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THE FLORA OF MAMMOTH CAVE NATIONAL PARK

BY

**LANDON E. MCKINNEY
KENTUCKY STATE NATURE PRESERVES COMMISSION
407 BROADWAY
FRANKFORT, KY 40601**

**MARC EVANS
KENTUCKY STATE NATURE PRESERVES COMMISSION
407 BROADWAY
FRANKFORT, KY 40601**

**KENNETH A. NICELY
DEPARTMENT OF BIOLOGY
WESTERN KENTUCKY UNIVERSITY
BOWLING GREEN, KY 42101**

ABSTRACT

Mammoth Cave National Park has long been known for its extensive system of underground caverns. While the importance of this natural resource is well known, the park's natural resources above ground have drawn less attention. Mammoth Cave National Park encompasses approximately 52,000 acres of terrestrial and aquatic ecosystems and constitutes one of the greatest protectors of biological diversity in Kentucky.

The purpose of this study was to update and document the vascular flora of the park while paying particular attention to rare species and unique communities. Existing data was compiled from a number of previous sources including park records. Field work was conducted to document much of the existing information while adding much new data.

A total of 866 species and four varieties are now known to occur within the park's boundaries. Of these, 21 species are currently listed as endangered, threatened, or of special concern for the Commonwealth by the Kentucky State Nature Preserves Commission. While most of the park's acreage consists of second-growth woodlands, a number of unique communities such as cool mesic ravines, wetlands, and open barrens contribute much to the park's overall biological diversity and harbor many of the known rare species. These important communities should be monitored closely to help insure their continued existence.

INTRODUCTION

Mammoth Cave National Park (MCNP) encompasses approximately 52,000 acres covering much of Edmonson and parts of Barren and Hart counties in Kentucky. Much of the parks acreage consists of young to maturing second-growth forests which have developed from old farmsteads purchased during the 1920's and 1930's. While the park has long been known for its extensive system of underground caverns, its natural resources above ground have drawn much less attention.

Davies (1954) provided the first published preliminary flora documenting 674 species and varieties of vascular plants. He included two earlier works, that of R.P. Holland, a local ranger who had provided a comprehensive survey of the trees of the area prior to the establishment of the park and that of Henry Lix, the park naturalist between 1946 and 1951 who had provided the original collection of many of the vascular plants of the park. Faller (1975) provided an excellent study of the plant ecology of the park and added another 77 species to the previously known flora.

This floristic effort began in 1988 with the objective to update and further document the park's vascular flora while paying special attention to those species considered endangered, threatened, or of special concern for the Commonwealth by the Kentucky State Nature Preserves Commission (Unpubl. 1991). Another part of this effort was to identify interesting or unique communities that may need special attention or protection efforts. Most of the park's acreage consists of second-growth woodlands and the floristic elements are very predictable and quite similar from one location to another. However, certain communities such as wetlands or barren-like habitats while occupying very little overall acreage, contribute a disproportionate number of plants to the park's flora. Thus a small percentage of acreage contribute a much larger percent of the park's biological diversity.

DESCRIPTION OF THE STUDY AREA

PHYSIOGRAPHY, TOPOGRAPHY, AND GEOLOGY

Physiographically, MCNP is located in the Shawnee Hills Section of the Interior Low Plateaus Province (Feeneman 1938, Quaterman and Powell 1978). Most of the park lies in the Mammoth Cave Plateau Subsection while a portion, north of the Green River, occurs in the Ohio River Hills and Lowlands Subsection. The Dripping Springs Escarpment, a prominent cuesta, lies just south and east of the park. The escarpment marks the abrupt change from the relatively flat to rolling Pennyroyal Plain of the Highland Rim to the Mammoth Cave Plateau.

The Mammoth Cave Plateau is capped by the Big Clifty Sandstone of

Missippian-age. Underlying this sandstone are the Girkin and St. Genevieve limestones, from which most of the massive cave system is carved. The limestone is commonly exposed at the surface where the sandstone cap is missing and on slopes and cliffs in ravines, sinks, and karst valleys. North of the Green River the Ohio River Hills area is delineated by the poorly developed Pottsville Escarpment. This somewhat higher area is capped by Pennsylvanian-aged strata, mainly sandstone of the Caseyville formation.

The topography of MCNP ranges from almost flat, broad ridges to steep-sloped karst valleys and sinks to gorge-like sandstone walled ravines to the deep gorge of the Green River. Few surface streams occur south of the Green River as most water quickly disappears underground. Elevations within the park range from approximately 450 to 900 feet above sea level (McGrain and Currens 1978).

VEGETATION

The park lies within the Western Mesophytic Forest region of Braun (1950). This region is made up of a mosaic of forest communities representing elements of the Mixed Mesophytic Forest Region to the east and the Oak-Hickory Forest Region to the west. Likewise, the park itself presents a mosaic of forest types. The more mesic slopes are dominated by beech (Fagus grandifolia Ehr.), tulip poplar (Liriodendron tulipifera L.), and sugar maple (Acer saccharum Marsh.) especially along the lower portions. Along the upper portions beech and sugar maple are typically replaced by white oak (Quercus alba L.), and northern red oak (Q. rubra L.). Some upper slopes and upland flats are more xeric in nature. These are dominated by a variety of oaks such as post (Q. stellata Wang.), southern red (Q. falcata Michx.), black (Q. velutina Lam.), and black jack (Q. marilandica Muenchh.). The flood plain forests along the Green River are dominated by sycamore (Platanus occidentalis L.), river birch (Betula nigra L.), box elder (Acer negundo L.), and hackberry (Celtis occidentalis L.).

Faller (1975) sampled 44 different sites dominated by 13 different species. In all, he encountered 45 woody species and suggested a widely diverse mosaic of dominance patterns based on elevation, position, and soil moisture.

MATERIALS AND METHODS

Efforts were made to compile all existing information on the parks floristic elements and to document questionable taxa either in the field or herbaria. Field work was conducted during the growing seasons of 1988 through the first half of 1991. This effort consisted of documenting previously known floristic elements as well as searching for additional species. Particular attention was given to the verification of the continued existence of rare species. When found, certain conditions were noted such as population vigor, population numbers, and habitat conditions. Special attention was given to certain interesting or unique communities as these are often the more environmentally sensitive habitats.

Nomenclature, for the most part, follows Kartesz and Kartesz (1980). Plant identifications were based on Gleason and Cronquist (1963) and Beal and Thieret (1986). Voucher specimens of certain newly collected material will be deposited at Vanderbilt University (VB) and MCNP, and Western Kentucky University (WKU).

RESULTS

FLORISTIC ANALYSIS

A total of 866 species and four varieties of vascular plants are now known to occur in the park. These taxa represent 117 families and 434 genera. The largest families include Asteraceae (136 spp.), Poaceae (75 spp.), Fabaceae (44 spp.), and Cyperaceae (41 spp.). The largest genera include Carex (27 spp.), Quercus (15 spp.), Aster and Solidago (14 spp. each), and Viola (13 spp.).

A total of 21 species (Table 1) are currently listed as endangered, threatened, or of special concern for the Commonwealth by the Kentucky State Nature Preserves Commission. Four are under review by the U.S. Fish and Wildlife Service for possible endangered or threatened status (United States Fish and Wildlife Service, 1990).

In comparison to other regional floras, the number of vascular plants known to occur in the park compares favorably at 4.4 percent above prediction based on acreage (Wade and Thompson, 1991).

COMMUNITY ANALYSIS

Mammoth Cave National Park presents a mosaic of vegetative communities all of which are important but most are not currently in any immediate need of special attention for preservation purposes. There are several communities that are unique or of some other special concern that should be targeted for monitoring closely to insure continued preservation of the biological diversity that they contain. These communities are as follows:

1. The "Big Woods"
2. Large Sinkholes
3. Barren-like Habitats
4. Wetlands
5. Hemlock Gorges

Table 1

Species	Status ST/Fed	Verified
<u>Agrimonia gryposepala</u> Wallr.	S/-	*
<u>Aster sericeus</u> Vent.	T/-	*
<u>Aureolaria patula</u> (Chapm.) Pennell	E/C1	*
<u>Carex decomposita</u> Muhl.	T/-	*
<u>Chelone obliqua</u> L. var. <u>obliqua</u>	T/-	*
<u>Clematis glaucophylla</u> Small	S/-	*
<u>Cypripedium parviflorum</u> Salisb.	E/-	
<u>Dodecatheon frenchii</u> Vasey.	S/-	*
<u>Dryopteris spinulosa</u> (Muller.) Watt.	S/-	*
<u>Gentiana puberulenta</u> J. pringle	E/-	*
<u>Helianthus eggertii</u> Small	E/C2	*
<u>Juglans cinerea</u> L.	S/C2	
<u>Lesquerella globosa</u> (Desv.) Wats.	E/C2	
<u>Lilium philadelphicum</u> L.	T/-	*
<u>Potamogeton pulcher</u> Tuckerm.	E/-	
<u>Sagittaria graminea</u> Michx.	T/-	
<u>Scleria ciliata</u> Michx.	E/-	*
<u>Solidago puberula</u> Nutt.	T/-	*
<u>Trichomanes boschianum</u> Sturm.	S/-	*
<u>Trifolium reflexum</u> L.	E/-	*
<u>Veratrum woodii</u> Robbins	T/-	*

TABLE ONE. Rare plants occurring in Mammoth Cave National Park. E = endangered, ST = state, T = threatened, S = special concern, Kentucky State Nature Preserves Commission (1991), Fed = Federal; C1 or C2 = candidate for listing. United States Fish and Wildlife Service (1985, 1990), * = verification made in either field or herbaria.

