VASCULAR PLANT SURVEY OF
PRIVATELY OWNED WETLANDS, PAVILION TOWNSHIP,
KALAMAZOO COUNTY, MICHIGAN

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ABSTRACT

Pavilion Township has extensive wetland areas that were not accessible for evaluation during the writing of two extensive floras of Kalamazoo County due to private ownership. Although not historically surveyed, these wetlands contain diverse habitats that contribute to the biodiversity and overall floristic quality of the township and the county. A vascular plant survey was completed for a 40 acre (16ha) tract of privately owned wetlands in the township. The survey was performed from April 2008 through September 2008. The resulting vascular plant list contains 292 species, representing 81 families and 180 genera. Of these taxa 80 percent are native, including one new county record. Wetland communities at the site include emergent marsh, seepage bog/fen with associated shrub swamp and tamarack swamp forest, and red maple swamp forest. The Floristic Quality Index for the area was 68, considerably above the state threshold of 50 for extremely rare communities.

KEY WORDS: Kalamazoo County, Michigan, Vascular Plant, Wetland

INTRODUCTION

Privately owned natural areas are often not surveyed during the compilation of regional floras. Even when surveys are conducted in these areas, landowners are at times hesitant to allow publication of exact location of rare species and rare community types. Pavilion Township in Kalamazoo County, Michigan, has several areas of unsurveyed wetlands that are only tangentially mentioned in the floras of the county (Hanes and Hanes 1947; McKenna 2004). This study documents the vascular plant flora of 40 acres of one contiguous, well-preserved, privately-owned wetland in the region. Repeated floristic inventories of relatively small tracts, less than 100 ha, over time are a useful way of documenting the effects of invasive species, high deer populations, and climate change on regional diversity and floristic quality (Judziewicz 2004). Plant survey information is also valuable for landowners who currently make management decisions in the township. It is hoped that this isolated wetland system will remain undisturbed and become an area for longitudinal study in the region. A floristic inventory, supported by dried herbarium specimens, and a description of floristic quality of the area is provided in this report. Results may be included in future floras of the county.
METHODS AND MATERIALS

Study Site

Kalamazoo County is halfway between Chicago, Illinois to the west and Detroit, Michigan to the east. Pavilion Township (T3S; R10W) is located in the east central portion of Kalamazoo County in southwest Michigan. The surface geology of Kalamazoo County is glacial in origin. The landforms today were largely formed during the Wisconsin glaciation. The last glaciers retreated from the region approximately 11,000 years ago. Pavilion Township lies on an outwash plain deposited by flowing meltwater (Passero et al. 1978). Kettle depressions are common in the outwash plain and the study site is within one such depression.

The Soil Survey of Kalamazoo County (Soil Conservation Service 1979) classifies the soils of most of this area as Houghton muck, which is common in areas where a high water table retards the breakdown of the organics. Along the edges of emergent marsh, soil cores taken by the author have shown that Houghton muck overlays gravel and Sleeth loam. Depth of the muck layer becomes deeper as the water table increases in height. Further into the marsh, 18-24 inches of peat overlays marl. The peat layer increases in thickness toward a bog/fen with associated shrub swamp and floating tamarack swamp forest. Local reports indicate a solid bottom to be approximately 12-20 feet below the floating tamarack swamp, but this has not been verified.

National Climatic Data Center normals (NCDC 2002) at Kalamazoo State Hospital show that mean monthly temperatures in the area range from −8°C (17°F) in January to 29°C (84°F) in July. The growing season varies from 145-155 days. Average precipitation is 95 cm (37.4 in), with higher precipitation during the growing season. Monthly average precipitation is highest in September, 10.4 cm (4.10 in), and lowest in February, 4.5 cm (1.76 in).

Plant communities in the study site, as described by McKenna (2004), include emergent marsh, a seepage bog/fen with associated shrub swamp and tamarack swamp forest, and red maple swamp forest wetland communities. Smaller areas of pasture and old field are also present in the study site. At the request of the landowners, the exact location of the tract is not described here.

