

Vascular Flora of Horseshoe Bottom Nature Preserve, Vermilion County, Illinois

Richard L. Larimore¹, Loy R. Phillippe¹, Scott D. Simon², and John E. Ebinger¹

¹Illinois Natural History Survey, 607 East Peabody Drive,
Champaign, Illinois 61820.

²The Nature Conservancy, 601 North University,
Little Rock, Arkansas 72205.

ABSTRACT

The vascular flora of Horseshoe Bottom Nature Preserve, Vermilion County, Illinois, was studied during the growing seasons of 1992-1998. A total of 463 taxa were found: eight fern-allies and ferns, one gymnosperm, 110 monocots, and 344 dicots. The families with the largest number of taxa included the Asteraceae with 66 taxa, the Poaceae with 50 taxa, and the Cyperaceae with 30 taxa, of which 23 were members of the genus *Carex*. A grass hybrid (*Elymus x ebingeri* G.C. Tucker) was listed in Illinois for the first time. Four forest communities (wet floodplain, swamp, mesic floodplain, mesic upland) were surveyed, and the density (stems/ha), basal area (m²/ha), importance value, and average diameter were determined for each overstory species. The wet floodplain forest was dominated by silver maple; the swamp by silver maple, green ash, and black ash; the mesic floodplain forest by white oak, black oak, slippery elm, bitternut hickory, and shagbark hickory; and the mesic upland forest, situated on steep south-facing and west-facing hillsides, was dominated by red oak, white oak, and sugar maple. A small glacial drift hill prairie, dominated by little bluestem, was located on a bluff in the preserve.

INTRODUCTION

Horseshoe Bottom Nature Preserve (HBNP) is located in central Vermilion County, east-central Illinois. The preserve is owned by the Vermilion County Conservation District and is part of Kennekuk Cove County Park, an area of 1,214 ha (3,000 acres). The park borders the north and south sides of the preserve with the east side bordered by privately owned agricultural land, mostly hay fields. The west side is bordered by the Middle Fork of the Vermilion River, which is a designated National Scenic River. The Middle Fork State Fish and Wildlife Area, located west of the river, encompasses 1,220 ha (3,015 acres) owned by the Illinois Department of Natural Resources. The HBNP is one of eight dedicated nature preserves in Vermilion County. No previous studies have been published on the vascular flora of these preserves.

HBNP is 40 ha (99 acres) in size, 21 ha (52 acres) dedicated as a nature preserve in 1979, the remainder being buffer. Though subjected to some disturbances, particularly cutting around the turn of the century and heavy grazing into the 1940s, HBNP has a relatively high diversity of plant and animal life. The present study was undertaken to document the vascular flora of the preserve, and to determine the composition and structure of the natural plant communities present.

MATERIALS AND METHODS

At various times throughout the growing seasons, from late 1993 through fall of 1998, field trips were made to HBNP. During each trip voucher specimens were collected, habitat data for each taxon determined, and the natural communities delineated. The material collected was identified and deposited in the herbarium of the Illinois Natural History Survey (ILLS), Champaign, Illinois. Criteria for designating native and non-native taxa followed Fernald (1950), Steyermark (1963), Mohlenbrock (1986), and Gleason and Cronquist (1991).

During the summer of 1996, a randomly located 0.5 ha section (50 m x 100 m) within each of the four forest communities (wet floodplain, swamp, mesic floodplain, mesic upland) was divided into eight quadrats 25 m on a side. In each quadrat all living woody individuals 10 cm dbh (diameter at breast height, 1.5 meter above the ground) and above were identified and their diameters recorded. From these data density (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value (IV), and average diameter (cm) were calculated for each species. Determination of the IV follows the procedure used by McIntosh (1957), and is the sum of the relative density and relative dominance of a given species. Density (stems/ha) of woody understory species was determined using 10 nested circular plots 0.0001, 0.001, and 0.01 ha in size, randomly located along line transects through the study areas. Four additional 0.0001 ha circular plots were located 6 m from each center along the cardinal compass directions. In 0.0001 ha plots tree seedlings (<50 cm tall) and all shrubs were counted, in 0.001 ha circular plots small saplings (>50 cm tall and <2.5 cm dbh) were counted, and in 0.01 ha circular plots large saplings (2.5-9.9 cm dbh) were counted. Nomenclature follows Mohlenbrock (1986) and/or Gleason and Cronquist (1991).

Ground layer species (species <1.5 m tall) of the small glacial drift hill prairie were analyzed using $1/4 m^2$ quadrats located at each meter mark along a north/south transect 20 m long. The cover of each species was determined using Daubenmire (1959) cover classes as modified by Bailey and Poulton (1968). From these data cover (%), relative cover, frequency (%), relative frequency, and importance value of each species were calculated.

DESCRIPTION OF THE STUDY AREA

HBNP is in the Vermilion River Section of the Wabash Border Division (Schwegman et al. 1973). Located on the Wisconsin Till Plain, HBNP is about 80 km north of the terminal moraine. This very level region, exposed by the retreating glacier, was dissected by rapid down cutting from the post-glacial river, leaving behind the entrenched Middle Fork of the Vermilion River. Presently, this section is characterized by rugged topography along major streams surrounded by relatively flat uplands. Presettlement vegetation

was mostly wet-mesic to dry forests in ravines and dissected uplands, with mesic prairie, savanna, and open woodlands on flat to gently rolling uplands.

This 40 ha preserve is situated 8 km south of Potomac, Illinois (SE 1/4 S36 T21N R13W, SW 1/4 S 31 T21N R12W). Elevation of HBNP is from 180 m above sea level at the river bed to nearly 200 m at its highest point. The climate of east-central Illinois is continental with cool winters, hot summers, and little or no water deficit in any season of the year (Page 1949, Fehrenbacher et al. 1967, Schwegman et al. 1973). In Danville, Illinois, 15 km to the southeast, average precipitation is 101.6 cm, with the month of May having the highest rainfall. Mean average temperature in Danville is 11.3°C with the hottest month being July (average of 24°C) and the coldest January (average of -3.8°C). The number of frost free days is 170 to 180.

RESULTS AND DISCUSSION

Vascular Plant Species Present

The flora of HBNP consisted of 463 species and subspecific taxa within 273 genera and 89 families. Of these taxa, 52 (11.2%) were not native to Illinois.

Fern-allies, ferns, and gymnosperms were poorly represented at HBNP, accounting for only 9 taxa (2% of all taxa) while angiosperms accounted for the remainder. Among the angiosperms, monocots accounted for 110 taxa in 52 genera and 12 families (24% of all taxa), while dicots accounted for 344 taxa in 214 genera and 73 families (74% of all taxa). Genera represented by the most taxa were *Carex* (23), *Solidago* (10), and *Aster* (8). Families with the most taxa were Asteraceae (66), Poaceae (50), Cyperaceae (30), Rosaceae (19), Brassicaceae (16), Lamiaceae (15), Fabaceae (14), Scrophulariaceae (13), and Apiaceae (13). A grass hybrid (*Elymus x ebingeri* G.C. Tucker) was listed in Illinois for the first time. This hybrid was first described in 1996 (Tucker 1996). For a complete list of taxa see Appendix 1.

Habitat Types Present

Natural plant communities were designated primarily using the community classification of White and Madany (1978). Most of these communities have been influenced by various disturbances such as occasional flooding, past management practices, fire suppression, grazing, and wildlife activity, particularly browsing by white-tailed deer (*Odocoileus virginianus*). Below is a description of each forest community surveyed at HBNP. In addition to the communities discussed, a disturbed upland forest, 0.3 ha in size, was located at the northwest corner of the preserve; a swamp white oak flatwoods, about 0.8 ha in size, occurred in part of a meander scar; a perennial stream ran along the west side of the preserve; and a few successional fields, totaling about 15.6 ha, were also present (Figure 1).

Wet Floodplain Forest. Characterized by frequent flooding during the growing season, this 2.5 ha community had a low diversity of woody and herbaceous species. The over-story contained 10 tree species with a density of 288 stems/ha, and basal area of 32.38 m²/ha (Table 1). Silver maple (*Acer saccharinum*) dominated, was common in all diameter classes, had an average diameter of 39.5 cm, and an IV of 112. Box elder (*Acer negundo*), mostly restricted to the small diameter class, had an average diameter of 17.5

cm and ranked second with an IV of 26.9. Sycamore (*Platanus occidentalis*), with an average diameter of 57.1 cm, ranked third in IV with most individuals in the 50+ diameter class. Few woody understory trees and shrubs occurred in the very open understory, although the vines poison ivy (*Toxicodendron radicans*) and trumpet creeper (*Campsis radicans*) were common. Tree seedlings and small saplings were not encountered in the sample plots. Large saplings had a density of 140 stems/ha with box elder and hackberry (*Celtis occidentalis*) the most common.