1. The "Big Woods"

The "Big Woods" as referred to by Braun (1950) is the oldest and least disturbed stand of timber within the park's boundaries. Throughout the Commonwealth old growth timber is quite rare. This fact alone makes the "Big Woods" one of the most unique communities in the park. The ravine flats are dominated by beech (Fagus grandifolia Ehrh.). Beech remains an important constituent of the lower and middle slopes, along with tulip poplar (Liriodendron tulipifera L.) and sugar maple (Acer saccharum Marsh.). Tulip poplar remains an important constituent of the upper slopes and is joined by white and black oak (Quercus alba and Q. velutina). The chestnut (Castanea dentata (Marsh.) Borkh.) was originally an important part of the upper slopes but has now been replaced by several species of hickories such as shagbark (Carya ovata (Mill.) K. Koch.), pignut (C. glabra (Mill.) Sweet.), and mockernut (C. cordiformis (Wang.) K. Koch.). In communication with park officials, Braun (1968) suggested that the tulip poplar/white oak/black oak component of the "Big Woods" is one of the finest remaining examples of this forest type in the eastern United States. The significance of the "Big Woods" as an old growth forest was further recognized in 1989 when the area was registered as a state natural area through a joint cooperative effort between the National Park Service, The Kentucky State Nature Preserves Commission, and the Nature Conservancy.

2. Large Sinkholes

Some of the larger sinkholes found within the park's boundaries present microhabitats that provide for floristic elements far different from the surrounding terrain. The width and depth of these large sinks creates microclimatic differences in both temperature and humidity from the surrounding uplands. By midsummer, temperatures may vary as much as 20 degrees Fahrenheit from the bottom to the top of the sink (Hemerly, 1967). The mesic nature of the sloping walls of the sink as well as the wet to mesic nature of its base provide for a more floristically diverse flora than the surrounding xeric to subxeric uplands. Cedar sink is an excellent example of such a community. These sinks contribute greatly to the biological diversity found in the park and as such should be carefully monitored to insure future preservation.

3. Barren-like Habitats

Historically, native grassland (prairies, barrens) occurred throughout much of western and central Kentucky (Transeau 1935). However, since early settlement, anthropogenic influence has greatly altered Kentucky's natural landscape. Virtually all of the former grasslands have been converted to agricultural lands except for a few very small remnants. Otherwise, many of the species once inhabiting these native grasslands have taken refuge along rocky, barren-like roadsides where conditions were not conducive for the planting or sowing of non-native species. Within the park, there are several of these roadside refugia which provide homes for a number of species that occur nowhere else

within the park's boundaries. Species characteristic to these areas include purple cornflower (Echinacea pallida Nutt.), bird's foot violet (Viola pedata L.), green milkweed (Asclepias viridiflora Raf.), spiked lobelia (Lobelia spicata Lam.), big bluestem (Andropogon gerardi Vitm.), blazing star (Liatris squarrosa (L.) Michx.), sunflower (Helianthus occidentalis Riddell.), and gaura (Gaura filipes Spach.). This habitat provides a home for several rare species known to occur in the park such as silky aster (Aster sericeus Vent.), downy goldenrod (Solidago puberula Nutt.) and prairie gentian (Gentiana puberulenta J. Pringle). For such small areas, these barren-like roadsides provide a disproportionate number of species to the park's known vascular flora. Areas such as these can be severely impacted at any time. Thus, greater care should be taken in these areas when confronted with roadside maintenance. Areas along Flint Ridge Road are some of the best examples of this community type. Use of fire management in certain areas would enhance the continued survival of this habit in the park.

4. Wetlands

Wetlands occupy a very small percentage of the parks' acreage but again provides a large number of species to the parks biological diversity. Ponds, swamp forests, and cobblebars provide refuge for a number of wetland plants that could not occur elsewhere. Sloan's Pond provides one of the best examples of a very important wetland occurring within the park's boundaries. Both submergent and emergent vegetation occur as well as a number of other wetland species associated with the surrounding wet woods occur. Species occurring here include a number of sedges such as Carex crinita Lam., C. tribuloides Wahl., C. lupulina Muhl., and one rare sedge C. decomposita Muhl., rush (Juncus acuminatus Michx.), spike rush (Eleocharis quadrangulata R. & S.), bulrush (Scirpus cyperinus (L.) Kunth, beakrush (Rhynchospora corniculata (Lam.) Gray), three-way sedge (Dulichium arundinaceum (L.) Britt.), bladderwort (Utricularia gibba L.), lance-leaved violet (Viola lanceolata L.), and arrowhead (Sagittaria rigida Pursh).

Cobblebars, wet banks, and the wet woods along the Green River provide homes for a number of other wetland species such as swamp milkweed (Asclepias incarnata L.), loosestrife (Lysimachia ciliata L.), false pimpernel (Lindernia anagallidea (Michx.) Pennell), fog-fruit (Phyla lanceolata Michx.) Greene, and marsh-cress (Rorippa sylvestris (L.) Besser). The wetter communities of the park are not presently being threatened but periodic monitoring of both physical and biological elements should be conducted.

5. Hemlock Gorges

Disjunct populations of hemlock (Tsuga canadensis (L.) Carr.) occur along the northern portions of the park where streams have cut gorges through the Pottsville sandstone (Braun 1950). These gorges may also contain other species more characteristic of the Appalachian and Mixed Mesophytic forests such as yellow birch (Betula lutea Michx. f.), magnolias (Magnolia acuminata L., M. macrophylla Michx. and M. tripetala L.), American holly (Ilex opaca Ait.), and

sourwood (Oxydendrum arboreum L. DC.). Mountain laurel (Kalmia latifolia L.) is conspicuous in the understory as are several species of blueberries (Vaccinium spp.). Although these sheltered gorges are not floristically diverse herbaceously, they do provide havens for such species as the sweet white violet (Viola blanda Willd.), roundleaf catchfly (Silene rotundifolia Nutt.), mountain meadowrue (Thalictrum clavatum DC.), and the rare Frenches' shooting star (Dodecatheon frenchii (Vasey) Rydb.). The fact that this community is disjunct and rare this far west in the state make it an important and unique contribution to the park's biological diversity.

CONCLUSION

Based on similar floristic studies in both the Mixed Mesophytic and Western Mesophytic Forest regions, the presently known flora of Mammoth Cave National Park is more diverse than might be expected based on species-area curves (Wade and Thompson 1991). There is no doubt that the park's list of vascular plants is still incomplete and that there are many more species yet to be found within the parks boundaries. Twenty-one rare species of plants are now known to occur in the park. The park is a known haven for other rare species as well such as mussels (Cicerello and Hannan 1990) and fish (Cicerello and Hannan 1991).

Mammoth Cave National Park provides one of the largest refugia for biological diversity in Kentucky making it of vast importance in the preservation of Kentucky's natural heritage. However, certain of the park's natural communities are more environmentally sensitive than others and should be monitored closely to insure their continued existence.

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Appendix One. Vascular Plant Checklist of Mammoth Cave National Park
* = Rare Plant Status in Kentucky

LYCOPODIOPHYTA

Lycopodiaceae

Lycopodium digitatum A. Braun. Blanchard. Rare, Woods

L. lucidulum Michx. Rare, Wet Woods.

EQUISETOPHYTA

Equisetaceae

Equisetum arvense L. Infrequent, Mesic Areas.

E. hyemale L. Rare, Wet Areas.

PTERIODOPHYTA

Adiantaceae

Adiantum pedatum L. Infrequent, Rich Woods.

Cheilanthes lanosa (Michx). D.C. Eat. Infrequent, Rocky Areas.

Pellaea atropurpurea (L.) Link. Infrequent, Limestone Areas.

Aspleniaceae

Asplenium montanum Willd. Rare, Sandstone Crevices.

A. pinnatifidum Nutt. Rare, Sandstone Crevices.

A. platyneuron (L.) Oakes. Frequent, Woods.

A. resiliens Kunze. Infrequent, Woods.

A. rhizophyllum L. Infrequent, Limestone Rocks.

A. trichomanes L. Rare, Rich Woods.

A. X trudellii Wherry. Rare, Sandstone Crevices.

Athyrium filix-femina L. Infrequent, Mesic Woods.

A. pycnocarpon (Spreng.) Tidest. Infrequent, Mesic Woods.

A. thelypteroides (Michx.) Desv. Infrequent, Mesic Woods.

Cystopteris bulbifera (L.) Bernh. Infrequent, Limestone Cliffs.

C. fragilis (L.) Bernh. Infrequent, Mesic Woods

C. fragilis (L.) Bernh. var. mackayi Lawson. Rare, Mesic Woods.

Dryopteris goldiana (Hook.) Gray. Rare, Mesic Woods.