A permanently inundated emergent marsh (Figure 1) is dominated by *Typha latifolia* and occurs where Houghton muck transitions to Sleeth loam. For several decades the higher, loamy areas have been used as pasture and cropland, leading to some eutrophication of the adjacent wetlands and in-
troduction of the pasture species *Dactylis glomerata*, *Phleum pratense*, *Trifolium hybridum*, and others. Shrub swamp (Figure 2) acts as an interface between emergent marsh and tamarack swamp forest. Typical species in the shrub swamp include *Cephalanthus occidentalis* and *Cornus* spp. The tamarack swamp (Figure 3), dominated by *Larix laricina* and *Toxicodendron vernix*, is difficult to access through the shrub swamp moat. A tamarack swamp forms a mosaic with the seepage bog/fen. Local concentrations of bog plants, including *Pogonia ophioglossoides*, *Sarracenia purpurea* (Figure 4), and *Vaccinium* spp. alternate with typical fen species, such as *Calopogon tuberosus* (Figure 5) and *Potentilla palustris*, on the *Sphagnum* and *Larix* mat. Seasonally flooded areas at the outer extent of these wetlands are dominated by red maple swamp forest (Figure 6) where Houghton muck transitions to Sebewa loam.

An archeological survey of the sections surrounding the wetlands found projectile points, flakes and biface fragments that indicate the area was used as hunting grounds by Archaic, Late Archaic/Early Woodland and Middle Woodland Native Americans (Cremin et al. 1984). In the last 50 years anthropogenic impacts have included selective cutting of trees, pasturing of cattle in some upland and marsh locations, and limited mowing and/or cultivation of the uplands (pers. comm. with land owner).

**Methods**

Vascular plants were collected from April 2008 to September 2008. In order to obtain as complete an inventory as possible, all plant community types were searched approximately every three weeks. Angiosperms, except for some trees, were collected in flower or with fruits. Gymnosperms were collected without cones, and pteridophytes and their allies were collected with sporangia when possible. Voucher specimens for all taxa listed below are being deposited in the Hanes Herbarium, Western Michigan University (WMU). Six of these specimens were collected June 2010 to supplement previous collections. Voucher specimens for *Toxicodendron radicans* and *T. vernix* are photos only. Nomenclature generally follows *Michigan Flora* vol. 1–3 (Voss 1972; 1985; 1996) for gymnosperms, monocots, and dicots and *Flora of North America* vol. 2 *Pteridophytes and Gymnosperms* (Flora of North America Editorial Committee 1993) for ferns and their allies. Additional references
used for identification of specimens include Crow and Hellquist (2000a, 2000b), Gleason and Cronquist (1991), and Holmgren (1998). Introduced species were determined according to Michigan’s floristic quality assessment (Michigan DNR 2001) and Michigan’s Special Plants (Michigan DNR 2009) was used to determine species which were threatened or of special concern in the state of Michigan.

The Floristic Quality Index (FQI) was calculated following the methods described by the Michigan Department of Natural Resources (2001). The procedure for calculating FQI is a standardized, repeatable method of determining the floristic quality of an area based on the native plants found at the site. A coefficient of conservatism (C) has been assigned to each species based on the probability that the species would be found in Michigan during pre-settlement times. The C values range from zero to ten, with zero being associated with the highest disturbance tolerance and least fidelity to pre-settlement vegetation. Plants with a C value of ten are being associated with the least disturbance tolerance and greatest fidelity to pre-settlement conditions. The mathematical formula for determining the FQI for a site is based on the C values for the plants at the site and the species richness at the site.


TABLE 1. Species with a Coefficient of Conservation Value 10

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Common Name</th>
<th>Location</th>
<th>Wetland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodwardia virginica (L.) Smith</td>
<td>Giant Chain Fern</td>
<td>Bog/fen/tamaracks</td>
<td>OBL</td>
</tr>
<tr>
<td>Carex chordorrhiza Ehrh. ex L. f.</td>
<td>Edge of bog</td>
<td></td>
<td>FACW+</td>
</tr>
<tr>
<td>Carex rostrata Stokes</td>
<td>Bog, emergent marsh</td>
<td></td>
<td>OBL</td>
</tr>
<tr>
<td>Pogonia ophioglossoides (L.) Ker-Gawl</td>
<td>Rose Pogonia</td>
<td>Bog/fen/tamaracks</td>
<td>OBL</td>
</tr>
<tr>
<td>Cardamine pratensis L.</td>
<td>Cuckoo-flower</td>
<td>Bog/fen/tamaracks</td>
<td>OBL</td>
</tr>
<tr>
<td>Sarracenia purpurea L.</td>
<td>Pitcher-plant</td>
<td>Bog/fen/tamaracks</td>
<td>OBL</td>
</tr>
<tr>
<td>Conopholis americana (L.) Wallr.</td>
<td>Squaw-root</td>
<td>Red maple swamp</td>
<td>UPL</td>
</tr>
<tr>
<td>Utricularia minor L.</td>
<td>Lesser Bladderwort</td>
<td>Marsh/bog/fen interface</td>
<td>OBL</td>
</tr>
</tbody>
</table>