Swamp. This 1.2 ha community was located in part of an old meander scar on the terrace. The overstory contained 15 tree species with a density of 490 stems/ha and basal area of 38.67 m²/ha (Table 1). Silver maple was common in all diameter classes, had an average diameter of 27.8 cm, and was the leading dominant with an IV of 68.5. Green ash (*Fraxinus pennsylvanica*) and black ash (*F. nigra*) ranked second and third with IV's of 48.6 and 41.8, respectively. Both were common in the smaller diameter classes, most individuals being less than 50 cm dbh. Swamp white oak (*Quercus bicolor*) and sycamore were relatively common species in the larger diameter classes, while American elm (*Ulmus americana*) was fairly common in the 10-29 cm diameter class. Woody seedlings had a density of 2,800 stems/ha, with green ash, silver maple and American elm common. The small sapling layer was dominated by green ash with a density of 600 stems/ha, while large saplings had a density of 192 stems/ha, with silver maple and ash species the most common. Buttonbush (*Cephalanthus occidentalis*) dominated the shrub zone.

Mesic Floodplain Forest. This 12.7 ha community occurred on the terrace about 5 m above the wet floodplain forest; rarely flooding during the growing season. The overstory contained 17 tree species with a density of 288 stems/ha and basal area of 26.48 m²/ha (Table 1). White oak (*Quercus alba*), with an IV of 56.4, and black oak (*Q. velutina*), with an IV of 36.6, dominated the larger diameter class, both with average diameters of 47 cm. Slippery elm (*Ulmus rubra*), with an IV of 32.7, dominated the 10-29 cm diameter class. Together bitternut hickory (*Carya cordiformis*) and shagbark hickory (*C. ovata*) exceeded the IV of slippery elm and ranked fourth and fifth respectively. Woody seedlings had a density of 11,000 stems/ha; green ash and bitternut hickory accounted for 60% of the total. The shrub layer was dominated by Missouri gooseberry (*Ribes missouriense*), probably an indication of past grazing (Steyermark, 1963). Small saplings had a density of 1,300 stems/ha, large saplings had a density of 1,190 stems/ha, with elms and green ash the dominant taxa.

Mesic Upland Forest. This 7.3 ha community was located on steep, south-facing and west-facing hillsides. On the west-facing hillside the overstory contained 16 tree species with a density of 382 stems/ha and basal area of 35.29 m²/ha (Table 1). Red oak (*Quercus rubra*) dominated the larger diameter classes, had an average diameter of 47.8 cm, and was the leading dominant with an IV of 71.1. Sugar maple (*Acer saccharum*) dominated the smallest diameter class (10-29 cm) with a density of 138 stems/ha, had an average diameter of 17.6, and ranked second with an IV of 56.9. Sugar maple also dominated the seedling (5,200 stems/ha) and sapling (1,300 stems/ha) layers. The only other common overstory species was white oak with an IV of 36.8. In addition to sugar maple, seedlings of green ash, American elm, and black cherry (*Prunus serotina*) were common.

Glacial Drift Hill Prairie. Located on a bluff overlooking the Middle Fork of the Vermilion River, most of the hill prairie has been lost due to undercutting and subsequent slumping of the bluff face. The prairie covered an area of about 100 m². Woody encroachment had occurred with hop hornbeam (*Ostrya virginiana*) and black haw (*Viburnum prunifolium*) the common species. Herbaceous species were similar to those encountered at Windfall Prairie, located just a few km to the south, and to other glacial drift hill prairies found in east-central Illinois (Ebinger 1981).

Species diversity was low, only 39 species were recorded in the plots. Of these, two were naturalized (*Poa compressa* and *Melilotus alba*) while 10 were woody taxa encroaching the prairie (Table 2). Little bluestem (*Schizachyrium scoparium*) was the dominant species present. Two additional graminoid taxa, Pennsylvania sedge (*Carex pensylvanica*) and side-oats grama (*Bouteloua curtipendula*) were common. Prominent forbs included woodland sunflower (*Helianthus divaricatus*) and elm-leaved goldenrod (*Solidago ulmi-folia*), both open woodland species, along with prairie forbs partridge pea (*Cassia fasciculata*), hairy meadow parsnip (*Thaspium barbinode*), prairie-dock (*Silphium terebinthinaceum*), and rigid goldenrod (*Solidago rigida*).

The communities at HBNP had been subjected to extensive cutting and grazing before the area was dedicated as a nature preserve. The forests contained numerous small diameter trees with occasional large, open-grown trees with low branches and branch scars. This forest structure indicated a more open woodland during the first half of this century when cutting and grazing probably occurred. At the time of this survey, the forests were recovering and a stratified structure was developing with many trees entering the canopy. Also, the mesic upland forest was becoming dominated by sugar maple, which will increase in importance as the oaks die (Ebinger 1986, Ebinger and McClain 1991). Current management activities involve the control of exotic species and encroaching native species as well as the planting of oak acorns into successional fields.

ACKNOWLEDGMENT

The authors would like to thank Dr. Almut Jones, University of Illinois, Urbana, for help in the identification of members of the genus *Aster*.

LITERATURE CITED

- Bailey, A.W. and C.E. Poulton. 1968. Plant communities and environmental relationships in a portion of the Tillamook burn, northwestern Oregon. *Ecology* 49:1-13.
- Daubenmire, R. 1959. A canopy coverage method of vegetation analysis. *Northwest Science* 33:43-64.
- Ebinger, J.E. 1981. Vegetation of glacial drift hill prairies in East-Central Illinois. *Castanea* 46:115-121.
- Ebinger, J.E. 1986. Sugar maple, a management problem in Illinois forests? *Transactions of the Illinois State Academy of Science* 79(1 & 2):25-30.
- Ebinger, J.E. and W.E. McClain. 1991. Forest succession in the prairie peninsula of Illinois. *Illinois Natural History Survey Bulletin* 34:375-381.
- Fehrenbacher, J.B., G.O. Walker, and H.L. Wascher. 1967. Soils of Illinois. University of Illinois Agriculture Experiment Station Bulletin 725:1-47.
- Fernald, M.L. 1950. *Gray's manual of botany*, 8th ed. American Book Company, New York. lxiv+1,632 pages.
- Gleason, H.A. and A. Cronquist. 1991. *Manual of the vascular flora of northeastern United States and adjacent Canada*. 2nd ed. The New York Botanical Garden, Bronx. lxxv+910 pages.
- McIntosh, R.P. 1957. The York Woods. A case history of forest succession in southern Wisconsin. *Ecology* 38:29-37.
- Mohlenbrock, R.H. 1986. *Guide to the vascular flora of Illinois*. Southern Illinois University Press, Carbondale, Illinois. viii+507 pages.
- Page J.L. 1949. *Climate of Illinois*. University of Illinois Agriculture Experiment Station Bulletin 39:93-364.
- Schwegman, J.E., M. Hutchison, G. Paulson, G.B. Fell, W.M. Shepherd, and J. White. 1973. Comprehensive plan for the Illinois nature preserves system. Part 2. The natural divisions of Illinois. Illinois Nature Preserves Commission, Rockford. 32 pages + map.
- Steyermark, J.A. 1963. *Flora of Missouri*. Iowa State University Press, Ames. lxxxiii+1728 pages.
- Tucker, G.C. 1996. The genera of Poöideae (Gramineae) in the southeastern United States. *Harvard Papers in Botany*. 9: 11-90.
- White, J. and M.H. Madany. 1978. Classification of natural communities in Illinois. pages 310-505. in J. White (editor), *Illinois natural areas inventory*. Technical report. Illinois Natural Areas Inventory, Urbana, Ill.

APPENDIX 1

Vascular Plants of Horseshoe Bottom Nature Preserve, Vermilion County, Illinois

Natural plant communities:

- | | |
|--------------------------------------|-------------------------------|
| 1. Dry upland forest | 6. Glacial drift hill-prairie |
| 2. Mesic upland forest | 7. Seep and swamp forest |
| 3. Mesic floodplain forest (terrace) | 8. Swamp White Oak flatwoods |
| 4. Wet floodplain forest | 9. Successional field |
| 5. Perennial stream | |

Collections and identification were conducted 1992-1998.