D. marginalis (L.) Gray. Rare, Woods

*D. spinulosa (Muell.) Watt. Rare, Mesic Woods.

Onoclea sensibilis L. Rare, Wet Woods.

Polystichum acrostichoides (Michx.) Weatherby. Infrequent, Woods.

Thelypteris hexagonoptera (Michx.) Wheatherby. Infrequent, Woods.

Woodsia obtusa (Spreng.) Torr. Frequent, Woods.

Blechnaceae

Woodwardia areolata (L.) T. Moore. Rare, Wet Woods.

Dennstaedtiaceae

Dennstaedtia punctilobula (Michx.) Moore. Rare, Open Woods.

Pteridium aquilinum (L.) Kuhn. Infrequent, Waste Areas.

Hymenophyllaceae

*Trichomanes boschianum Sturm. Rare, Moist Sandstone Crevices.

Ophioglossaceae

Botrychium dissectum Spreng. Rare, Woods.

B. virginianum (L.) Sw. Frequent, Mesic Woods.

Ophioglossum engelmanni Prantl. Rare, Barrens.

Osmundaceae

Osmunda cinnamomea L. Rare, Wet Woods.

O. regalis L. Rare, Wet Woods.

Polypodiaceae

Polypodium polypodioides (L.) Watt. Infrequent, Rocks and Trees.

P. virginianum L. Rare, Rocks.

PINOPHYTA

Cupressaceae

Juniperus virginiana L. Frequent, Dry Woods and Fields.

Pinaceae

Pinus echinata Mill. Frequent, Upland Woods. (Not native)

P. strobus L. Rare, Wasteground. (Not native)

P. virginiana Mill. Infrequent, Dry Open Areas.

Tsuga canadensis (L.) Carr. Infrequent, Mesic Woods.

MAGNOLIOPHYTA-LILIOPSIDA

Alismataceae

*Sagittaria graminea Michx. Rare, Upland Swamps.

S. rigida Pursh. Infrequent, Upland Swamps.

Agavaceae

Manfreda virginiana (L.) Rose. Infrequent, Barrens.

Yucca filamentosa L. Rare, Waste Ground.

Araceae

Arisaema dracontium (L.) Schott. Infrequent, Mesic Woods.

A. triphyllum (L.) Schott. Common, Mesic Woods.

Commelinaceae

Commelina communis L. Frequent, Wasteground.

C. virginica L. Rare, Mesic Woods.

Tradescantia subaspera Ker-Gawl. Infrequent, Mesic Woods.

T. virginiana L. Infrequent, Mesic Woods and Wasteground.

Cyperaceae

Carex albursina Sheldon. Infrequent, Mesic Woods.

C. amphibola Steud. Infrequent. Woods.

C. blanda Dewey. Frequent, Woods.

C. careyana Torr. Rare, Mesic Woods.

C. cephalophora Muhl. Frequent, Woods.

C. crinita Lam. Infrequent, Wet Areas.

C. communis Bailey. Rare, Woods.

*C. decomposita Muhl. Rare, Wet Areas.

C. digitalis Willd. Frequent, Woods.

C. eburnea Boott. Rare, Woods.

C. flaccosperma Dewey. Infrequent, Woods.

C. grayii Carey. Infrequent, Alluvial Woods.

C. hirsutella Mack. Frequent Woods.

C. hirtifolia Mack. Infrequent, Dry Woods.

C. jamesii Schw. Frequent, Mesic Woods.

C. laxiflora Lam. Frequent, Woods.

C. lupulina Muhl. Frequent, Wet Areas.
C. meadii Dewey. Rare, Limestone Glades.
C. nigromarginata Schw. Infrequent, Woods.
C. pensylvanica Lam. Frequent, Woods.
C. physorhynca Liebm. Infrequent, Woods.
C. plantaginea Lam. Infrequent, Mesic Woods.
C. platyphylla Carey. Infrequent, Mesic Woods.
C. retroflexa Muhl. Rare, Wet Woods.
C. swanii (Fern.) Mack. Frequent, Woods.
C. tribuloides Wahl. Frequent, Wet Areas.
C. wildenovii Schk. Rare, Mesic Woods.
Cyperus flavescens L. Frequent, Wet Areas.
C. ovularis (Michx.) Torr. Infrequent, Wet Areas.
C. pseudovegatus Steud. Rare, Wet Areas.
Dulichium arundinaceum (L.) Britt. Rare, Wet Areas.
Eleocharis engelmannii Steud. Frequent, Wet Areas.
E. palustris (L.) R. & S. Rare, Wet Areas.
E. quadrangulata (Michx.) R. & S. Rare, Wet Areas.
E. tenuis (Willd.) Schultes. Rare, Wet Area.
Fimbristylis autumnalis (L.) R. & S. Infrequent, Wet Areas.
Rhynchospora corniculata (Lam.) Gray. Rare, Wet Areas.
Scirpus atrovirens Willd. Infrequent, Wet Areas.
S. cyperinus (L.) Kunth. Infrequent, Wet Areas.
*Scleria ciliata Michx. Rare, Wet Ground.

Dioscoreaceae

Dioscorea quaternata (Walt.) Gmel. Infrequent, Woods.

D. villosa L. Rare, Mesic Woods.

Iridaceae

Belamcanda chinensis (L.) DC. Rare, Woods.

Iris cristata Ait. Infrequent, Rich Woods.

Sisyrinchium albidum Raf. Frequent, Open Areas, Barrens.

S. angustifolium Mill. Rare, Open Areas.

Juncaceae

Juncus acuminatus Michx. Frequent, Wet Areas.

J. tenuis Willd. Frequent, Wasteground.

Luzula echinata (Small) F.J. Herm. Infrequent, Woods.

Lemnaceae

Spirodela polyrhiza (L.) Schleid. Infrequent, Ponds.

Liliaceae

Allium canadense L. Infrequent, Open Areas.

A. tricoccum Ait. Rare, Woods.

Asparagus officinalis L. Rare, Wasteground.

Chamaelirium luteum (L.) Gray. Rare, Mesic Woods.

Erythronium albidum Nutt. Rare, Mesic Woods.

E. americanum Ker. Infrequent, Mesic Woods.

Hemerocallis fulva L. Infrequent, Wasteground.

Hymenocallis occidentalis (LeConte) Kunth. Rare, Wet Woods.

Hypoxis hirsuta (L.) Coville. Infrequent, Dry Woods, Barrens.

Lilium canadense L. Rare, Wet Open Areas.

*L. philadelphicum L. Rare, Dry Open Areas, Barrens.

Medeola virginiana L. Rare, Mesic Woods.

Nothoscordum bivalve (L.) Britt. Infrequent, Open Areas, Barrens.

Ornithogalum umbellatum L. Rare, Wasteground.

Polygonatum biflorum (Watt.) Ell. Infrequent, Woods.

Smilacina racemosa (L.) Dest. Infrequent, Woods.

Trillium flexipes Raf. Rare, Mesic Woods.

T. recurvatum Beck. Infrequent, Woods.

T. sessile L. Frequent, Woods.

Uvularia perfoliata L. Infrequent, Mesic Woods.

U. sessilifolia L. Infrequent, Mesic Woods.

*Veratrum woodii Robbins. Rare, Mesic Woods.

Najadaceae

*Potamogeton pulcher Tuckerm. Infrequent, Ponds.

Orchidaceae

Aplectum hyemale (Muhl.) Torr. Frequent, Woods.

Corallorhiza wisteriana Conrad. Rare, Woods.

Cypripedium calceolus L. Rare, Mesic Woods.

*C. parviflorum Salisb. Rare, Mesic Woods.

Goodyera pubescens (Willd.) R. Br. Infrequent, Woods.

Hexalectris spicata (Watt.) Barnh. Rare, Woods.

Liparis lilifolia (L.) L. C. Richard. Rare, Mesic Woods.

Orchis spectabilis L. Rare, Rich Woods.

Spiranthes cernua (L.) Rich. Infrequent, Open Areas.

S. gracilis (Bigel.) Beck. Rare, Open Areas.

S. ovalis Lindl. Rare, Open Areas.

S. tuberosa Raf. Rare, Open Areas.

S. vernalis Engelm. & Gray. Rare, Open Areas.

Tipularia discolor (Pursh) Nutt. Rare, Rich Woods.

Poaceae

Agrostis alba L. Infrequent, Wet Areas.

A. hyemalis (Watt.) BSB. Infrequent, Woods and Wasteground.

A. perennans (Watt.) Tuckerm. Infrequent, Woods and Wasteground.

Andropogon elliottii Champ. Infrequent, Open Areas.

A. gerardi Vitm. Infrequent, Barrens.

A. ternarius Michx. Rare, Open Areas.

A. virginicus L. Frequent, Open Areas.

Aristida dichotoma Michx. Infrequent, Wasteground.

A. oligantha Michx. Infrequent, Wasteground.

Arundinaria gigantea (Watt.) Chapm. Rare, Moist Woods.

Bromus commutatus Schrad. Frequent, Wasteground.

B. japonicus Thunb. Frequent, Wasteground.

B. purgans L. Infrequent, Wasteground.

Chasmanthium latifolium (Michx.) Yates. Frequent, Alluvial Woods.