RESULTS

The study area yielded a total of 292 species of vascular plants (Appendix 1). These species represented 81 families and 180 genera. The most species-rich families were Asteraceae (40), Rosaceae (25), Cyperaceae (24), Poaceae (16), and Fabaceae (12). Nine genera contained five or more species including: Carex (16); Salix (7); Polygonum (6), Aster, Galium, Rumex, Solidago, and Trifolium (5). Of the 292 species eight were pteridophytes, four were gymnosperms, 58 were monocots and 222 were dicots. One of the species, Carex chordorrhiza, is a new record for Kalamazoo County. About 20 percent of the species, 60 of the 292, were exotics while the rest were native species. The Asteraceae contained the greatest number of exotic species (12), with eight in Poaceae and seven in Fabaceae.

The FQI value, based on 232 native species, was 68. Eight species had a C value of 10, indicating that they are almost always restricted to a presettlement remnant (Table 1). Seven of the eight species were found in conjunction with seepage bog/fen ingrating with marsh and tamarack swamp and are considered obligate or facultative wetland species (Michigan DNR 2001). Only one of the species was an upland species, Conopholis americana found in red maple swamp forest.

DISCUSSION

In Michigan, most of the remaining undeveloped land has minimal significance from a natural quality perspective (Michigan DNR 2001). It is significant that a new county record can be found in a county as thoroughly studied as Kalamazoo County.

Small tracts of privately held lands with diverse habitats and plant communities are important to the preservation of Michigan’s native biodiversity. These tracts can be more isolated and less susceptible to introduced species than public lands. In the case of the studied tract, the tamarack swamp and bog/fen areas are rarely visited by humans or domesticated animals. In addition to being surrounded by agricultural land, the deep moat and tenuous structure of the mat dis-
courage visitors. Results from this study site show relatively low influx of introduced species with an FQI of 68. Areas that register above 50 on the FQI in Michigan are considered "extremely rare" (Michigan DNR 2001). However, the FQI does not incorporate evenness or abundance of species. Species that are most indicative of undisturbed habitats (high C values) are relegated to small patches within the overall matrix of the tract.

Repeated floristic inventories of privately owned, relatively small plots can be a useful way of documenting the effects of changing faunal populations, including increasing deer herbivory and turkey populations, invasive species, and climate change. It is hoped that the "extremely rare" conditions present at the study site persist and that the area will remain undisturbed.

ACKNOWLEDGEMENTS

We sincerely thank the landowners who permitted this survey and assisted in finding safe paths in and out of deep bog areas. We are also grateful to the trustees of the Hanes Fund for providing us with the funding.

LITERATURE CITED


APPENDIX 1. Vascular flora of privately owned wetlands, Pavilion Township, Kalamazoo County, Michigan.

The list of flora is arranged synoptically according to Voss (1972; 1985; 1996), and the sequence of taxa within families is alphabetical. Nomenclature, in general, follows Voss (1972; 1985; 1996) and Flora of North America (1993). In an effort to make the checklist more useful to the general public, vernacular names are given whenever possible, primarily following Voss (1972; 1985; 1996). Voucher numbers for C. Elizabeth Whately follow common name of species in parentheses.

PTERIDOPHYTES

LYCOPODIACEAE (Club-moss Family)
*Diphasiastrum digitatum* (Dilleniusex A. Braun) Holub; Southern Running-pine. (4)

EQUISETACEAE (Horsetail Family)
*Equisetum arvense* L.; Common Horsetail. (131)
*x litorale* Kuhlewein ex Ruprecht. (49)

DRYOPTERIDACEAE (Wood Fern Family)
*Dryopteris clintoniana* (D.C. Eaton) Dowell; Clinton’s wood fern. (132)

OSMUNDACEAE (Royal Fern Family)
*Osmunda cinnamomea* L.; Cinnamon Fern. (78)
*Osmunda regalis* L.; Royal Fern. (154)

THELYPTERIDACEAE (Marsh Fern Family)
*Thelypteris palustris* Schott; Marsh Fern. (271)

BLECHNACEAE
*Woodwardia virginica* (L.) Smith; Virginia Chain Fern. (224)

GYMNOSPERMS

PINACEAE (Pine Family)
*Larix laricina* (DuRoi) K. Koch; Tamarack. (143)
*Pinus sylvestris* L.; Scotch Pine. (5)
*Pseudotsuga menziesii* (Mirbel) Franco; Douglas-fir. (195)