The vascular taxa encountered and collected at Horseshoe Bottom Nature Preserve are listed in the following pages. All species are arranged into their appropriate divisions which include: Sphenophyta, Pteridophyta, Coniferophyta, and Anthophyta which are divided into Monocotyledoneae and Dicotyledoneae. We have arranged the families, genera, and species alphabetically within each group. Non-native taxa are indicated by an asterisk (*). After the binomial and the authority, the collecting numbers preceded by the initial of the collectors last name (P for Phillippe, E for Ebinger or S for Simon) are given. The number of the community where the voucher specimen for the taxon was collected is given next, and then the numbers of the other communities where it was found.

SPHENOPHYTA

EQUISETACEAE - HORSETAIL FAMILY

- Equisetum arvense* L., Common Horsetail: S458, S510; 9
Equisetum hyemale L. var. *affine* (Engelm.) A.A.Eaton, Scouring Rush: S511; 9, 5

PTERIDOPHYTA

ASPLENIACEAE - SPLEENWORT FAMILY

- Asplenium platyneuron* (L.) Oakes, Ebony Spleenwort: S362, S476, S693; 6, 1, 9
Athyrium angustum (Willd.) Presl, Lady Fern: S446; 3
Cystopteris protrusa (Weatherby) Blasd., Fragile Fern: S302, S450, S538; 2, 3, 8
Onoclea sensibilis L., Sensitive Fern: S634; 3, 7

OPHIOGLOSSACEAE - ADDER'S-TONGUE FAMILY

- Botrychium dissectum* Spreng. var. *obliquum* (Muhl.) Clute, Grape Fern: S701; 9, 3
Botrychium virginianum (L.) Sw., Rattlesnake Fern: S244; 2, 3

CONIFEROPHYTA

CUPRESSACEAE - CYPRESS FAMILY

- Juniperus virginiana* L., Red Cedar: S639; 6, 1, 9

ANTHOPHYTA

MONOCOTYLEDONAE

ALISMACEAE - WATER PLANTAIN FAMILY

Alisma plantago-aquatica L., Water Plantain: S530; 7

ARACEAE - ARUM FAMILY

Arisaema dracontium (L.) Schott, Green Dragon: S323; 4, 3

Arisaema triphyllum (L.) Schott, Jack-in-the-Pulpit: P19831; 2, 3

CYPERACEAE - SEDGE FAMILY

Carex annectens Bickn.: S261, S376; 9

Carex blanda Dewey: S225, S227, S258, S265, S332; 2, 1, 3, 6, 9,

Carex cephalophora Willd.: S229, S279, S334, S335, S394; 2, 1, 9

Carex frankii Kunth: S381, S755; 5, 9

Carex glaucoidea Tuckerm.: S284; 8, 1, 9,

Carex granularis Willd.: S342; 9, 3

Carex grayi Carey: S252, S354; 4, 7, 9,

Carex hirsutella Mack.: S238, S260, S271, S281, S333, S374-B; 1, 2, 6, 9

Carex hystricina Willd.: S351; 7, 8

Carex jamesii Schwein.: S226, S311; 2

Carex lacustris Willd.: S232, S343; 8, 7

Carex lupulina Willd.: S344; 8, 7

Carex molesta Mack.: S254, S276, S345, S361, S412; 4, 8, 9

Carex muskingumensis Schwein.: S340, S352, P29858; 7, 4, 8,

Carex oligocarpa Willd.: S224, S228, S239, S280, S368, S379; 1, 2, 3, 6, 9

Carex pennsylvanica Lam.: S212; 1, 2, 3, 6

Carex radiata (Wahl.) Sm.: S243, S348; 2, 7

Carex rosea Willd.: S213; 2, 1, 3, 7

Carex shortiana Dewey: S233, S259, S403, S414; 8, 9

Carex sparganioides Willd.: S230, S231, S313; 2, 3

Carex sprengelii Dewey: S358; 4, 9

Carex squarrosa L.: S341; 8, 7

Carex stipata Muhl.: P29611; 7

Cyperus acuminatus Torr. & Hook.: P29865; 9

Cyperus lupulinus (Spreng.) Marcks: S360; 9

Cyperus odoratus L.: S736; 5

Eleocharis obtusa (Willd.) Schult., Spike Rush: S405; 9, 5

Eleocharis verrucosa (Svens.) Harms., Spike Rush: S267, S406, S407; 9

Scirpus americanus Pers.: P29875; 4

Scirpus cyperinus (L.) Kunth: E27704; 9

COMMELINACEAE - SPIDERWORT FAMILY

Tradescantia subaspera Ker., Spiderwort: S306, S452; 3

Tradescantia virginiana L., Spiderwort: S219; 2, 1

DIOSCOREACEAE - WILD YAM FAMILY

Dioscorea villosa L., Wild Yam: S457, S659; 7, 3

IRIDACEAE - IRIS FAMILY

**Belamcanda chinensis* (L.) DC., Blackberry Lily: S475; 6

**Iris x germanica* L., Bearded Iris: S262, S531; 9

Iris shrevei Small, Wild Blue Iris: S531; 7

Sisyrinchium angustifolium Mill., Blue-eyed Grass: S380; 9

JUNCACEAE - RUSH FAMILY

- Juncus brachycarpus* Engel.: S391, S709; 9
Juncus dudleyi Weig.: S356; 9
Juncus interior Weig.: S369; 9

LEMNACEAE - DUCKWEED FAMILY

- Lemna minor* L., Duckweed: S763; 7

LILIACEAE - LILY FAMILY

- Allium canadense* L., Wild Onion: S304; 2, 3, 9
Allium tricoccum Ait., Wild Leek: S242, P29614; 2, 3
Erythronium albidum Nutt., White Dog-tooth Violet: P19836; 2, 3
 **Hemerocallis fulva* (L.) L., Orange Day Lily: P29845; 3
Hypoxis hirsuta (L.) Coville, Yellow Star Grass: S237; 2, 1, 6
Polygonatum biflorum (Walt.) Ell., Small Solomon's Seal: S253; 4
Smilacina racemosa (L.) Desf., False Solomon's Seal: P29616; 3, 2
Smilacina stellata (L.) Desf., Small False Solomon's Seal: P29623; 4
Trillium recurvatum Beck, Red Trillium: P19824; 2, 3
Uvularia grandiflora Sm., Yellow Bellwort: P19828; 2, 3

ORCHIDACEAE - ORCHID FAMILY

- Aplectrum hyemale* (Willd.) Nutt., Putty-root Orchid: E27701; 3
Corallorhiza odontorhiza (Willd.) Nutt., Fall Coral-root Orchid: S757; 9, 2
Galearis spectabilis (L.) Raf., Showy Orchis: P29843; 3

POACEAE - GRASS FAMILY

- **Agrostis alba* L., Red Top: S480, S504; 6, 9
Agrostis hyemalis (Walt.) BSP., Tickle Grass: S404; 9
Agrostis perennans (Walt.) Tuckerm., Upland Bent Grass: S610, S660, S662; 7, 1, 9
Alopecurus aequalis Sobol., Foxtail: P29612; 7
Bouteloua curtipendula (Michx.) Torr., Sideoats Grama: S465; 6
Brachelytrum erectum (Schreb.) Beauv.: S346, S434; 2, 8
 **Bromus commutatus* Schrad., Hairy Chess: S273, S387; 9
 **Bromus inermis* Leyss., Awnless Brome Grass: S413; 9
Bromus pubescens Muhl., Canada Brome Grass: S310, S433; 2, 1, 6
Bromus purgans L., Brome Grass: S562; 4
Chasmanthium latifolium (Michx.) Yates, Sea Oats: S603; 9, 2, 3
Cinna arundinacea L., Stout Wood Reed: S541; 2, 1, 7, 8
 **Dactylis glomerata* L., Orchard Grass: S269; 9
Danthonia spicata (L.) Roem. & Schultes, Curly Oat Grass: S319; 2, 1, 6
Diarrhena americana Beauv. var. *obovata* Gl.: S420, S565; 3, 7
 **Digitaria ischaemum* (Schreb.) Muhl., Smooth Crab Grass: S716; 9
 **Echinochloa crus-galli* (L.) Beauv., Barnyard Grass: S591; 9, 5
Elymus canadensis L., Nodding Wild Rye: S600, S649; 6
Elymus x ebingeri G.C. Tucker, Ebinger's Wild Rye: E27702; 7
Elymus hystrix L., Bottlebrush Grass: S315; 2, 1, 3
Elymus villosus Muhl.: S329; 4, 1, 2, 3, 8
Elymus virginicus L., Virginia Wild Rye: S324, S498; 4, 3, 7, 8, 9
 **Festuca pratensis* Huds., Meadow Fescue: S365; 9
Festuca obtusa Biehler, Nodding Fescue: S307, S390; 2, 3, 9
Glyceria striata (Lam.) Hitchcock, Fowl Manna Grass: E27703; 7
Leersia lenticularis Michx., Catchfly Grass: S557; 8
Leersia virginica Willd., White Grass: S425, S468, S558; 6, 2, 3, 4, 7, 8
Muhlenbergia bushii Pohl, Muhly: S561; 5
Muhlenbergia frondosa (Poir.) Fern., Muhly: S731, S754; 5
Muhlenbergia schreberi J.F. Gmel., Nimble Will: S700; 9
Muhlenbergia sobolifera (Muhl.) Trin., Muhly: S546; 2, 1

