreus, Caenius americanus var. paecilius, Carex castanea, Carex sartwellii, Cynanchum laeve, Elymus nuttallii, Heliconium automnale, Heteranthera dubia, Najas flexilis, Sagittaria calycina, Sagittaria latifolia, Salix lucida, Verbena × rydbergii, Zanichella palustris
(22) Homer Cemetery Prairie 1314 290th St. Webster Township (T87N-R26W) Section 8 NW1/4-NW1/4 Pdr,ms,wt; 2 ac (.8 ha)
Acorus camescens, Asclepias tuberosa ssp. interior, Caenius americanus var. paecilius, Carex castanea, Carex meadii, Cicuta maculata, Gentiana puberulenta, Koeleria macrantha, Lilium michiganense, Muhlenbergia sylvatica, Oxalis violacea, Prenanthes magnicamporum
(23) Liberty Center Cemetery Prairie 2449 Little Wall Lake Road (Hway 69) Liberty Township (T88N-R24W) Section 16 NE1/4-SE1/4 Pdr, 1 ac (.4 ha)
Coreopsis tripteris, Echinacea pallida, Gentiana puberulenta, Koeleria macrantha, Lilium michiganense, Muhlenbergia sylvatica, Salix humilis, Solidago missourianis, Sporobolus heterolepis
(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)
Apocony androsaemifolius, Asclepias viridiflora, Carex chamaea, Coreopsis tripteris, Echinacea pallida, Mirabilis albida, Pycnanthemum var. magirae, Roelia humilis, Trillium niveale
(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 esula, Euphorbia cyathophora, Gentiana puberulenta, Koeleria macrantha, Lilium michigiane, Liptophorum incisum, Mirabilis albida, Pycnanthemum var. magirae, Roelia humilis, Trillium niveale
(26) South Marion Cemetery and Prairie 3838 Fenton Ave. Marion Township (T86N-R26W) Section 27-28 Pms; Our, 2 ac (.8 ha)
Bidens polylepis, Buchloe dactyloides, Chamaerista fasciculata, Glycyrrhiza lepidota, Schedonardus paniculatus, Silphium integrifolium