CUPRESSACEAE (Cypress Family)
*Juniperus communis* L.; Common Juniper. (46)

MONOCOTS

TYPHACEAE (Cat-tail Family)
*Typha latifolia* L.; Common Cattail. (184)

SPARGANIACEAE (Bur-reed Family)
*Sparaganiaceum americanum* Nutt. (183)
*Sparganium chlorocarpum* Rydb.; European Bur-reed. (253)

ALISMATAEAE (Water-plantain Family)
*Alisma plantago-aquatica* L.; Water-plantain. (220)
*Sagittaria latifolia* Willd.; Arrowhead, Wapato. (225)

POACEAE (Grass Family)
*Agropyron repens* (L.) Beauv.; Quack Grass. (307)
*Agrostis perennis* (Walter) Tuckerman; Autumn Bent Grass. (136)
*Andropogon virginicus* L.; Broom-sedge. (297)
*Bromus commutatus* Schrader; Hairy Chess. (91)
*Bromus mollis* L.; Soft Chess. (107)
*Cinna arundinacea* L.; Wood Reedgrass. (294)
*Dactylis glomerata* L.; Orchard Grass. (100)
Glyceria striata (Lam.) Hitchc.; Fowl Manna Grass. (134)
Hystrich ponderosa Moench; Bottlebrush Grass. (243)
Panicum rigidulum Nees. (257)
Phalaris arundinacea L.; Reed Canary Grass. (140)
Phleum pratense L.; Timothy. (106)
Phragmites australis (Cav.) Steudel; Reed. (254)
Poa annua L.; Annual Bluegrass. (37)
Poa compressa L.; Canada Bluegrass. (166)
Poa pratensis L.; Kentucky Bluegrass. (95)

Cyperaceae (Sedge Family)
Carex amphibola Steudel. (175)
Carex bebbii (Bailey) Fern. (152)
Carex canescens L. (81)
Carex chordorrhiza Ehrh. ex L. f. (76)
Carex comosa Boot.; Bristly Sedge. (150)
Carex frankii Kunth. (182)
Carex lasiocarpa Ehrh. (82, 153)
Carex laxicarpa Lam. (41)
Carex pulicaria Willd. (114)
Carex muhlenbergii Willd. (51)
Carex rosea Willd. (135)
Carex rostrata Stokes. (80, 181)
Carex swanii (Fern.) Mack. (125)
Carex tribuloides Wahlenb.; Blunt Broom Sedge (231)
Carex trisperma Dewey. (70)
Carex vulpinoides Michx. (99)
Cyperus engelmannii Steudel.; Fragrant Flatsedge. (281)
Dulichium arundinaceum (L.) Brit.; Three-way Sedge. (228)
Eleocharis smallii Britton. (79)
Eriophorum virginicum L.; Tawny Cotton-grass. (230)
Eriophorum viridicarinatum (Engelm.) Fern. (229)
Scirpus atrovirens Willd. (167)
Scirpus cyperinus (L.) Kunth; Wool-grass. (284)
Scirpus validus Vahl; Softstem Bulrush. (187)

Araceae (Arum Family)
Arisaema triphyllum (L.) Schott; Jack-in-the-pulpit. (84)

Lemnaceae (Duckweed Family)
Lemma minor L.; Duckweed.

Pontederiaceae (Pickerel-weed Family)
Pontederia cordata L.; Pickerel-weed. (245)

Juncaceae (Rush Family)
Juncus canadensis J. Gay. (227)
Juncus dudleyi Wieg. (111)
Juncus effusus L.; Soft Rush. (113)
Juncus tenuis Willd.; Path Rush. (174)
Luzula multiflora (Retz.) Lej. (34, 57)

Liliaceae (Lily Family)
Allium vineale L.; Field Garlic. (120)

Iridaceae (Iris Family)
Iris virginica L.; Southern Blue Flag. (103)

Orchidaceae (Orchid Family)
Calopogon tuberosus (L.) Bsp.; Grass-pink. (149)
Cypripedium acaule Aiton; Moccasin Flower; Pink or Stemless Lady-slipper. (74)
Platanthera clavillata (Michx.) Luer; Green Woodland Orchid. (263)
Pogonia ophioglossoides (L.) Ker-Gawl; Rose Pogonia. (148)
Spiranthes cernua (L.) Richard; Nodding Ladies’-tresses. (283)
DICOTS