Muhlenbergia sylvatica (Torr.) Torr., Muhly: S661; 4
Panicum clandestinum L., Deer-tongue Grass: S400, S611; 9, 3
Panicum dichotomiflorum Michx., Fall Panicum: S717; 9
Panicum lanuginosum Ell. var. *fasciculatum* (Torr.) Fern.: S336, S375, S506; 2, 1, 6, 9
Panicum latifolium L., Broad-leaved Panic Grass: S312; 9, 3
Panicum virgatum L., Switch Grass: P29872; 5, 6
Phalaris arundinacea L., Reed Canary Grass: S747; 5
 **Phleum pratense* L., Timothy: S371; 9
Poa chapmaniana Scribn., Annual Bluegrass: P19855; 9
 **Poa compressa* L., Canadian Bluegrass: S308, S318; 2, 1, 6, 9
 **Poa sylvensis* L., Kentucky Bluegrass: S268, S367, S393, S415; 9, 6
Poa sylvestris A. Gray, Woodland Bluegrass: S216; 2, 3
Schizachyrium scoparium (Michx.) Nash, Little Bluestem: S602, S718; 6, 1, 9
 **Setaria faberii* Herrm., Giant Foxtail: S712; 9
 **Setaria glauca* (L.) Beauv., Yellow Foxtail: S623, S711; 9
Sorghastrum nutans (L.) Nash, Indian Grass: S647; 6, 9
Sphenopholis obtusata (Michx.) Scribn. var. *major* (Torr.) Erdman: S240, S305; 1, 2, 6,
Tridens flavus (L.) Hitchcock, Purple Top: S612; 9
Vulpia octoflora (Walt.) Rydb., Six-weeks Fescue: S235, S357; 6, 9

SMILACACEAE - SMILAX FAMILY

Smilax ecirrhata Kunth, Carrion Flower: P29617; 3
Smilax hispida Muhl., Bristly Catbrier: S567; 2, 1, 3, 4, 6, 7, 8
Smilax lasioneuron Hook., Carrion Flower: S519; 9, 3

DICOTYLEDONAE

ACANTHACEAE - ACANTHUS FAMILY

Ruellia humilis Nutt., Wild Petunia: S477, S630; 6, 9
Ruellia strepens L., Smooth Ruellia: S322; 4, 3

ACERACEAE - MAPLE FAMILY

Acer negundo L. Box Elder: S325, S730; 4, 9
Acer saccharinum L., Silver Maple: S759; 4, 7, 8
Acer saccharum Marsh., Sugar Maple: S721; 1, 2, 5, 6, 9

AMARANTHACEAE - PIGWEED FAMILY

Amaranthus rudis Sauer, Water Hemp: S741; 5

ANACARDIACEAE - CASHEW FAMILY

Rhus glabra L., Smooth Sumac: S377; 9
Toxicodendron radicans (L.) Kuntze, Poison Ivy: S615; 1, 2, 3, 4, 6, 7, 8, 9

ANNONACEAE - CUSTARD FAMILY

Asimina triloba (L.) Dunal, Pawpaw: S637; 3

APIACEAE - CARROT FAMILY

Chaerophyllum procumbens (L.) Crantz, Wild Chervil: S211, P19846; 2, 3
Cryptotaenia canadensis (L.) DC., Honewort: S655; 4, 2, 3, 7, 8
 **Daucus carota* L., Wild Carrot, Queen-Anne's-Lace: S494, S599; 2, 9
Erigenia bulbosa (Michx.) Nutt., Harbinger-of-Spring: P19815; 3
Heraclium lanatum Michx., Cow Parsnip: S255; 3
Osmorhiza claytonii (Michx.) Clarke, Sweet Cicely: S218; 2, 3
Osmorhiza longistylis (Torr.) DC.: S217; 2, 3
Oxypolis rigidior (L.) Raf., Cowbane: P29844; 7
Sanicula canadensis L., Canadian Black Snakeroot: S397; 9, 1, 2, 3
Sanicula gregaria Bickn., Common Snakeroot: S221; 2, 3, 7

Sium suave Walt., Water Parsnip: S436; 8, 7
Taenidia integerrima (L.) Drude, Yellow Pimpernel: S236; 1, 6
Thaspium barbinode (Michx.) Nutt., Hairy Meadow Parsnip: S256, S373; 9, 6

APOCYNACEAE - DOGBANE FAMILY

Apocynum cannabinum L., Dogbane: P29876; 9

ARALIACEAE - ARALIA FAMILY

Panax quinquefolius L., Ginseng: S435; 2, 3

ARISTOLOCHACEAE - BIRTHWORT FAMILY

Aristolochia serpentaria L., Virginia Snakeroot: S245; 2, 3
Asarum canadense L. var. *reflexum* (Bickn.) Robins., Wild Ginger: P19829; 3, 2

ASCLEPIADACEAE - MILKWEED FAMILY

Asclepias incarnata L., Swamp Milkweed: P29873; 5
Asclepias syriaca L., Common Milkweed: S390, S492; 9
Asclepias verticillata L., Horsetail Milkweed: S643; 6, 9

ASTERACEAE - SUNFLOWER FAMILY

**Achillea millefolium* L., Common Yarrow: S372, S609; 9
Ambrosia artemisiifolia L., Common Ragweed: S699; 9
Ambrosia trifida L., Giant Ragweed: S559; 8, 9
Antennaria plantaginifolia (L.) Richardson, Pussytoes: S654, P19814; 6, 1
Aster cordifolius L., Heart-leaved Aster: S686, S641; 6
Aster drummondii Lindl., Drummond's Aster: S707, S723; 9, 2
Aster laevis L., Smooth Aster: S645; 6
Aster lateriflorus (L.) Britt., Side-flowered Aster: S671, S678; 2, 3, 4, 7, 8
Aster novae-angliae L., New England Aster: S722; 9
Aster pilosus Willd., Hairy Aster: S613, S698; 9
Aster shortii Lindl., Shorts Aster: S635, S677; 2, 3
Aster simplex Willd., Panicked Aster: S666, S750, S751; 5, 3, 4, 7, 8
Bidens cernua L., Sticktight: S748; 5, 7
Bidens frondosa L., Common Beggar-ticks: S525, S663, S758; 7, 8
Bidens tripartita L., Beggar-ticks: S664, S753; 5, 7
Bidens vulgata Greene, Tall Beggar-ticks: S622, S704; 9
Brickellia eupatorioides (L.) Shinnars, False Boneset: P29867; 6
Cacalia atriplicifolia L., Pale Indian Plantain: S651; 6
Cirsium altissimum (L.) Spreng., Tall Thistle: P29621; 3, 9
Cirsium discolor (Muhl.) Spreng., Field Thistle: S624, S719, P29855; 9
Conyza canadensis (L.) Cronq., Horseweed: S570; 4, 9
Coreopsis tripteris L., Tall Tickseed: S489; 9
Eclipta prostrata (L.) L., Yerba de Tajo: S749; 5, 7
Erechtites hieracifolia (L.) Raf., Fireweed: S762; 8, 9
Erigeron annuus (L.) Pers., Daisy Fleabane: S374-A; 9
Eupatorium altissimum L., Tall Boneset: S601; 2, 6, 9
Eupatorium coelestinum L., Mistflower: S568; 4, 5, 7
Eupatorium perfoliatum L., Common Boneset: S598; 3, 5, 7
Eupatorium purpureum L., Purple Joe-Pye-weed: S419, S472, S518, S596; 2, 3, 4, 7, 9
Eupatorium rugosum Houtt., White Snakeroot: S445, S545; 3, 2, 7, 8
Eupatorium serotinum Michx., Late Boneset: S592; 3, 5
Eupatorium sessilifolium L., Upland Boneset: P29842; 2
Euthamia graminifolia (L.) Salisb., Grass-leaved Goldenrod: S597; 2, 9
Gnaphalium obtusifolium L., Sweet Everlasting: S617; 9
Helenium autumnale L., Autumn Sneezeweed: S745; 5
Helianthus divaricatus L., Woodland Sunflower: S467, S628, S629; 6, 1, 9
Helianthus strumosus L., Pale-leaved Sunflower: S577; 4