Dactylis glomerata L. Frequent, Wasteground.

Danthonia spicata (L.) Beauv. Infrequent, Open Areas, Barrens.

Diarrhena americana Beauv. Frequent, Mesic Woods.

Dichanthelium boscii (Poir.) Gould & Clark. Frequent, Woods.

D. commutatum (Schultes) Gould. Infrequent, Open Areas.

D. depauperatum Muhl.) Gould. Frequent, Woods.

D. dichotomum (Lam.) Gould. Infrequent, Woods.

D. latifolium (L.) Gould & Clark. Frequent, Woods.

D. laxiflorum (Lam.) Gould. Infrequent, Woods.

D. oligosanthos (Schutt.) Gould. Frequent, Open Areas.

D. ravenelii (Ell.) Gould. Frequent, Woods.

D. sphaerocarpon (Ell.) Gould var. isophyllum (Scribn.) Gould & Clark.
Frequent, Woods.

D. sphaerocarpon (Ell.) Gould var. sphaerocarpon. Frequent, Woods.

Digitaria ischaemum (Schreb.) Muhl. Frequent, Wasteground.

D. sanguinalis (L.) Scop. Frequent, Wasteground.

Echinochloa crusgalli (L.) Beauv. Frequent, Moist Areas.

E. muricata (Beauv.) Fern. Infrequent, Moist Areas.

Eleusine indica (L.) Gaertn. Frequent, Wasteground.

Elymus villosus Muhl. Infrequent, Woods.

E. virginicus L. Frequent, Moist Woods.

Eragrostis cilianensis (All.) Link. Frequent, Wasteground.

E. frankii C.A. Meyer. Rare, Wet Areas.

E. pectinacea (Michx.) Nees. Infrequent, Wet Areas.

E. spectabilis (Pursh.) Steud. Frequent, Wasteground.

Erianthus alopecuroides (L.) Ell. Infrequent, Open Areas.

Festuca elatior L. Frequent, Wasteground.

F. obtusa Biehler. Frequent, Wasteground.

Glyceria striata (Lam.) Hitchc. Frequent, Wet Areas.

Hordeum pusillum Nutt. Frequent, Wasteground.

Hystrix patula Moench. Frequent, Woods.

Leersia oryzoides (L.) Sw. Frequent, Wet Areas.

L. virginica Willd. Rare, Wet Ground.

Leptochloa filiformis (Lam.) Beauv. Rare, Open Areas.

Melica mutica Watt. Frequent, Open Woods.

Microstegium vimineum (Trin.) A. Camus. Frequent, Mesic Woods.

Muhlenbergia frondosa (Poir) Fern. Infrequent, Wet Areas.

M. mexicana (L.) Trin. Rare, Wet Areas.

M. schreberi J. F. Gmel. Infrequent, Wet Wasteground.

Panicum anceps Michx. Frequent, Mesic Woods.

P. capillare L. Frequent, Wasteground.

P. dichotomiflorum Michx. Frequent, Wet Areas.

P. gattingeri Nash. Infrequent, Wasteground.

P. stipitatum Nash. Infrequent, Wet Areas.

P. verrucosum Muhl. Rare, Wet Woods.

P. virgatum L. Frequent, Wasteground.

Paspalum laeve Michx. Frequent, Wasteground.

P. pubiflorum Rupr. Infrequent, Wasteground.

Phleum pratense L. Frequent, Wasteground.

Poa compressa L. Infrequent, Wasteground.

P. pratensis L. Frequent, Wasteground.

Schizachyrium scoparium (Michx.) Nash. Infrequent, Open Areas.

Setaria faberii Herrm. Frequent, Wasteground.

S. geniculata (Lam.) Beauv. Frequent, Moist Wasteground.

S. glauca (L.) Beauv. Frequent, Wasteground.

Sorghastrum nutans (L.) Nash. Infrequent, Barrens.

Sorghum halepense (L.) Pers. Frequent, Wasteground.

Sphenopholis intermedia Rydb. Infrequent, Wet Areas.

S. nitida (Biehler) Scribn. Frequent, Woods.

Sporobolus asper (Michx.) Kunth. Rare, Barrens.

S. vaginiflorus (Torr.) Wood. Infrequent, Barrens.

Tridens flavus (L.) Hitch. Frequent, Open Areas.

Smilacaceae

Smilax bona-nox L. Frequent, Woods.

S. ecirrhata Engelm.) S. Wats. Rare, Rich Woods.

S. glauca Watt. Frequent, Woods.

S. herbacea L. Rare, Woods

S. hispida Muhl. Rare, Mesic Areas.

S. rotundifolia L. Infrequent, Woods.

Sparganiaceae

Sparganium androcladum (Engelm.) Morong. Rare, Wet Areas.

Typhaceae

Typha angustifolia L. Rare, Wet Areas.

T. latifolia L. Frequent, Wet Areas.

MAGNOLIOPHYTA-MAGNOLIOPSIDA

Acanthaceae

Justicia americana (L.) Vahl. Common, Wet Areas.

Ruellia caroliniensis (Watt). Steud. Common, Roadsides.

Ruellia strepens L. Infrequent, Roadsides.

Aceraceae

Acer negundo L. Common, Alluvial Woods, Wasteground.

A. nigrum Michx. f. Rare, Mesic Woods.

A. rubrum L. Common, Mesic Woods.

A. saccharinum L. Common, Alluvial Woods, Wasteground.

A. saccharum Marsh. Common, Woods.

Aizoaceae

Mollugo verticillata L. Infrequent, Wasteground.

Anacardiaceae

Rhus aromatica Ait. Infrequent, Wasteground.

R. copallinum L. Infrequent, Wasteground.

R. glabra L. Infrequent, Wasteground.

R. typhina L. Infrequent, Wasteground.

Toxicodendron radicans (L.) Kuntze. Frequent, Woods, Wasteground.

Annonaceae

Asimina triloba (L.) Dunal. Infrequent, Rich Mesic Woods.

Apiaceae

Angelica venenosa (Greenway) Fern. Rare, Dry Open Areas.

Chaeophyllum tainturieri Hook. Infrequent, Open Areas.

Cryptotaenia canadensis (L.) DC. Infrequent, Woods.

Daucus carota L. Frequent, Wasteground.

Erigenia bulbosa (Michx.) Nutt. Infrequent, Woods.

Eryngium yuccifolium Michx. Rare, Open Woods, Barrens.

Osmorhiza claytoni (Michx.) Clarke. Infrequent, Mesic Woods.

Oxypolis rigidior (L.) Raf. Rare, Wet Areas.

Sanicula canadensis L. Infrequent, Woods.

S. marilandica L. Infrequent, Woods.

Taenidia integerrima (L.) Drude. Infrequent, Dry Open Areas.

Thaspium pinnatifidum (Buckl.) Gray. Frequent, Dry Open Areas.

Zizia aptera (Gray) Fern. Frequent, Alluvial Woods.

Apocynaceae

Apocynum cannabinum L. Infrequent, Wasteground.

Vinca minor L. Rare, Wasteground.

Aquifoliaceae

Ilex opaca Ait. Rare, Sandy Woods.

Araliaceae

Aralia racemosa L. Infrequent, Mesic Woods.

A. spinosa L. Infrequent, Mesic Woods.

Panax quinquefolium L. Rare, Mesic Woods.

Asclepiadaceae

Asclepias exaltata L. Rare, Mesic Woods.

A. incarnata L. Infrequent, Alluvial Woods.

A. quadrifolia Jacq. Infrequent, Woods.

A. syriaca L. Frequent, Wasteground.

A. tuberosa L. Infrequent, Wasteground.

A. variegata L. Rare, Woods.

A. verticillata L. Rare, Barrens.

A. viridiflora Raf. Rare, Barrens.

Aristolochiaceae

Aristolochia macrophylla Lam. Rare, Mesic Woods.

A. serpentaria L. Infrequent, Woods.

A. tomentosa Sims. Infrequent, Alluvial Woods.

Asteraceae

Achillea millefolium L. Frequent, Wasteground.

Ambrosia artemisiifolia L. Frequent, Wasteground.

A. trifida L. Frequent, Wasteground.

Antennaria plantaginifolia (L.) Richards. Frequent, Woods, Wasteground.

A. solitaria Rydb. Rare, Woods.

Anthemis cotula L. Frequent, Wasteground.

Arctium minus Schk. Infrequent, Wasteground.

Artemesia annua L. Infrequent, Wasteground.

A. ludoviciana Nutt. Infrequent, Wasteground.

Aster divaricatus L. Frequent, Woods.

A. dumosus L. Frequent, Wasteground.

A. laevis L. Rare, Barrens.

A. lateriflorus (L.) Britt. Infrequent, Wasteground.

A. linariifolius L. Infrequent, Open Woods, Wasteground.

A. patens Ait. Infrequent Woods, Wasteground.

A. pilosus Willd. Frequent, Wasteground.

A. sagittifolius Willd. Rare, Woods.

*A. sericeus Vent. Rare, Barrens.