SALICACEAE (Willow Family)
- *Populus tremuloides* Michaux; Quaking Aspen. (2, 14)
- *Salix bebbiana* Sarg.; Long-beaked Willow. (28)
- *Salix discolor* Muhl.; Large Pussy Willow. (3, 9)
- *Salix eriocephala* Michaux. (1, 31)
- *Salix lucida* Muhl.; Shining Willow. (23)
- *Salix nigra* Marsh.; Black Willow. (270)
- *Salix petiolaris* Smith; Slender Willow. (25)
- *Salix sericea* Marsh.; Silky Willow. (11, 19)

JUGLANDACEAE (Walnut Family)
- *Carya glabra* (Miller) Sweet; Pignut Hickory. (310)
- *Carya ovata* (Miller) K. Koch; Shagbark Hickory. (191)

BETULACEAE
- *Betula pumila* L.; Swamp Birch. (29, 142)
- *Corylus americana* Walter; Hazelnut. (193)

FAGACEAE (Beech Family)
- *Quercus alba* L.; White Oak. (298)
- *Quercus palustris* Muenchh.; Pin Oak. (296)
- *Quercus rubra* L.; Red Oak. (205)
- *Quercus velutina* Lam.; Black Oak. (293)

ULMACEAE (Elm Family)
- *Ulmus americana* L.; American or White Elm. (202)

MORACEAE (Mulberry Family)
- *Morus alba* L.; Russian or White Mulberry. (194)

URTICACEAE (Nettle Family)
- *Boehmeria cylindrica* (L.) Sw.; Bog-hemp; False Nettle. (210)
- *Urtica dioica* L.; Stinging Nettle. (214)

POLYGONACEAE (Buckwheat Family)
- *Polygonum amphibium* L.; Water Smartweed. (250)
- *Polygonum hydropiperoides* Michx.; Mild Water-pepper. (165)
- *Polygonum pensylvanicum* L.; Pinkweed; Bidgeed Smartweed. (178, 222)
- *Polygonum persicaria* L.; Heart’s-ease; Lady’s-thumb. (256)
- *Polygonum sagittatum* L.; Tear-thumb. (232)
- *Polygonum virginianum* L.; Jumpseed. (255)
- *Rumex acetosella* L.; Sheep Sorrel. (32)
- *Rumex altissimus* Wood; Pale Dock. (116)
- *Rumex crispus* L.; Curly Dock. (251)
- *Rumex obtusifolius* L.; Bitter Dock. (213)
- *Rumex orbiculatus* A. Gray; Great Water Dock. (288)

PORTULACACEAE (Purslane Family)
- *Claytonia virginica* L.; Spring Beauty. (15)

CARYOPHYLLACEAE (Pink Family)
- *Cerastium fontanum* Baumg.; Mouse-ear Chickweed. (43)
- *Dianthus armeria* L.; Deptford Pink. (207)
- *Silene pratensis* (Rafn) Godron & Gren.; White Campion. (62)
- *Stellaria media* (L.) Vill.; Common Chickweed. (12)

CERATOPHYLLACEAE (Hornwort Family)
- *Ceratophyllum demersum* L.; Hornwort. (217)

NYMPHACEAE (Water-lily Family)
- *Nuphar advena* (Ait.) Ait. f.; Yellow Spatterdock. (221)

RANUNCULACEAE (Buttercup Family)
- *Actaea pachypoda* Ell.; White Baneberry; Doll’s-eyes. (200)
- *Anemone cylindrica* A. Gray; Thimbleweed. (203)
- *Anemone virginiana* L.; Thimbleweed. (164)
- *Anemonella thalictroides* (L.) Spach; Rue-anemone. (38)
- *Caltha palustris* L.; Marsh-marigold. (36)
Ranunculus abortivus L.; Small-flowered Buttercup. (16)
Ranunculus recurvatus Poiret; Hooked Crowfoot. (212)
Ranunculus sceleratus L.; Cursed Crowfoot. (186)

BERBERIDACEAE (Barberry Family)
Podophyllum peltatum L.; May-apple. (52)

LAURACEAE (Laurel Family)
Lindera benzoin (L.) Blume; Spicebush. (300)
Sassafras albidum (Nutt.) Nees; Sassafras. (123)

BRASSICACEAE (Mustard Family)
Arabidopsis thaliana (L.) Heynh.; Mouse-ear Cress. (13)
Barbaraea vulgaris R. Br.; Yellow Rocket. (10)
Cardamine bulbosa (Muhl.) BSP; Spring Cress. (42)
Cardamine pratensis L.; Cuckoo-flower. (73)
Lepidium campestre (L.) R. Br.; Field Peppergrass. (60)