Heliopsis helianthoides (L.) Sweet, False Sunflower: S493, S728; 9
Lactuca canadensis L., Wild Lettuce: S507, S619; 9
Lactuca floridana (L.) Gaertn., Woodland Lettuce: S517; 9
Liatris aspera Michx., Rough Blazing-star: S652; 6
Liatris cylindracea Michx., Blazing-star: S589; 6, 1
Prenanthes alba L., White Lettuce: S514, S644; 6, 9
Prenanthes crepidinea Michx., Great White Lettuce: P29609; 3, 2
Ratibida pinnata (Vent.) Barnh., Yellow Coneflower: S469; 6
Rudbeckia laciniata L., Goldenglow: S575; 4, 5
Rudbeckia triloba L., Brown-eyed Susan: S502; 9
Senecio glabellus Poir., Butterweed: S353; 7
Silphium integrifolium Michx., Rosinweed: S479; 6
Silphium perfoliatum L., Cup-plant: P29847; 3
Silphium terebinthinaceum Jacq., Prairie-dock: S515; 6, 9
Solidago caesia L., Woodland Goldenrod: S672; 2, 1, 3, 7
Solidago canadensis L., Tall Goldenrod: S627; 9
Solidago flexicaulis L., Broadleaf Goldenrod: S674; 2
Solidago gigantea Ait., Late Goldenrod: S566; 4, 7
Solidago missouriensis Nutt., Missouri Goldenrod: S483, S595, S625; 2, 1, 9
Solidago nemoralis Ait., Field Goldenrod: S690; 6, 1, 9
Solidago patula Muhl., Spreading Goldenrod: S669; 7
Solidago rigida L., Rigid Goldenrod: S714; 6, 9
Solidago speciosa Nutt., Showy Goldenrod: S715; 9
Solidago ulmifolia Muhl., Elm-leaved Goldenrod: S520, S543, S642, S679, S681; 2, 1, 3, 6, 9
**Taraxacum officinale* Weber, Common Dandelion: P19844; 9
**Tragopogon dubius* Scop., Sand Goat's-beard: S408; 9
Verbesina alternifolia (L.) Britt., Yellow Ironweed: S576, S621, S694; 4, 3, 5, 9
Vernonia gigantea (Walt.) Trel., Tall Ironweed: S588; 9
Xanthium strumarium L. var. *canadensis* (Mill.) Torr. & Gray: S734; 4, 5

BALSAMINACEAE - BALSAM FAMILY

Impatiens capensis Meerb., Spotted Touch-me-not: S462, S535; 7
Impatiens pallida Nutt., Pale Touch-me-not: S418, S569; 4

BERBERIDACEAE - BARBERRY FAMILY

Caulophyllum thalictroides (L.) Michx., Blue Cohosh: S241; 2, 3
Podophyllum peltatum L., Mayapple: P19834; 2, 3

BIGNONIACEAE - BIGNONIA FAMILY

Campsis radicans (L.) Seem., Trumpet Creeper: S760; 8, 3, 4, 7, 9

BORAGINACEAE - BORAGE FAMILY

Hackelia virginiana (L.) I.M. Johnston, Stickseed: S432; 2, 3, 8
Lithospermum latifolium Michx., American Gromwell: S246, S317; 2, 3
Mertensia virginica (L.) Pers., Bluebells: P19833; 4, 3
Myosotis verna Nutt., Scorpion Grass: S257; 9

BRASSICACEAE - MUSTARD FAMILY

**Arabidopsis thaliana* (L.) Heynh., Mouse-ear-Cress: P19842; 9
Arabis laevigata (Muhl.) Poir., Smooth Rock Cress: S234; 1, 6
**Barbarea vulgaris* R. Br. var. *arcuata* (Opiz) Fries, Yellow Rocket: P19852; 9
**Camelina microcarpa* Andrz., False Flax: S272; 9
**Capsella bursa-pastoris* (L.) Medik., Shepherd's-Purse: P19845; 9
Cardamine bulbosa (Schreb.) BSP., Spring Cress: P19865; 7
Cardamine douglassii (Torr.) Britt., Purple Cress: P19860; 3
Cardamine parviflora L. var. *arenicola* (Britt.) O.E. Schulz, Small-flowered Bitter Cress: P19849;

Cardamine pensylvanica Muhl., Bitter Cress: S248; 7
Dentaria laciniata Muhl., Toothwort: P19823; 2, 3
Descurainia pinnata (Walt.) Britt. ssp. *brachycarpa* (Richardson) Detling: P19851; 9
 **Draba verna* L., Whitlow Grass: P19848; 9
Iodanthus pinnatifidus (Michx.) Steud., Purple Rocket: S328; 4, 3
 **Lepidium campestre* (L.) R. Br., Field Peppergrass: S274; 9
Lepidium virginicum L., Common Peppergrass: S382; 9
 **Rorippa sylvestris* (L.) Besser, Creeping Yellow Cress: P29871; 4, 5

CAESALPINACEAE - CAESALPINIA FAMILY

Cassia fasciculata Michx., Partridge Pea: S485; 6, 9
Cassia marilandica L., Maryland Senna: S501, S696; 9
Cercis canadensis L., Redbud: P19840; 6, 1, 2, 3, 9
Gleditsia triacanthos L., Honey Locust: P29620; 3
Gymnocladus dioica (L.) K. Koch, Kentucky Coffee-tree: S547, P29856; 3

CAMPANULACEAE - BELLFLOWER FAMILY

Campanula americana L., American Bellflower: S487; 9, 2, 3
Lobelia inflata L., Indian Tobacco: S486; 9, 1
Lobelia siphilitica L., Blue Cardinal-flower: S533; 7
Triodanis perfoliata (L.) Nieuwl., Venus' Looking-glass: S378; 9, 1

CAPRIFOLIACEAE - HONEYSUCKLE FAMILY

**Lonicera morrowi* Gray, Honeysuckle: S359; 9
Lonicera prolifera (Kirchn.) Rehder, Grape Honeysuckle: P29619; 6
Sambucus canadensis L., Elderberry: S656; 4
Symphoricarpos orbiculatus Moench, Coralberry: S495, S563; 4, 1, 3, 9
Triosteum perfoliatum L., Late Horse Gentian: S478; 6, 1, 2
Viburnum prunifolium L., Black Haw: P29608; 1, 2, 6

CARYOPHYLLACEAE - PINK FAMILY

**Arenaria serpyllifolia* L., Thyme-leaved Sandwort: S270; 9
Cerastium nutans Raf., Nodding Mouse-eared Chickweed: P19850; 9
 **Cerastium vulgatum* L., Common Mouse-eared Chickweed: S283; 9
 **Dianthus armeria* L., Deptford Pink: S364, S500; 9
Paronychia canadensis (L.) Wood, Forked Chickweed: S321; 2, 1
Silene antirrhina L., Sleepy Catchfly: S278, S401; 9
Silene nivea (Nutt.) Otth, Snowy Champion: S427; 3
Silene stellata (L.) Ait. f., Starry Champion: S443; 3, 2
Stellaria longifolia Muhl., Chickweed: S247; 7

CELASTRACEAE - BITTERSWEET FAMILY

Celastrus scandens L., Bittersweet: P29868; 6, 1
Euonymus atropurpureus Jacq., Wahoo: S327; 3
Euonymus obovata Nutt., Running Strawberry Bush: P29622; 3, 2

CHENOPODIACEAE - GOOSEFOOT FAMILY

Chenopodium album L., Lamb's Quarters: S430; 2, 9
Chenopodium standleyanum Aellen, Goosefoot: S657, S667; 4, 5

CONVOLVULACEAE - MORNING-GLORY FAMILY

**Ipomoea hederacea* (L.) Jacq., Ivy-leaved Morning-glory: S726; 9
 **Ipomoea purpurea* (L.) Roth, Common Morning-glory: S724; 9