A. shortii Lindl. Infrequent, Woods, Wasteground.

A. simplex Willd. Frequent, Mesic Woods and Wasteground.

A. solidagineus Michx. Rare, Wasteground.

A. undulatus L. Frequent, Dry Woods.

A. vimineus Lam. Frequent, Wasteground.

Astranthium integrifolium (Michx.) Nutt. Infrequent, Open Woods.

Bidens aristosa (Michx.) Britt. Frequent, Wet Areas.
B. bipinnata L. Frequent, Wet Areas.
B. discoidea (T & G.) Brit. Frequent, Wet Areas.
B. polylepis Blake. Infrequent, Wet Areas.
B. tripartita L. Frequent, Wet Areas.
Cacalia muhlenbergii (Schultz-Bip) Fern. Rare, Wasteground.
C. sauveolens L. Rare, Wasteground.
Centaurea maculosa Lam. Rare, Wasteground, Barrens.
Chrysanthemum leucanthemum L. Frequent, Wasteground.
Cichorium intybus L. Frequent, Wasteground.
Cirsium altissimum (L.) Spreng. Infrequent, Wasteground, Open Woods.
C. discolor (Muhl.) Spreng. Frequent, Wasteground.
C. virginianum (L.) Michx. Rare, Wet Wasteground.
Conyza canadensis (L.) Cronq. Frequent, Wasteground.
Coreopsis auriculata L. Infrequent, Open Woods.
C. lanceolata L. Infrequent, Wasteground.
C. major Watt. Infrequent, Woods.
C. pubescens Ell. Rare, Woods.
C. tripteris L. Infrequent, Open Woods, Barrens.
Echinacea pallida Nut. Rare, Barrens.
E. purpurea (L.) Moench. Rare, Open Woods, Barrens.
Eclipta alba (L.) Hassk. Infrequent, Wasteground.
Elephantopus carolinianus Willd. Infrequent, Open Woods, Wasteground.
Erechtites hieracifolia (L.) Raf. Rare, Wasteground.
Erigeron annuus (L.) Pers. Frequent, Wasteground.
E. philadelphicus L. Infrequent, Wasteground.
E. pulchellus Michx. Frequent, Woods, Wasteground.

E. strigosus Muhl. Infrequent, Woods, Wasteground.

Eupatorium altissimum L. Infrequent, Woods.

E. aromaticum L. Rare, Dry Woods.

E. coelestinum L. Frequent, Mesic Woods, Wasteground.

E. dubium Willd. Rare, Wet, Open Ground.

E. hyssopifolium L. Rare, Wasteground, Barrens.

E. perfoliatum L. Infrequent, Wet Open Woods, Wasteground.

E. pilosum Watt. Rare, Wet, Open, Ground.

E. purpureum L. Frequent, Dry Open Woods, Wasteground.

E. rotundifolium L. Infrequent, Woods.

E. rugosum Houtt. Frequent, Woods.

E. serotinum Michx. Infrequent, Woods.

E. sessilifolium L. Infrequent, Woods.

Galinsoga ciliata (Raf.) Blake. Infrequent, Wasteground.

Gnaphalium obtusifolium L. Infrequent, Wasteground.

G. purpureum L. Infrequent, Wasteground.

Helenium autumnale L. Rare, Wet Ground.

H. flexuosum Raf. Infrequent, Wet Ground.

Helianthus divaricatus L. Common, Open Woods, Wasteground.

*H. eggertii Small. Rare, Roadsides, Barrens.

H. hirsutus Raf. Frequent, Woods.

H. microcephalus T & G. Infrequent, Open Woods, Roadsides.

H. mollis Lam. Infrequent, Open Woods, Barrens.

H. occidentalis Ridell. Rare, Barrens.

H. strumosus L. Infrequent, Open Woods, Wasteground.

Heliopsis helianthoides (L.) Sweet. Infrequent, Dry Woods, Wasteground.

Hieracium auranticum L. Infrequent, Wasteground.

H. gronovii L. Frequent, Wasteground.
H. pilosella L. Infrequent, Wasteground.
H. scabrum Michx. Infrequent, Woods.
H. trallii Greene. Rare, Open Woods.
H. venosum L. Frequent, Wasteground.
Krigia biflora (Watt.) Blake. Frequent, Woods, Wasteground.
H. dandelion (L.) Nutt. Frequent, Wasteground.
K. oppositifolia Raf. Infrequent, Moist Wasteground.
K. virginica (L.) Willd. Frequent, Wasteground.
Kuhnia eupatorioides L. Infrequent, Barrens, Wasteground.
Lactuca floridana (L.) Gaertn. Frequent, Open Woods, Wasteground.
Liatris scabra (Greene). K. Schum. Infrequent, Open Woods.
L. scariosa (L.) Willd. Rare, Barrens.
L. squarrosa (L.) Michx. Infrequent, Barrens, Wasteground.
L. squarrulosa Michx. Infrequent, Barrens.
Parthenium integrifolium L. Frequent, Open Ground.
Pluchea camphorata (L.) DC. Rare, Wet Areas.
Polymnia canadensis L. Frequent, Wasteground, Disturbed Woods.
P. uvedalia L. Frequent, Wasteground, Disturbed Woods.
Prenanthes altissima L. Infrequent, Woods.
P. trifoliolata Cass.) Fern. Infrequent, Woods.
Pyrrhopappus carolinianus (Watt). DC. Frequent, Wasteground.
Ratibida pinnata (Vent.) Barnh. Rare, Open Woods, Barrens.
Rudbeckia fulgida Ait. Rare, Open Ground.
R. hirta L. Frequent, Wasteground, Open Woods.
R. laciniata L. Rare, Wet Ground.
R. triloba L. Frequent, Wasteground, Open Woods.

Senecio aureus L. Infrequent, Open Woods.
S. obovatus Muhl. Infrequent, Mesic Woods.
S. pauperculus Michx. Rare, Open Areas.
S. smallii Britt. Frequent, Open Areas.
S. viscosus L. Infrequent, Wasteground.
Silphium integrifolium Michx. Infrequent, Open Areas, Barrens.
S. perfoliatum L. Frequent, Open Woods.
S. terebinthinaceum Jacq. Rare, Barrens.
S. trifoliatum L. Infrequent, Open Ground.
Solidago bicolor O. Rare, Dry Woods.
S. caesia L. Infrequent, Woods.
S. canadensis L. Frequent, Wasteground.
S. erecta Pursh. Infrequent, Dry Woods.
S. flexicaulis L. Infrequent, Woods.
S. gattingeri Chapm. Rare, Barrens.
S. graminifolia L. Salisb. Rare, Wet Ground.
S. juncea Ait. Frequent, Wasteground.
S. nemoralis Ait. Frequent, Wasteground.
S. odora Ait. Infrequent, Open Woods.
*S. puberula Nutt. Rare, Barrens.
S. rugosa Mill. Rare, Woods.
S. sphacelata Raf. Rare, Woods.
S. ulmifolia Muhl. Infrequent, Woods.
Sonchus asper (L.) Hill. Frequent, Wasteground.
Taraxacum laevigatum (Willd.) DC. Infrequent, Wasteground.
T. officinale Weber. Frequent, Wasteground.
Tragopogon dubius Scop. Frequent, Wasteground.

Verbesina alternifolia (L.) Britt. Infrequent, Wet Woods.

V. helianthoides Michx. Rare, Dry Woods and Open Areas.

V. virginica L. Frequent, Woods.

Vernonia altissima Nutt. Frequent, Wasteground.

Berberidaceae

Caulophyllum thalictroides (L.) Michx. Infrequent, Mesic Woods.

Jeffersonia diphylla (L.) Pers. Rare, Mesic Woods.

Podophyllum peltatum L. Frequent, Woods.

Betulaceae

Alnus glutinosa (L.) Gaertn. Rare, Mesic Woods.

Betula lenta L. Rare, Mesic Woods.

B. lutea Michx. f. Rare, Mesic Woods.

B. nigra L. Infrequent, Alluvial Woods.

Carpinus caroliniana att. Infrequent, Mesic Woods.

Corylus americana Watt. Infrequent, Woods, Wasteground.

Ostrya virginiana (Mill.) K. Koch. Frequent, Woods.

Bignoniaceae

Bignonia capreolata L. Frequent, Woods, Wasteground.

Campsis radicans (L.) Seen. ex Bureau. Frequent, Wasteground.

Boraginaceae

Cynoglossum virginianum L. Frequent, Woods.

Hackelia virginiana (L.) Johnst. Rare, Woods.

Lithospermum canescens (Michx.) Helm. Infrequent, Barrens, Wasteground.

L. latifolium Michx. Infrequent, Alluvial Woods.

Mertensia virginica (L.) Pers. Infrequent, Alluvial Woods.

Myosotis verna Nutt. Infrequent, Woods, Wasteground.

Brassicaceae

Arabidopsis thaliana (L.) Heyn. Infrequent, Wasteground.

Arabis canadensis L. Rare, Woods.

A. laevigata (Muhl.) Poir. Infrequent, Woods.

A. virginica (L.) Poir. Frequent, Woods and Wasteground.

Barbarea vulgaris R. Br. Frequent, Wasteground.

Brassica nigra (L.) Koch. Frequent, Wasteground.