SARRACENIACEAE (Pitcher-plant Family)
Sarracenia purpurea L.; Pitcher-plant. (144)

DROSERACEAE (Sundew Family)
Drosera rotundifolia L.; Round-leaved Sundew. (71)

SAXIFRAGACEAE (Saxifrage Family)
Penthorum sedoides L. (279)

GROSSULARIACEAE (Gooseberry Family)
Ribes cynosbati L.; Wild Gooseberry. (66)

ROSACEAE (Rose Family)
Agrimonia gryposepala Wallr.; Tall Agrimony. (211)
Agrimonia pubescens Wallr.; Soft Agrimony. (170)
Aronia prunifolia (Marsh.) Rehd.; Chokeberry. (70)
Crataegus pedicellata Sarg. (54)
Fragaria virginiana Miller; Wild Strawberry. (35)
Geum canadense Jacq.; White Avens. (133)
Geum vernum (Raf.) T. & G. (39)
Malus coronaria (L.) Miller; Wild, American, or Sweet Crab. (117, 309)
Malus pumila Miller; Apple. (22)
Potentilla norvegica L.; Rough Cinquefoil. (63)
Potentilla palustris (L.) Scop.; Marsh Cinquefoil. (141)
Potentilla recta L.; Rough-fruited Cinquefoil. (118)
Potentilla simplex Michaux; Common Cinquefoil. (89)
Prunus pensylvanica L. f.; Pin Cherry. (33)
Prunus serotina Ehrh.; Wild Black Cherry. (50)
Rosa carolina L.; Pasture Rose. (104)
Rosa multiflora Murray; Multiflora Rose. (158)
Rosa palustris Marsh.; Swamp Rose. (180)
Rubus allegheniensis Porter; Common Blackberry. (306)
Rubus flagellaris Willd.; Northern Dewberry. (67)
Rubus occidentalis L.; Black Raspberry. (97)
Rubus pensylvanicus Poiret. (98)
Sorbus aucuparia L.; European Mountain-ash. (204)
Spiraea alba DuRoi; Meadowsweet. (138)
Spiraea tomentosa L.; Steeplebush. (146, 241)

FABACEAE
Apios americana Medic.; Groundnut. (260)
Desmodium marilandicum (L.) DC.; Smooth Small-leaf Tick Trefoil. (238)
Desmodium paniculatum (L.) DC.; Paniced Tick Trefoil. (240)
Lathyrus palustris L.; Marsh Pea; Vetchling. (163)
Lespedeza intermedia (Watson) Britton. (242)
Lespedeza violacea (L.) Pers. (198)
Medicago lupulina L.; Black Medic. (92)
Trifolium campestre Schreber; Low Hop Clover. (105)
Trifolium dubium Sibth.; Little Hop Clover. (59)
Trifolium hybridum L.; Alsike Clover. (102)
Trifolium pratense L.; Red Clover. (93)
Trifolium repens L.; White Clover. (94)

OXALIDACEAE (Wood-sorrel Family)
Oxalis stricta L.; Wood-sorrel. (58)

GERANIACEAE (Geranium Family)
Geranium maculatum L.; Wild Geranium. (53)
Geranium robertianum L.; Herb Robert. (64)

POLYGALACEAE (Milkwort Family)
Polygala sanguinea L.; Purple Milkwort. (246)

EUPHORBIACEAE (Spurge Family)
Euphorbia corollata L.; Flowering Spurge. (124)

ANACARDIACEAE (Cashew Family)
Rhus typhina L.; Staghorn Sumac. (129)
Toxicodendron radicans (L.) Ktze.; Poison Ivy. (Photo Documentation)
Toxicodendron vernix (L.) Ktze.; Poison Sumac. (Photo Documentation)

AQUAFOLIACEAE (Holly Family)
Ilex verticillata (L.) Gray; Winterberry. (289)

ACERACEAE (Maple Family)
Acer rubrum L.; Red Maple. (7, 188)
Acer saccharinum L.; Silver Maple. (6, 206)
Acer saccharum Marsh; Sugar Maple. (308)

BALSAMINACEAE (Touch-me-not Family)
Impatiens capensis Meerb.; Spotted Touch-me-not. (169)

Rhamnaceae (Buckthorn Family)
Rhamnus frangula L.; Glossy Buckthorn. (126)