CORNACEAE - DOGWOOD FAMILY

Cornus alternifolia L. f., Alternate-leaved Dogwood: S544; 7
Cornus racemosa Lam., Gray Dogwood: S646, S673; 2, 6

CORYLACEAE - HAZELNUT FAMILY

Carpinus caroliniana Walt., Blue Beech: S688; 2
Corylus americana Walt., Hazelnut: S706, P19867; 9, 1, 3, 7
Ostrya virginiana (Mill.) K. Koch, Hop Hornbeam: S396; 2, 1, 6, 9

CUCURBITACEAE - GOURD FAMILY

Sicyos angulatus L., Bur Cucumber: S422, S573; 4, 3

CUSCUTACEAE - DODDER FAMILY

Cuscuta gronovii Willd., Dodder: S670; 7

ELAEAGNACEAE - ELAEAGNUS FAMILY

**Elaeagnus umbellata* Thunb., Autumn Olive: S474; 6, 1, 9

EUPHORBIACEAE - SPURGE FAMILY

Acalypha deamii (Weatherby) Ahles, Large-seeded Mercury: E27122, P29846; 3, 4
Acalypha rhomboidea Raf., Three-seeded Mercury: S549, S668; 2, 3, 7, 9
Acalypha virginica L., Three-seeded Mercury: S675, S692, S705; 9
Euphorbia corollata L., Flowering Spurge: S399; 6, 1, 9

FABACEAE - PEA FAMILY

Amorpha fruticosa L., False Indigo: S523; 3, 5
Baptisia lactea (Raf.) Thieret, White Wild Indigo: S417, S708; 9
Desmodium cuspidatum (Muhl.) Loud., Tick Trefoil: S702, S713; 9
Desmodium glabellum (Michx.) DC., Tick Trefoil: S620, P29851; 9
Desmodium glutinosum (Muhl.) Wood, Pointed Tick Trefoil: S540; 2, 3
Lespedeza capitata Michx., Round-headed Bush Clover: P29849; 9
Lespedeza intermedia (S. Wats.) Britt., Bush Clover: S640; 6, 1
 **Medicago lupulina* L., Black Medic: S409; 9
 **Melilotis alba* Medik., White Sweet Clover: S355; 6, 9
 **Melilotis officinalis* (L.) Pallas, Yellow Sweet Clover: S385, S490; 9
 **Robinia pseudoacacia* L., Black Locust: S605, S725; 9
Strophostyles helvola (L.) Ell., Wild Bean: P29850; 9
 **Trifolium hybridum* L., Alsike Clover: S392; 9
 **Trifolium repens* L., White Clover: S738; 5

FAGACEAE - BEECH FAMILY

Quercus alba L., White Oak: S682; 1, 2, 3, 6
Quercus bicolor Willd., Swamp White Oak: S551; 7, 8
Quercus imbricaria Michx., Shingle Oak: S384; 9, 1
Quercus macrocarpa Michx., Bur Oak: P29624; 3
Quercus prinoides Willd., Yellow Chestnut Oak: S648; 6, 1, 2
Quercus rubra L., Red Oak: S685; 2, 3
Quercus velutina Lam., Black Oak: P29610; 1, 2, 3, 9

GENTIANACEAE - GENTIAN FAMILY

Gentianella quinquefolia (L.) Small ssp. *occidentalis* (Gray) J. Gillet., Stiff Gentian: S735; 5

GERANIACEAE - GERANIUM FAMILY

Geranium maculatum L., Wild Geranium: P19861; 3, 2

GROSSULARIACEAE - GOOSEBERRY FAMILY

Ribes missouriense Nutt., Missouri Gooseberry: P19838; 3, 1, 2, 7

HIPPOCASTANACEAE - HORSE CHESTNUT FAMILY

Aesculus glabra Willd., Ohio Buckeye: P19839; 3, 2, 7

HYDRANGEACEAE - HYDRANGEA FAMILY

Hydrangea arborescens L., Wild Hydrangea: S512; 6, 3, 7

HYDROPHYLLACEAE - WATERLEAF FAMILY

Ellisia nyctelea L., Waterpod: S220; 2, 3

Hydrophyllum appendiculatum Michx., Great Waterleaf: S223; 2, 3

Hydrophyllum virginianum L., Virginia Waterleaf: S222; 2, 3, 7

HYPERICACEAE - ST. JOHN'S-WORT FAMILY

Hypericum canadense L., Canadian St. John's-wort: S710; 9

Hypericum majus (Gray) Britt., St. John's-wort: P29863; 9

Hypericum punctatum Lam., Spotted St. John's-wort: S505, S618; 9

JUGLANDACEAE - WALNUT FAMILY

Carya cordiformis (Wang.) K. Koch, Bitternut Hickory: S386, S606, S687; 2, 3, 9

Carya ovalis (Wang.) Sarg., Sweet Pignut Hickory: P29618; 3

Carya ovata (Mill.) K. Koch, Shagbark Hickory: S697; 2, 1, 3, 9

Carya tomentosa (Poir.) Nutt., Mockernut Hickory: S638; 6, 1, 3

Juglans cinerea L., Butternut: S441; 3

Juglans nigra L., Black Walnut: S395; 3, 9

LAMIACEAE - MINT FAMILY

Agastache nepetoides (L.) Kuntze, Yellow Giant Hyssop: S607; 9, 2, 3

Agastache scrophulariaefolia (Willd.) Kuntze., Purple Giant Hyssop: S584; 2, 3

Blephilia ciliata (L.) Benth., Pagoda Plant: S337; 2, 6

Blephilia hirsuta (Pursh) Benth., Pagoda Plant: P29857; 3

Lycopus americanus Muhl., Common Water Horehound: S742, S743; 5, 7, 8

Lycopus rubellus Moench, Stalked Water Horehound: S537; 7, 8

**Mentha arvensis* L., Field Mint: S455, S536; 2, 7

Monarda clinopodia L., Bee Balm: S442; 3

Monarda fistulosa L., Wild Bergamont: S488; 9

Prunella vulgaris L. var. *elongata* Benth., Self-heal: S496-B, S508; 9

Pycnanthemum tenuifolium Schrad., Slender Mountain Mint: S370, S484; 9

Scutellaria incana Biehler, Downy Scullcap: S431; 2

Scutellaria lateriflora L., Mad-dog Scullcap: S453, S524; 2, 7

Stachys tenuifolia Willd., Smooth Hedge Nettle: S437, S586, S614; 2, 8

Teucrium canadense L. var. *virginicum* (L.) Eat., American Germander: S497; 9

LAURACEAE - LAUREL FAMILY

Lindera benzoin (L.) Blume, Spicebush: S529; 2, 3, 7, 8

Sassafras albidum (Nutt.) Nees, Sassafras: S447; 3, 1, 2, 9

MENISPERMACEAE - MOONSEED FAMILY

Menispermum canadense L., Moonseed: S579; 4, 1, 2, 3, 7, 8

MOLLUGINACEAE - CARPETWEED FAMILY

**Mollugo verticillatus* L., Carpetweed: P29864; 9

MORACEAE - MULBERRY FAMILY

Humulus lupulus L., Common Hops: S449, S572; 3, 2, 4, 9

**Maclura pomifera* (Raf.) C.K. Schneider, Osage Orange: S658; 4, 3, 9

**Morus alba* L., White Mulberry: S583, S729; 4, 3, 9

OLEACEAE - ASH FAMILY

Fraxinus americana L., White Ash: S398, P19858; 3, 1, 2, 6, 9

Fraxinus nigra Marsh., Black Ash: S251; 7

Fraxinus pennsylvanica Marsh. var. *subintegerrima* (Vahl) Fern., Green Ash: S616, S582; 2, 3, 4, 7, 8, 9
Fraxinus quadrangulata Michx., Blue Ash: P29613; 7

ONAGRACEAE - EVENING PRIMROSE FAMILY

Circaea lutetiana L. ssp. *canadensis* (L.) Aschers & Magnus, Enchanter's Nightshade: S314; 2, 3, 8
Epilobium coloratum Biehler, Cinnamon Willow Herb: S534; 7, 9
Oenothera biennis L., Evening Primrose: S593, S727; 2, 9

OXALIDACEAE - OXALIS FAMILY

Oxalis dillenii Jacq., Yellow Wood Sorrel: S263; 9, 3
Oxalis stricta L., Yellow Wood Sorrel: S499, S513, S626; 9, 3
Oxalis violacea L., Purple Oxalis: site record only; 2