Capsella bursa-pastoris (L.) Medic. Frequent, Wasteground.

Cardamine bulbosa (Schreb.) BSP. Infrequent, Wet Areas.

C. douglassii (Torr.) Britt. Infrequent, Mesic Woods.

C. hirsuta L. Frequent, Wasteground.

C. parviflora L. Infrequent, Wasteground.

C. pennsylvanica Muhl. Rare, Woods.

Dentaria diphylla Michx. Infrequent, Woods.

D. heterophylla Nutt. Infrequent, Woods.

D. laciniata Muhl. Frequent, Woods.

D. multifida Muhl. Rare, Woods.

Draba brachycarpa Nutt. Infrequent, Open Woods, Wasteground.

D. verna L. Frequent, Wasteground.

Iodanthus pinnatifidus (Michx.) Steud. Infrequent, Woods.

Lepidium campestre (L.) R. Br. Frequent, Wasteground.

L. ruderale L. Frequent, Wasteground.

L. virginicum L. Frequent, Wasteground.

*Lesquerella globosa (Desv.) Wats. Rare, Rocky Roadsides.

Rorippa sylvestris (L.) Bessr. Rare, River Banks.

Cactaceae

Opuntia humifusa (Raf). Infrequent, Barrens.

Campanulaceae

Campanula americana L. Frequent, Mesic Woods.

Lobelia cardinalis L. Rare, Wet Woods.

L. inflata L. Infrequent, Open Woods.

L. puberula Michx. Rare, Open Areas.

L. spicata Lam. Infrequent, Barrens.

Triodanis perfoliata (L.) Niewl. Frequent, Wasteground.

Caprifoliaceae

Lonicera japonica Thumb. Frequent, Wasteground, Disturbed Woods.

L. sempervirens L. Infrequent, Woods, Wasteground.

Sambucus canadensis L. Frequent, Wasteground.

Symphoricarpos orbiculatus Moench. Infrequent, Dry Woods, Wasteground.

Triosteum perfoliatum L. Infrequent, Woods.

Viburnum acerifolium L. Infrequent, Mesic Sandstone Woods.

V. prunifolium L. Infrequent, Woods.

V. rufidulum Raf. Infrequent, Dry Woods.

Caryophyllaceae

Arenaria patula Michx. Frequent, Barrens, Wasteground.

Cerastium viscosum L. Frequent, Wasteground.

Dianthus armeria L. Frequent, Wasteground.

Paronychia canadensis (L.) Wood, Infrequent, Sandy Wasteground.

P. fastigata (Raf.) Fern. Rare, Dry Woods, Wasteground.

Saponaria officinalis L. Frequent, Wasteground.

Silene rotundifolia Nutt. Rare, Open Cliffs, Rocky Banks.

S. stellata (L.) Raf. F. Infrequent, Woods.

S. virginica L. Frequent, Woods, Open Slopes.

Stellaria media (L.) Cyrill. Frequent, Woods, Wasteground.

S. pubera Michx. Infrequent, Woods.

Celastraceae

Celastrus scandens L. Infrequent, Wasteground.

Euonymus americanus L. Frequent, Mesic Woods.

E. atropurpureus Jac. Infrequent, Mesic Woods.

Chenopodiaceae

Chenopodium ambrosioides L. Frequent, Wasteground.

Clusiaceae

Hypericum canadense L. Rare, Woods.

H. denticulatum Watt. Rare, Wasteground.

H. drummondii (Grev. & Hook.) T. & G. Rare, Woods.

H. frondosum Michx. Rare, Open Woods.

H. hypericoides (L.) Crantz. Infrequent, Woods.

H. mutilum L. Infrequent, Wet Areas.

H. perforatum L. Frequent, Open Areas.

H. prolificum L. Infrequent, Open Areas.

H. punctatum Lam. Infrequent, Open Areas.

H. sphaerocarpum Michx. Infrequent, Barrens.

Convolvulaceae

Convolvulus sepium L. Infrequent, Wasteground.

Cuscuta gronovii Willd. Infrequent, Wasteground.

Ipomoea pandurata (L.) Mey. Frequent, Wasteground.

I. purpurea (L.) Roth. Frequent, Wasteground.

Cornaceae

Cornus florida L. Frequent, Throughout.

Crassulaceae

Penthorum sedoides L. Rare, Wet Areas.

Sedum pulchellum Michx. Infrequent, Rocky Areas.

S. ternatum Michx. Infrequent, Woods.

Cucurbitaceae

Sicyos angulatus L. Rare, Wet Areas.

Dipsacaceae

Dipsacus fullonum L. Infrequent, Wasteground.

Ebenaceae

Diospyros virginiana L. Frequent, Woods.

Ericaceae

Chimaphila maculata (L.) Pursch. Frequent, Woods.

Gaulthera procumbens L. Rare, Sandstone Woods.
Gaylussacia baccata (Wang.) K. Koch. Rare, Sandy Woods.
Kalmia latifolia L. Infrequent, Sandy Woods.
Monotropa hypopithys L. Rare, Woods.
M. uniflora L. Rare, Woods.
Oxydendrum arboreum (L.) DC. Infrequent, Woods.
Vaccinium arboreum Marsh. Infrequent, Woods.
V. stamineum L. Frequent, Woods.
V. uliginosum L. Rare, Woods.
V. vacillans Torr. Infrequent, Woods.

Euphorbiaceae

Acalpha virginica L. Infrequent, Wasteground.
Croton capitatus Michx. Rare, Open Areas.
C. monanthogynus Michx. Frequent, Open Areas.
Euphorbia commutata Engelm. Infrequent, Woods.
E. maculata L. Frequent, Wasteground.
Tragia cordata Michx. Rare, Woods.

Fabaceae

Amphicarpa bracteata (L.) Fern. Infrequent, Woods, Wasteground.
Apios americana Medica. Rare, Moist Open Woods.
Cassia fasciculata Michx). Infrequent, Wasteground.
C. marilandica L. Frequent, Mesic Woods, Wasteground.
C. nictitans L. Infrequent, Wasteground.
Cercis canadensis L. Frequent, Woods, Wasteground.
Clitoria mariana L. Rare, Dry Open Woods.

Desmodium canadense (L.) DC. Frequent, Moist Areas.
D. cuspidatum (Muhl.) Loud. Infrequent, Dry Areas.
D. glutinosum (Muhl.) Wood. Infrequent, Rich Woods.
D. laevigatum (Nutt.) DC. Infrequent, Rich Woods.
D. nudiflorum (L.) DC. Frequent, Woods.
D. paniculatum (L.) DC. Frequent, Dry Woods.
D. pauciflorum (Nutt.) DC. Infrequent, Rich Woods.
D. rotundifolium DC. Frequent, Moist Woods.
D. viridiflorum (L.) DC. Infrequent, Moist Woods.
Gleditsia tricanthos L. Frequent, Woods.
Gymnocladus dioica (L.) K. Koch. Rare, Mesic Woods.
Lespedeza intermedia (Wats.) Britt. Frequent, Wasteground.
L. hirta (L.) Hornem. Infrequent, Wasteground.
L. procumbens Michx. Frequent, Wasteground.
L. striata (Thunb.) H. & A. Frequent, Wasteground.
L. virginica (L.) Britt. Frequent, Wasteground.
Medicago sativa L. Infrequent, Wasteground.
Melilotus alba Desr. Frequent, Wasteground.
M. officinalis (L.) Lam. Frequent, Wasteground.
Psoralea psoralioides (Watt). Cory. Infrequent, Woods.
Pueraria lobata (Willd.) Ohwi. Infrequent, Wasteground.
Robinia hispida L. Rare, Woods.
R. pseudoacacia L. Infrequent, Woods.
Strophostyles umbellata (Muhl.) Britt. Rare, Woods.
Stylosanthes biflora (L.) BSP. Infrequent, Open Woods.
Tephrosia virginiana (L.) Pers. Infrequent, Open Woods.
Trifolium agarium L. Infrequent, Wasteground.

T. arvense L. Frequent, Wasteground.
T. hybridum L. Infrequent, Wasteground.
T. pratense L. Frequent, Wasteground.
*T. reflexum L. Rare, Wasteground, Barrens.
T. repens L. Frequent, Wasteground.
Vicia caroliniana Watt. Infrequent, Woods,
V. sativa L. Infrequent, Wasteground.
Wisteria macrostachya Nutt. Rae, Wasteground.

Fagaceae

Castanea dentata (Marsh.) Borkh. Rare, Woods.
Fagus grandifolia Ehrh. Frequent, Woods.
Quercus alba L. Frequent, Woods.
Q. bicolor Willd. Infrequent, Wet Woods.
Q. coccinea Muenchh. Infrequent, Woods.
Q. falcata Michx. Infrequent, Woods.
Q. imbricaria Michx. Infrequent, Woods.
Q. macrocarpa Michx. Rare, Wet Woods.
Q. marilandica Muenchh. Infrequent, Dry Woods.
Q. muhlenbergii Engelm. Frequent, Woods.
Q. nigra L. Infrequent, Wet Woods.
Q. palustris Muenchh. Infrequent, Mesic Woods.
Q. phellos L. Infrequent, Woods.
Q. prinus L. Frequent, Woods.
Q. rubra L. Frequent, Woods.
Q. stellata Wang. Frequent, Woods.
Q. velutina Lam. Frequent, Woods.