VITACEAE (Grape Family)
Parthenocissus quinquefolia (L.) Planchon; Virginia Creeper. (299)
Vitis riparia Michaux; River-bank Grape. (90)

CLUSIACEAE (St. John’s-wort Family)
Hypericum perforatum L.; Common St. John’s-wort. (110)
Hypericum punctatum Lam.; Spotted St. John’s-wort. (219)
Triadenum fraseri (Spach) Gleason; Marsh St. John’s-wort. (266)

VIOLACEAE (Violet Family)
Viola blanda Wild.; Sweet White Violet. (17)
Viola macloskeyi Lloyd; Smooth White Violet. (26)
Viola pubescens Aiton; Yellow Violet. (20)
Viola sororia Wild.; Common Blue Violet. (18)

ELAEAGNACEAE (Oleaster Family)
Elaeagnus umbellata Thunb.; Autumn-olive. (68)

LYTHRACEAE (Loosestrife Family)
Decodon verticillatus (L.) Ell.; Swamp Loosestrife. (272)
Lythrum salicaria L.; Purple Loosestrife. (197)

ONAGRACEAE (Evening-primrose Family)
Circaea lutetiana L.; Enchanter’s Nightshade. (122, 176)
Epilobium coloratum Biehler; Purple-leaved Willow-herb. (267)
Epilobium leptophyllum Raf.; Linear-leaved Willow-herb. (282)

HALORAGACEAE (Water-milfoil Family)
Proserpinaca palustris L.; Mermaid-weed.

APIACEAE (Carrot Family)
Cicuta bulbifera L.; Bulb-bearing Water-hemlock. (268)
Cicuta maculata L.; Water-hemlock. (216)
Cryptotaenia canadensis (L.) D.C.; Honewort. (83, 130)
Daucus carota L.; Queen-Anne’s-lace. (162)
Osmorhiza claytonii (Michaux) C.B. Clarke; Wooly Sweet Cicely. (56)
Sanicula gregaria Bickn.; Clustered Snakeroot. (86)
Sium suave Walt.; Water-parsnip. (233)

CORNACEAE (Dogwood Family)
Cornus amomum Miller; Pale Dogwood. (112)
Cornus stolonifera Michx.; Red-osier Dogwood. (65)

ERICACEAE (Heath Family)
Chamaedaphne calyculata (L.) Moench; Leatherleaf. (27)
Gaylussacia baccata (Wang.) K. Koch; Black Huckleberry. (155)
Vaccinium corymbosum L.; Highbush Blueberry. (30, 47)
Vaccinium macrocarpon Ait.; Cranberry. (145)

PRIMULACEAE (Primrose Family)
Lysimachia thyrsiflora L.; Tufted loosestrife. (156)

OLEACEAE (Olive Family)
Fraxinus americana L.; White Ash. (190)
Fraxinus pensylvanica Marshall; Green Ash.

GENTIANACEAE (Gentian Family)
Gentiana andrewsii Griseb.; Bottle Gentian. (304)

MENYANTHACEAE (Buckbean Family)
Menyanthes trifoliata L.; Bogbean; Buckbean. (24, 75)

APOCYNACEAE (Dogbane Family)
Apocynum cannabinum L.; Indian-hemp. (121)

ASCLEPIADACEAE (Milkweed Family)
Asclepias incarnata L.; Swamp Milkweed. (215)
Asclepias syriaca L.; Common Milkweed. (172)
Asclepias tuberosa L.; Butterfly-weed. (157)

CONVOLVULACEAE (Morning-glory Family)
Calystegia sepium (L.) R. Br.; Hedge Bindweed. (161)

VERBENACEAE (Vervain Family)
Phryma leptostachya L.; Lopsseed. (171)

LAMIACEAE (Mint Family)
Agastache nepetoides (L.) Kuntze; Giant Hyssop. (261)
Lycopus uniflorus Michx.; Bugleweed. (223)
Mentha arvensis L.; Wild Mint. (237)
Monarda fistulosa L.; Wild-bergamot. (201)
Prunella vulgaris L.; Self-heal. (168)
Scutellaria galericulata L.; Common Skullcap. (147)
Scutellaria lateriflora L.; Mad-dog Skullcap. (244)

SOLANACEAE (Nightshade Family)
Solanum carolinense L.; Horse-nettle. (189)
Solanum dulcamara L.; Nightshade. (127)