PAPAVERACEAE - POPPY FAMILY

Dicentra cucullaria (L.) Bernh., Dutchman's-breeches: P19817; 2, 3
Sanguinaria canadensis L., Bloodroot: P19830; 2, 3

PHRYMACEAE - LOPSEED FAMILY

Phryma leptostachya L., Lopseed: S429; 2, 3

PHYTOLACCACEAE - POKEWEED FAMILY

Phytolacca americana L., Pokeweed: S444, S585; 2, 3, 7

PLANTAGINACEAE - PLANTAIN FAMILY

Plantago rugelii Decne., Rugel's Plantain: S326, S363, S496-A; 4, 9
Plantago virginica L., Dwarf Plantain: P19843; 9

PLATANACEAE - PLANE-TREE FAMILY

Platanus occidentalis L., Sycamore: S604; 7, 3, 4, 9

POLEMONIACEAE - PHLOX FAMILY

Phlox divaricata L. ssp. *laphamii* (Wood) Wherry, Common Phlox: P19835; 2, 3
Phlox pilosa L., Downy Phlox: S266; 9
Polemonium reptans L., Jacob's-ladder: P19859; 3

POLYGALACEAE - MILKWORT FAMILY

Polygala senega L., Seneca Snakeroot: S339, S470; 2, 1, 6
Polygala verticillata L. var. *isocycla* Fern., Whorled Milkwort: P29866; 6

POLYGONACEAE - BUCKWHEAT FAMILY

Polygonum hydropiperoides Michx., Mild Water Pepper: S438, S555; 8, 5, 7
Polygonum pensylvanicum L., Common Smartweed: S554, S556, S739; 5, 8
 **Polygonum persicaria* L., Lady's Thumb: S424, P29870; 4
Polygonum punctatum Ell., Smartweed: S527, S574, P29869; 4, 5, 7
Polygonum scandens L., False Buckwheat: S426, S571, S633; 4, 3, 9
Polygonum virginianum L., Virginia Knotweed: S548, S680; 2, 3, 7, 8
 **Rumex acetosella* L., Sour Dock: S275; 9
 **Rumex crispus* L., Curly Dock: S366; 9
Rumex verticillatus L., Swamp Dock: S350; 7

PORTULACAEAE - PURSLANE FAMILY

Claytonia virginica L., Spring Beauty: P19822; 2, 1, 3, 6, 9

PRIMULACEAE - PRIMROSE FAMILY

Lysimachia ciliata L., Fringed Loosestrife: P29859; 4, 3, 5, 7

Lysimachia lanceolata Walt., Lance-leaved Loosestrife: S383; 9, 3
 **Lysimachia nummularia* L., Moneywort: S746; 5, 4, 7
Samolus valerandii L., Brookweed: S461, S528; 7, 5

RANUNCULACEAE - BUTTERCUP FAMILY

Actaea pachypoda Ell., Doll's-eyes: S301; 2, 3
Anemone virginiana L., Tall Anemone: S471; 6, 1
Caltha palustris L., Marsh Marigold: P19866; 7
Clematis pitcheri Torr. & Gray, Leatherflower: P29848; 3
Clematis virginiana L., Virgin's Bower: S560; 3, 9
Ranunculus abortivus L., Small-flowered Crowfoot: S338, S347, P19818; 2, 3, 4, 7
Ranunculus flabellaris Raf., Yellow Water-crowfoot: S249; 7
Ranunculus septentrionalis Poir., Swamp Buttercup: P19863; 3, 4, 7
Thalictrum dasycarpum Fisch. & Lall, Purple Meadow Rue: S349; 7, 3
Thalictrum dioicum L., Early Meadow Rue: P19826; 2, 3
Thalictrum thalictroides (L.) Eaves & Boivin, Rue Anemone: P19825; 2, 3

ROSACEAE - ROSE FAMILY

Agrimonia parviflora Ait., Swamp Agrimony: P29853; 9, 3
Agrimonia pubescens Wallr., Soft Agrimony: S542, S691; 2, 9
Agrimonia rostellata Wallr., Woodland Agrimony: S428; 2
Amelanchier arborea (Michx. f.) Fern., Low Shadbush: P19857; 3
Crataegus crus-galli L., Cock-spur Thorn: S288; 9
Crataegus mollis (Torr. & Gray) Scheele, Red Haw: S289; 9
Crataegus pruinosa (Wendl.) K. Koch, Hawthorn: S290; 9
Fragaria virginiana Duchesne, Wild Strawberry: P19854; 9, 1, 6
Geum canadense Jacq., White Avens: S636; 3, 1, 2, 7, 8, 9
Geum vernum (Raf.) Torr. & Gray, Spring Avens: P19853; 9, 2, 3
Malus coronaria (L.) Mill., Wild Sweet Crab Apple: S287; 9
Potentilla simplex Michx., Common Cinquefoil: S277, S410; 9, 1, 6
Prunus angustifolia Marsh., Chickasaw Plum: P19841; 9
Prunus serotina Ehrh., Wild Black Cherry: S580, S676; 2, 1, 3, 6, 9
Rosa carolina L., Pasture Rose: S330; 6, 1
 **Rosa multiflora* Thunb., Multiflora Rose: S720; 9, 1, 2, 3, 7
Rubus allegheniensis Porter, Common Blackberry: S285; 9, 1, 3
Rubus flagellaris Willd., Dewberry: S286; 9, 1
Rubus occidentalis L., Black Raspberry: S264; 9, 1, 2, 3, 7

RUBIACEAE - MADDER FAMILY

Cephalanthus occidentalis L., Buttonbush: S456, S526; 7, 8
Galium aparine L., Goosegrass: S214; 2, 3
Galium circaezans Michx., Wild Licorice: S320, S539; 2, 3, 6
Galium concinnum Torr. & Gray, Shining Bedstraw: S303, S331, S463, S473; 2, 3, 6, 7, 8, 9
Galium triflorum Michx., Sweet-scented Bedstraw: P29854; 9, 2, 3

RUTACEAE - RUE FAMILY

Ptelea trifoliata L., Wafer Ash: S411, S503; 9
Zanthoxylum americanum Mill., Prickly Ash: S448; 3, 2, 7

SALICACEAE - WILLOW FAMILY

Populus deltoides Marsh., Cottonwood: S703; 4, 3, 7, 9
Salix exigua Nutt., Sandbar Willow: S732; 4, 5
Salix nigra Marsh., Black Willow: S733; 5
Salix rigida Muhl., Heart-leaved Willow: P29874; 5

SAURURACEAE - LIZARD'S TAIL FAMILY

Saururus cernuus L., Lizard's-tail: S532; 7, 4

SAXIFRAGACEAE - SAXIFRAGE FAMILY

Heuchera americana L., Tall Alumroot: S516; 9, 1
Penthorum sedoides L., Ditch Stonecrop: S459, S744; 5, 7

SCROPHULARIACEAE - FIGWORT FAMILY

Agalinis gattingeri (Small) Small, Rough-stemmed False Foxglove: S509; 9
Agalinis tenuifolia (Vahl) Raf., Slender False Foxglove: S608; 9
Chelone glabra L., White Turtlehead: S665; 7
Dasistoma macrophylla (Nutt.) Raf., Mullein Foxglove: S466; 6, 1, 2
Gratiola neglecta Torr., Clammy Hedge Hyssop: P29862; 9, 5
Leucospora multifida (Michx.) Nutt.: S752; 5, 9
Lindernia dubia (L.) Pennell, False Pimpernel: P29861; 9, 5
Mimulus alatus Ait., Winged Monkey-flower: P29860; 7
Mimulus ringens L., Monkey-flower: S460, S564; 4, 7
Penstemon digitalis Nutt., Foxglove Beardstongue: S309, S521; 2, 9
Scrophularia marilandica L., Late Figwort: S423; 3
 **Verbascum thapsus* L., Woolly Mullein: P29852; 9
 **Veronica arvensis* L., Corn Speedwell: S282; 9

SOLANACEAE - NIGHTSHADE FAMILY

**Datura stramonium* L., Jimsonweed: S553; 8, 9
Physalis heterophylla Nees, Ground Cherry: S491, S632; 9
Physalis subglabrata Mack. & Bush, Smooth Ground Cherry: S631; 9
Solanum carolinense L., Horse-nettle: S402, S481; 9
Solanum ptycanthum Dunal, Black Nightshade: S737; 5, 3, 4