Gentianaceae

Bartonia paniculata (Michx.) Muhl. Rare, Wet Areas.

Centaurium pulchellum (Sx.) Druce. Rare, Wasteground.

Frasera caroliniensis Walt. Infrequent, Woods.

Gentiana andrewsii Griseb. Rare, Wet Woods.

*G. puberula Michx. Rare, Open Areas.

G. villosa L. Rare, Woods.

Obolaria virginica L. Infrequent, Woods.

Sabatia angularis (L.) Pursh. Infrequent, Open Areas.

Geraniaceae

Geranium carolinianum L. Infrequent, Open Areas.

G. dissectum L. Infrequent, Open Woods.

G. maculatum L. Frequent, Woods.

G. molle L. Frequent, Wasteground.

Haloragidaceae

Proserpinaca palustris L. Infrequent, Wet Areas.

Hamamelidaceae

Hamamelis virginiana L. Infrequent, Moist Woods.

Liquidambar styraciflua L. Frequent, Wet Woods.

Hippocastanaceae

Aesculus glabra Willd. Infrequent, Woods.

Hydrophyllaceae

Hydrophyllum appendiculatum L. Frequent, Alluvial Woods.

Phacelia bipinnatifida Michx. Frequent, Woods.

Juglandaceae

Carya cordiformis (Wang.) K. Koch. Frequent, Upland Woods.

C. glabra (Mill.) Sweet. Frequent Woods.

C. illinoensis (Wang.) K. Koch. Rare, Wasteground.

C. laciniosa (Michx.) Loud. Infrequent, Woods

C. ovalis (Wang.) Sarg. Infrequent, Woods.

C. ovata (Mill.) Sweet. Frequent, Woods.

C. tomentosa (Poir.) Nutt. Frequent, Woods.

*Juglans cinerea L. Infrequent, Mesic Woods.

J. nigra L. Frequent, Woods.

Lamiaceae

Blephilia ciliata (L.) Benth. Infrequent, Woods and Open Areas.

B. hirsuta (Pursh) Benth. Infrequent, Woods and Open Areas.

Collinsonia canadensis L. Rare, Rich Woods.

Glechoma hederacea L. Frequent, Alluvial Woods.

Hedeoma pulgeioides (L.) Pers. Infrequent, Upland Woods.

Isanthus brachiatus (L.) BSP. Infrequent, Open Areas.

Lycopus americanus Muhl. Infrequent, Wet Areas.

L. uniflorus Michx. Rare, Wet Areas.

Meehania cordata (Nutt). Britt. Rare, Rich Woods.

Mentha piperita L. Infrequent, Wet Areas.

Monarda bradburiana Beck. Rare, Woods.

M. clinopodia L. Infrequent, Woods.
M. fistulosa L. Frequent, Open Areas.
M. russeliana Sims. Rare, Woods.
Perilla frutescens (L. Britt. Infrequent, Wasteground.
Physostegia virginiana (L.) Benth. Rare, Open Areas.
Prunella vulgaris (L.) Frequent, Wasteground.
Pycnanthemum flexuosum Watt.) BSP. Infrequent, Open Areas.
P. incanum (L.) Michx. Frequent, Open Woods.
Salvia lyrata L. Frequent, Wasteground.
Scutellaria elliptica Muhl. Infrequent, Woods.
S. incana Biehler. Infrequent, Woods.
S. lateriflora L. Infrequent, Wet Areas.
S. leonardii Epl. Rare, Dry Woods and Barrens.
S. ovata Hill. Frequent, Woods
S. nervosa Pursh. Infrequent Woods.
S. parvula Michx. Infrequent, Mesic Open Areas, Woods.
Synandra hispidula (Michx.) Baill. Rare, Rich Woods.
Teucrium canadense L. Infrequent, Mesic Woods.
Trichostema dichotomum L. Infrequent, Dry Open Areas.
T. setaceum Houtt. Frequent, Open Areas.

Lauraceae

Lindera benzoin (L.) Blume. Frequent, Woods.
Sassafras albidum (Nutt.) Nees. Frequent, Woods.

Lentibulariaceae

Utricularia gibba L. Rare, Ponds.

Linaceae

Linum medium (Planch.) Britt. Infrequent, Wasteground.

L. virginianum L. Infrequent, Wasteground.

Loranthaceae

Phoradendron serotinum (Raf.) M. C. Johnston. Rare, Woods.

Lythraceae

Cuphea petiolata (L.) Koehne. Rare, Open Areas.

Magnoliaceae

Liriodendron tulipifera L. Frequent, Woods.

Magnolia acuminata L. Infrequent, Mesic Woods.

M. macrophylla Michx. Rare, Rich Woods.

M. tripetala L. Infrequent, Mesic Woods.

Malvaceae

Hibiscus laevis All. Rare, Wet Areas.

H. moscheutos L. Rare, Wet Areas.

Sida spinosa L. Frequent, Wasteground.

Melastomataceae

Rhexia mariana L. Rare, Mesic Open Areas.

R. virginica L. Rare, Mesic Open Areas.

Moraceae

Maclura pomifera (Raf.) Schneid. Frequent, Wasteground.

Morus rubra L. Infrequent, Woods.

Nyssaceae

Nyssa sylvatica Marsh. Infrequent, Upland Woods.

Oleaceae

Fraxinus americana L. Frequent, Woods,

F. nigra Marsh. Rare, Woods.

F. pensylvanica Marsh. Infrequent, Mesic Woods.

F. quandrangulata Michx. Frequent, Woods.

Onagraceae

Circaea lutetiana (L.) Aschers & Magnus. Frequent, Mesic Woods.

Gaura filipes Spach. Rare, Open Areas, Barrens.

Ludwigia alternifolia L. Rare, Wet Areas.

L. palustris (L.) Ell. Rare, Wet Areas.

Oenothera fruticosa L. Rare, Open Areas.

O. rhombipetala Nutt. Rare, Open Areas.

O. tetragona Roth. Rare, Open Areas.

Orobanchaceae

Conopholis americana (L.) Wallr. Rare, Dry Woods.

Epifagus virginiana (L.) Bart. Frequent, Mesic Woods.

Oxalidaceae

Oxalis dillenii Jacq. Frequent, Wasteground.

O. grandis Small. Rare, Rich Woods.

O. stricta L. Frequent, Wasteground.

O. violacea L. Infrequent, Woods.

Papaveraceae

Corydalis flavula (Raf.) DC. Frequent, Woods.

Dicentra canadensis (Goldie). Walp. Frequent, Woods.

D. cucullaria (L.) Bernh. Infrequent, Woods.

Sanguinaria canadensis L. Rare, Rich Woods.

Stylophorum diphyllum (Michx.) Nutt. Rare, Rich Woods.

Passifloraceae

Passiflora incarnata L. Frequent, Wasteground.

P. lutea L. Rare, Wasteground.

Phytolaccaceae

Phytolacca americana L. Frequent, Wasteground.

Plantaginaceae

Plantago aristata Michx. Infrequent, Wasteground.

P. lanceolata L. Frequent, Wasteground.

P. media L. Rare, Wasteground.

P. rugelii Decne. Frequent, Wasteground.

P. virginica L. Rare, Wasteground.

Platanaceae

Platanus occidentalis L. Frequent, Alluvial Woods

Polemoniaceae

Phlox amoena Sims. Rare, Woods.

P. bifida Beck. Rare, Open Woods.

P. divaricata L. Frequent, Woods.

P. glaberrima L. Infrequent, Woods.

P. maculata L. Rare, Woods.

P. paniculata L. Rare, Wasteground.

Polemonium reptans Rare, Mesic Woods.

Polygalaceae

Polygala incarnata L. Rare, Barrens.

P. sanguinea L. Infrequent, Woods.

P. verticillata L. Rare, Barrens.

Polygonaceae

Polygonum caespitosum Blume. Frequent, Wasteground.

P. convolvulus L. Infrequent, Wasteground.

P. douglassii Greene. Rare, Wasteground.

P. hydropiperoides Michx. Infrequent, Wet Area.

P. persicaria L. Frequent, Wasteground.

P. punctatum Ell. Frequent, Wet. Areas.

P. scandens L. Infrequent, Wet Areas.

P. virginianum L. Frequent, Alluvial Woods.

Rumex acetosella L. Infrequent, Wasteground.

R. crispus L. Frequent, Wasteground.

R. pulcher L. Infrequent, Wasteground.

Portulacaceae

Claytonia virginica L. Frequent, Woods.

Portulaca oleracea L. Infrequent, Wasteground.

Primulaceae

Anagallis arvensis L. Infrequent, Wasteground.

Dodecatheon frenchii (Rydb.) Vasey. Rare, Sandstone Rockhouses.

D. media L. Infrequent, Woods.

Lysimachia ciliata L. Rare, Wet Areas.

L. lanceolata Watt. Infrequent, Mesic Areas.

L. nummularia L. Rare, Wet Areas.

L. quadrifolia L. Frequent, Woods.

Samolus parviflorus Raf. Rare, Wet Areas.