SCROPHULARIACEAE (Snapdragon Family)
Agalinus purpurea (L.) Pennell; Purple Gerardia. (262)
Chelone glabra; Turtlehead. (303)
Verbascum blattaria L.; Moth Mullien. (192)
Veronica officinalis L.; Common Speedwell. (87)
Veronica polita Fries. (45)

OROBANCHACEAE (Broom-rape Family)
Conopholis americana (L.) Wallr.; Squaw-root. (55)

LENTIBULARIACEAE (Bladderwort Family)
Utricularia minor L.; Lesser Bladderwort. (269)
Utricularia vulgaris L.; Common Bladderwort. (137, 177)

PLANTAGINACEAE (Plantain Family)
Plantago lanceolata L.; Narrow-leaved Plantain. (96)
Plantago major L.; Common Plantain. (199)
Plantago rugelii Decne.; Rugel’s Plantain. (185)

RUBIACEAE (Madder Family)
Cephalanthus occidentalis L.; Common Buttonbush. (179, 218)
Galium aparine L.; Goosegrass; Cleavers. (40)
Galium circaezans Michaux; Wild Licorice. (173)
Galium pilosum Aiton; Hairy Bedstraw. (128)
Galium tinctorium L. (139)
Galium trifidum L.; Small Bedstraw. (252)

CAPRIFOLIACEAE (Honeysuckle Family)
Loniceramorrowii A. Gray; Morrow Honeysuckle. (48)
Sambucus canadensis L.; Elderberry. (119)

CUCURBITACEAE (Gourd Family)
Echinocystis lobata (Michaux) T. & G.; Wild-cucumber. (301)

CAMPANULACEAE (Bellflower Family)
Campanula aparinoides Pursh; Marsh Bellflower. (226)
Lobelia cardinalis L.; Cardinal Flower. (278)
Lobelia siphilitica L.; Great Lobelia. (249)

ASTERACEAE (Aster Family)
Achillea millefolium L.; Yarrow. (115)
Ambrosia artemisiifolia L.; Common Ragweed. (258)
Anaphalis margaritacea (L.) Bentham; Pearly Everlasting. (280)
Antennaria howellii Greene. (61)
Antennaria parlinii Fernald; Parlin’s Pussytoes. (21)
Aster lateriflorus (L.) Britton; Calico Aster. (295)
Aster pilosus Willd. (290)
Aster punicus L.; Swamp Aster. (302)
Aster sagittifolius Willd.; Arrow-leaved Aster. (305)
Aster umbellatus Miller; Flat-topped Aster. (265)
Bidens cernua L.; Nodding Beggar-ticks. (285)
Bidens coronatus (L.) Britt.; Tickseed-sunflower. (286)
Centaura maculosa Lam.; Spotted Knapweed. (159)
Cichorium intybus L.; Chicory. (235)
Cirsium arvense (L.) Scop.; Field Thistle. (160)
Cirsium muticum Michx.; Swamp Thistle. (273)
Cirsium vulgare (Savi) Tenore; Bull Thistle. (292)
Coreopsis tripteris L.; Tall Tickseed. (264)
Crepis capillaris (L.) Wallr.; Smooth Hawk’s-beard. (208)
Crepis tectorum L. (109)
Erigeron philadelphicus L.; Common Fleabane. (85)
Eupatorium perfoliatum L.; Boneset. (248)
Eupatorium purpureum L.; Green-stemmed Joe-pye-weed. (236)
Euthamia graminifolia (L.) Nutt. ex Cass.; Narrow-leaved Goldenrod. (275)
Helianthus giganteus L.; Tall Sunflower. (247)
Hieracium aurantiacum L.; Orange Hawkweed. (88)
Hieracium caespitosum Dumort.; King Devil. (69)
Hieracium piloselloides Vill.; Yellow Hawkweed. (196)
Hieracium scabrum Michaux; Rough Hawkweed. (259)
Hypochaeris radicata L.; Cat’s-ear. (108)
Leucanthemum vulgare Lam.; Ox-eye Daisy. (101)
Senecio aureus L.; Golden Ragwort. (44)
Solidago altissima L.; Tall Goldenrod. (274)
Solidago canadensis L.; Canada Goldenrod. (277)
Solidago gigantea Aiton; Late Goldenrod. (276)
Solidago rugosa Miller; Rough-leaved Goldenrod. (239)
Solidago uliginosa Nutt.; Bog Goldenrod. (287)
Taraxacum officinale Wiggers; Common Dandelion. (8)
Tragopogon dubius Scop. (209)
Vernonia missurica Raf.; Ironweed. (234)