STAPHYLEACEAE - BLADDERNUT FAMILY

Staphylea trifolia L., Bladdernut: S421, P19820; 3, 7

TILIACEAE - BASSWOOD FAMILY

Tilia americana L., Basswood: S416; 2, 3

ULMACEAE - ELM FAMILY

Celtis occidentalis L., Hackberry: S581; 4, 1, 2, 3, 7, 8, 9
Ulmus americana L., American Elm: S761; 4, 1, 2, 3, 7, 8, 9
 **Ulmus pumila* L., Siberian Elm: S594; 2, 9
Ulmus rubra Muhl., Slippery Elm: S316, S689; 2, 1, 3, 9

URTICACEAE - NETTLE FAMILY

Boehmeria cylindrica (L.) Sw., False Nettle: S439; 8, 3, 4, 7
Laportea canadensis (L.) Wedd., Wood Nettle: S451; 3, 4, 7, 8
Parietaria pensylvanica Muhl., Pellitory: S215; 2, 1
Pilea pumila (L.) Gray, Clearweed: S550; 8, 3, 4, 7
Urtica dioica L., Stinging Nettle: P29615; 4, 3

VERBENACEAE - VERBENA FAMILY

Phyla lanceolata (Michx.) Greene, Fog-fruit: S740; 5
Verbena hastata L., Blue Vervain: S587; 9, 5
Verbena urticifolia L., White Vervain: S482; 9, 5

VIOLACEAE - VIOLET FAMILY

Viola pratincola Greene, Common Blue Violet: P19819; 4, 3, 6, 7
Viola pubescens Ait. var. *eriocarpa* (Schwein.) Russell, Smooth Yellow Violet: P19832; 2, 3
Viola rafinesquii Greene, Johnny-jump-up: P19847; 9, 1
Viola sororia Willd., Woolly Blue Violet: P19827, P19856, P19862; 2, 3, 9
Viola striata Ait., Cream Violet: P19816; 3

VITACEAE-GRAPE FAMILY

Parthenocissus quinquefolia (L.) Planch., Virginia Creeper: S756; 8, 1, 2, 3, 4, 6, 7

Vitis aestivalis Michx., Summer Grape: S388, S464, S552; 1, 3, 6, 8, 9

Vitis riparia Michx., Riverbank Grape: S389, S578, S650; 4, 6, 9

Vitis vulpina L., Frost Grape: S454, S683; 2, 7

Table 1. Densities (stems/ha), diameter classes, basal areas (m²/ha), relative values, importance values, and average diameters of the woody species in the forest communities at Horseshoe Bottom Nature Preserve, Vermilion County, Illinois.

Species	Diameter Class (cm)			Total stems/ha	Basal Area m ² /ha	Rel. Den.	Rel. Dom.	I.V.	Av. Diam (cm)
	10-29	30-49	50+						
Wet Floodplain Forest									
Silver Maple	48	52	38	138	20.75	47.9	64.1	112.0	39.5
Box Elder	56	6	--	62	1.75	21.5	5.4	26.9	17.5
Sycamore	2	4	12	18	5.08	6.3	15.7	22.0	57.1
American Elm	24	4	--	28	0.83	9.7	2.6	12.3	17.1
Hackberry	14	4	--	18	0.65	6.3	2.0	8.3	19.8
Cottonwood	--	--	6	6	2.40	2.1	7.4	9.5	70.6
Green Ash	10	4	--	14	0.74	4.9	2.3	7.2	23.9
Others	4	--	--	4	0.18	1.3	0.5	1.8	--
Totals	158	74	56	288	32.38	100.0	100.0	200.0	
Swamp Forest									
Silver Maple	114	34	18	166	13.40	33.9	34.6	68.5	27.8
Green Ash	64	32	16	112	9.93	22.9	25.7	48.6	30.4
Black Ash	80	34	2	116	6.99	23.7	18.1	41.8	25.5
Swamp White Oak	10	6	6	22	2.60	4.5	6.7	11.2	33.4
Sycamore	--	4	6	10	2.43	2.0	6.3	8.3	53.9
American Elm	24	--	--	24	0.33	4.9	0.9	5.8	13.1
Cottonwood	--	4	2	6	0.93	1.2	2.4	3.6	43.2
Others	28	2	4	34	2.06	6.9	5.3	12.2	--
Totals	320	116	54	490	38.67	100.0	100.0	200.0	
Mesic Floodplain Forest									
White Oak	10	16	24	50	10.33	17.4	39.0	56.4	47.2
Black Oak	6	14	12	32	6.75	11.1	25.5	36.6	47.5
Slippery Elm	80	--	--	80	1.31	27.7	5.0	32.7	14.1
Bitternut Hickory	34	12	--	46	2.04	16.0	7.7	23.7	22.3
Shagbark Hickory	36	2	--	38	1.25	13.2	4.7	17.9	19.5
Black Walnut	4	10	4	18	2.43	6.3	9.2	15.5	40.1
Others	16	4	4	24	2.37	8.3	8.9	17.2	--
Totals	186	58	44	288	26.48	100.0	100.0	200.0	
Mesic Upland Forest (west-facing hillside)									
Red Oak	4	46	40	90	16.76	23.6	47.5	71.1	47.8
Sugar Maple	138	22	--	160	5.29	41.9	15.0	56.9	17.6
White Oak	14	40	4	58	7.63	15.2	21.6	36.8	38.3
Basswood	8	4	2	14	1.43	3.7	4.0	7.7	32.6
Green Ash	6	8	--	14	1.22	3.7	3.5	7.2	30.6
Shagbark Hickory	10	4	--	14	0.76	3.7	2.1	5.8	24.3
Others	18	12	2	32	2.20	8.2	6.3	14.5	--
Totals	198	136	48	382	35.29	100.0	100.0	200.0	

Table 2. Relative cover, relative frequency, and importance value (IV) of ground layer species (species <1.5 m tall) of glacial drift hill prairie at the Horseshoe Bottom Nature Preserve, Vermilion County, Illinois. Only species with IV's > 1.0 are shown.

Species	Relative Cover	Relative Frequency	Importance Value
<i>Schizachyrium scoparium</i>	7.0	21.7	28.7
<i>Helianthus divaricatus</i>	5.4	9.8	15.2
<i>Carex pensylvanica</i>	4.6	8.8	13.4
<i>Viburnum prunifolium</i>	5.4	6.8	12.2
<i>Bouteloua curtipendula</i>	4.1	5.8	9.9
<i>Solidago ulmifolia</i>	4.6	5.0	9.6
<i>Cassia fasciculata</i>	6.6	2.9	9.5
<i>Thaspium barbinode</i>	4.6	4.5	9.1
<i>Fraxinus americana</i>	3.3	3.5	6.8
<i>Silphium terebinthinaceum</i>	2.9	3.7	6.6
<i>Ostrya virginiana</i>	2.9	3.1	6.0
<i>Rosa carolina</i>	3.3	2.7	6.0
<i>Melilotus alba</i>	3.7	1.3	5.0
<i>Solidago rigida</i>	2.9	2.1	5.0
<i>Danthonia spicata</i>	2.9	1.8	4.7
<i>Galium concinnum</i>	3.7	0.8	4.5
<i>Carex blanda</i>	2.5	1.7	4.2
<i>Euphorbia corollata</i>	3.7	0.5	4.2
<i>Poa compressa</i>	3.3	0.7	4.0
<i>Aster laevis</i>	2.1	1.7	3.8
<i>Toxicodendron radicans</i>	2.1	1.7	3.8
<i>Anemone virginiana</i>	2.5	1.2	3.7
<i>Solidago nemoralis</i>	1.7	1.3	3.0
<i>Cacalia atriplicifolia</i>	1.7	1.1	2.8
<i>Liatris cylindracea</i>	1.7	1.1	2.8
<i>Cercis canadensis</i>	1.7	1.1	2.8
<i>Polygala senega</i>	1.2	1.0	2.2
<i>Viola pratensis</i>	1.7	0.2	1.9
<i>Juniperus virginiana</i>	1.7	0.2	1.9
<i>Blephilia ciliata</i>	1.2	0.2	1.4
Others (9 species)	3.3	2.0	5.3
Totals	100.0	100.0	200.0

Figure 1. Natural communities of Horseshoe Bottom Nature Preserve (and buffer), Vermilion County, Illinois. (1) dry upland forest, (2) mesic upland forest, (3) mesic floodplain forest, (4) wet floodplain forest, (5) perennial stream, (6) glacial drift hill prairie, (7) seep and swamp forest, (8) Swamp White Oak flatwoods, and (9) successional field.