Ranunculaceae

Actaea pachypoda Ell. Infrequent, Woods.

Anemone quinquefolia L. Infrequent, Woods,

A. virginiana L. Frequent, Woods.

Aquilegia canadensis L. Infrequent, Woods.

Cimicifuga racemosa (L.) Nutt. Infrequent, Woods

*Clematis glaucophylla Small. Rare, Woods

C. viorna L. Infrequent, Mesic Open Woods.

Delphinium tricornis Michx. Frequent, Woods.

Hepatica acutiloba DC. Infrequent, Rich Woods.

Hydrastis canadensis L. Rare, Mesic Woods.

Isopyrum biternatum (Raf.) T. & G. Infrequent, Woods.

Ranunculus abortivus L. Frequent, Wasteground

R. fascicularis Muhl. Infrequent, Woods.
R. hispidus Michx. Infrequent, Woods.
R. recurvatus Poir. Infrequent, Woods.
R. sardous Crantz. Infrequent, Woods.
R. septentrionalis Poir. Infrequent, Woods.
Thalictrum clavatum DC. Rare, Sandstone Rockhouses.
T. pubescens Pursh. Infrequent, Woods.
T. revolutum DC. Rare, Woods.
T. thalictroides (L.) Eames & Boivin. Frequent, Woods.

Rhamnaceae

Ceanothus americanus L. Rare, Wasteground.
Rhamnus carolinianus Watt. Frequent, Dry Woods.

Rosaceae

*Agrimonia gryposepala Wallr. Rare, Woods.
A. parviflora Ait. Infrequent, Woods.
A. pubescens Wallr. Frequent, Wasteground.
A. rostellata Wallr. Infrequent, Woods.
Amelanchier arborea (Michx. F.) Fern. Frequent, Upland Woods.
A. canadensis (L.) Medic. Infrequent, Woods.
Aruncus dioicus (Watt.) Fern. Rare, Rich Woods.
Duchesnea indica (Andr.) Focke. Frequent, Wasteground.
Fragaria virginiana Duch. Frequent, Open Areas.
Geum vernum (Raf.) T. & G. Rare, Woods.
G. virginianum L. Infrequent, Woods.
Physocarpus opulifolius (L.) Maxim. Rare, Woods.

Porteranthus stipulatus (Muhl. ex Willd.) Britotn. Rare, Open Woods.

Potentilla recta L. Frequent. Woods, Wasteground.

P. simplex Michx. Frequent, Woods, Wasteground.

Prunus americana Marsh. Infrequent, Mesic Open Areas.

P. persica (L.) Patsch. Rare, Wasteground.

P. serotina Ehrh. Frequent, Woods.

Rosa carolina L. Frequent, Wasteground.

R. palustris Marsh. Infrequent, Ponds, Wet Areas.

R. setigera Michx. Frequent, Wasteground.

R. virginiana Mill. Rare, Open Areas.

Rubus flagellaris Willd. Frequent, Wasteground.

R. occidentalis L. Rare, Wasteground.

R. pensylvanicus Poir. Infrequent, Wasteground.

Spiraea tomentosa L. Rare, Roadsides.

Waldsteinia fragariodes (Michx.) Tratt. Rare, Woods.

W. parviflora Small. Rare, Woods.

Rubiaceae

Cephalanthus occidentalis L. Infrequent, Wet Areas.

Diodia teres Watt. Frequent, Open, Dry Areas.

D. virginiana L. Frequent, Wet Areas.

Galium asprellum Michx. Infrequent, Mesic Areas.

G. circaezans Michx. Infrequent, Woods.

G. obtusum Bigel. Infrequent, Woods,

G. triflorum Michx. Infrequent, Alluvial Woods.

Hedyotis caerulea (L.) Hook. Frequent, Dry Woods.

H. crassifolia Raf. Infrequent, Woods.

H. longifolia Gaertn. Infrequent, Woods.

H. purpurea (L.) T. & G. var. purpurea. Infrequent, Woods.

H. purpurea (L.) T. & G. var. calycosa (Gray) Fosberg. Frequent, Open Areas.

Mitchella repens L. Infrequent, Rich Woods.

Rutaceae

Ptelea trifoliata L. Rare, Rich Woods.

Salicaceae

Populus alba L. Rare, Wasteground.

Salix gracilis Fern. Rare, Wet Areas.

S. humilus March. Rare, Dry Open Areas.

S. interior Rowlee. Infrequent, Wet Areas.

S. nigra L. Frequent, Wet Areas.

S. sericea Marsh. Infrequent, Wet Areas.

Santalaceae

Comandra richardsiana Fern. Rare, Dry Woods, Open Areas.

Sapotaceae

Bumelia lycioides (L.) Pers. Rare, Alluvial Woods.

Saururaceae

Saururus cernuus L. Rare, Wet Areas.

Saxifragaceae

Astilbe biternata (Vent.) Britt. Rare, Woods.

Heuchera americana L. Frequent, Dry Woods.

H. parviflora Bartl. Infrequent, Sandstone Rocks.

H. villosa Michx. Rare, Mesic Rocky Areas.

Hydrangea arborescens L. Frequent, Woods.

Mitella diphylla L. Infrequent, Mesic Woods.

Saxifraga virginensis Michx. Frequent, Woods.

Tiarella cordifolia L. Infrequent, Mesic Woods.

Scrophulariaceae

Agalinis tenuifolia (Vahl.) Raf. Infrequent, Open Areas.

Aureolaria flava (L.) Farw. Rare, Woods.

*A. patula (Chapm.) Pennell. Rare, Limestone Talus.

A. virginica (L.) Pennell. Rare, Woods.

Buchnera americana L. Rare, Open Sandy Areas.

*Chelone obliqua L. Rare, Wet Woods.

Dasistoma macrophylla (Nutt.) Raf. Infrequent, Rich Woods.

Leucospora multifida (Michx.) Pennell. Infrequent, Wet Areas.

Lindernia anagallidea (Michx.) Pennell. Infrequent, Wet Areas.

L. dubia (L.) Pennell. Infrequent, Wet Areas.

Mimulus alatus Ait. Infrequent, Wet Areas.

Paulownia tomentosa (Thunb.) Steud. Rare, Wasteground.

Pedicularis canadensis L. Rare, Mesic Woods.

Penstemon calycosus Small. Infrequent, Open Areas.

P. digitalis Nutt. Rare, Mesic Open Areas.

P. hirsutus (L.) Willd. Infrequent, Open Areas

P. pallidus Small. Infrequent, Woods.

Scrophularia marilandica L. Rare, Open Woods.

Verbascum blattaria L. Frequent, Wasteground.

V. thapsus L. Frequent, Wasteground.

Veronica arvensis L. Frequent, Wasteground.

V. serpyllifolia L. Infrequent, Wasteground.

Veronicastrum virginicum (L.) Faw. Rare, Woods, Open Areas.

Simaroubaceae

Ailanthus altissima (Mill.) Swingle. Infrequent, Wasteground.

Solanaceae

Datura stramonium L. Infrequent, Wasteground.

Physalis heterophylla Nees. Infrequent, Wasteground.

P. longifolia Nutt. Frequent, Wasteground.

Solanum carolinense L. Frequent, Wasteground.

S. nigrum L. Infrequent, Wasteground.

Staphyleaceae

Staphylea trifolia L. Rare, Mesic Area.

Tiliaceae

Tilia americana L. Infrequent, Woods.

Thymelaeaceae

Dirca palustris L. Infrequent, Mesic Woods.

Ulmaceae

Celtis occidentalis L. Infrequent, Disturbed Areas.

C. tenuifolia Nutt. Frequent, Dry Areas, Barrens.

Planera aquatica (Watt.) J.F. Gmel. Rare, Wet Areas.

Ulmus alata Michx. Frequent, Wasteground.

U. americana L. Infrequent, Woods.

U. rubra Muhl. Infrequent, Alluvial Woods.

U. thomasi Sarg. Rare, Woods.

Urticaceae

Boehmeria cylindrica (L.) Sw. Infrequent, Woods.

Laportea canadensis (L.) Wedd. Infrequent, Rich Woods.

Parietaria pensylvanica Muhl. Rare, Woods.

Pilea pumila (L.) Gray. Infrequent, Mesic Woods.

Valerianaceae

Valeriana pauciflora Michx. Infrequent, Mesic Woods.

Verbenaceae

Phyla lanceolata (Michx.) Greene. Rare, Wet Disturbed Areas.

Verbena canadensis (L.) Britt. Infrequent, Wasteground.

V. simplex Lehm. Frequent, Wasteground.

V. stricta Vent. Infrequent, Wasteground.

V. urticifolia L. Infrequent, Wasteground.

Violaceae

Hybanthus concolor (Forst.) Spreng. Infrequent, Woods.

Viola blanda Willd. Infrequent, Rich Woods.

V. conspersa Reichenb. Rare, Mesic Woods.

V. cucullata Ait. Rare, Wet Areas.

V. pubescens Ait. var. eriocarpa (Schwein). Russell. Infrequent, Mesic Woods.

V. hirsutula Brainerd. Infrequent Woods.