

I 29.105:50

I 29.105:50



3 1604 019 571 076

THE VASCULAR FLORA OF SHILOH NATIONAL MILITARY PARK, HARDIN COUNTY, TENNESSEE

RESEARCH/RESOURCES MANAGEMENT REPORT No. 50



U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
SOUTHEAST REGION

UPLANDS FIELD RESEARCH LABORATORY
GREAT SMOKY MOUNTAINS NATIONAL PARK
TWIN CREEKS AREA
GATLINBURG, TENNESSEE 37738



The Research/Resources Management Series of the Natural Science and Research Division, National Park Service, Southeast Regional Office, was established as a medium for distributing scientific information originally prepared for park Superintendents, resource management specialists, and other National Park Service personnel in the parks of the Southeast Region. The papers in the Series also contain information potentially useful to other Park Service areas outside the Southeast Region and often benefit independent researchers working in the parks. The Series provides for the retention of research information in the biological, physical, and social sciences and makes possible more complete in-house evaluation of non-refereed research, technical, and consultant reports.

The Research/Resources Management Series is not intended as a substitute for refereed scientific or technical journals. However, when the occasion warrants, a copyrighted journal paper authored by a National Park Service scientist may be reprinted as a Series report in order to meet park informational and disseminative needs. In such cases permission to reprint the copyrighted article is sought. The Series includes:

1. Research reports which directly address resource management problems in the parks.
2. Papers which are primarily literature reviews and/or bibliographies of existing information relative to park resource management problems.
3. Presentations of basic resource inventory data.
4. Reports of contracted scientific research studies which are reprinted due to the demand.
5. Other reports and papers considered compatible to the Series, including approved reprints of copyrighted journal papers and results of applicable university or independent research.

The Series is flexible in format and the degree of editing depends on content.

Research/Resources Management Reports are produced by the Natural Science and Research Division, Southeast Regional Office, in limited quantities. As long as the supply lasts, copies may be obtained from:

Natural Science and Research Division
National Park Service
Southeast Regional Office
75 Spring Street, SW
Atlanta, Georgia 30303

NOTE: Use of trade names does not imply U.S. Government endorsement of commercial products.

THE VASCULAR FLORA OF SHILOH NATIONAL MILITARY PARK,
HARDIN COUNTY, TENNESSEE

RESEARCH/RESOURCES MANAGEMENT REPORT NO. 50

Ronald L. Jones¹
Department of General Biology
Vanderbilt University
Nashville, Tennessee 37235

and

Peter S. White
Uplands Field Research Laboratory
Great Smoky Mountains National Park
Twin Creeks Area
Gatlinburg, Tennessee 37738

September 1981

U.S. Department of the Interior
National Park Service
Southeast Regional Office
Natural Science and Research Division
75 Spring Street, S.W.
Atlanta, Georgia 30303

¹ Present Address: Department of Biological Sciences
Eastern Kentucky University
Richmond, Kentucky 40475

Jones, Ronald L. and Peter S. White. 1981. The Vascular Flora of Shiloh National Military Park, Hardin County, Tennessee. U.S. Department of the Interior, National Park Service, NPS-SER Research/Resources Management Report No. 50. 49 pp.

TABLE OF CONTENTS


	<u>Page</u>
List of Tables and Figures.....	ii.
Acknowledgements.....	iii
Abstract.....	1
Introduction.....	2
The Study Area.....	4
Physiography, geology, and soils.....	4
Present day vegetation.....	6
Climate.....	8
Methods.....	8
Results and Discussion.....	10
General characteristics of the flora.....	10
Geographical relationships.....	12
Community types.....	14
Bloody Pond and other upland ponds.....	16
Rare and endangered species.....	16
Exotic species.....	17
<u>Juniperus virginiana</u> and its varieties.....	20
Conclusions.....	22
References Cited.....	24
An annotated checklist of the vascular flora of Shiloh National Military Park:.....	26
Appendix I. A checklist of the woody plants of Shiloh National Military Park.....	47
Appendix II. A checklist of the exotic species of Shiloh National Military Park.....	49

LIST OF TABLES AND FIGURES

<u>Table</u>	<u>Page</u>
1. Major vegetation types of Shiloh National Military Park.....	7
2. Summary statistics for the flora of Shiloh National Military Park.....	11
3. The largest families and genera in the flora of Shiloh National Military Park.....	11
4. Geographic affinities of the vascular plant taxa of Shiloh National Military Park.....	13
 <u>Figure</u>	
1. Location of Shiloh National Military Park.....	3
2. Topography of Shiloh National Military Park.....	5

ACKNOWLEDGEMENTS

We would like to thank Dean Berg, formerly of Shiloh National Military Park, and Superintendent Zeb McKinney, Historian George Reaves, and the entire staff of Shiloh National Military Park for their friendly help during this study. The need for a botanical assessment of Shiloh was first articulated by Dean Berg, and hence the project owes a special debt of gratitude to him. Without his persistence and organization, the project would not have been possible. Dr. Robert Kral made facilities available at the Vanderbilt University Herbarium and graciously assisted with identification in some plant groups. Drs. Eugene Wofford, David Webb, Leo Collins, and Guy Nesom, and Messrs. Vernon Bates and E. W. Chester aided the study by providing information on species distributions and county records of Tennessee plants.



Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

<http://www.archive.org/details/vascularfloraofs00jone>

ABSTRACT

A floristic study at Shiloh National Military Park, Hardin County, Tennessee, documented the presence of 112 families, 375 genera, and 655 species of vascular plants. Four hundred and seven new records for Hardin County are reported. Woody plants contribute 25 percent of the flora, with 72 trees, 65 shrubs, and 26 woody vines. A geographical analysis revealed that 62.0 percent of the flora is eastern, while 21.8 percent of the flora is southern and 4.6 percent is central in affinity. The herbs were relatively more eastern and intraneous, while the woody plants were relatively more southern and extraneous. Shiloh lies in a physiographic transition between the western Highland Rim and the Coastal Plain, and the flora reflects this fact. The most diverse communities are the complex of alluvial floodplain, bottomland, and swamp forests which occur in lower slope positions. No rare species of national significance were found, but one plant, Carex howei, is a special concern plant in Tennessee. Seventy-eight exotic species are reported, of which 10 are potentially able to invade or persist in native communities. Non-native genotypes of Juniperus virginiana are frequent and pose a difficult biological problem since they interbreed with native forms.

INTRODUCTION

Shiloh National Military Park (hereafter referred to simply as "Shiloh" or the "park") is a 1,498 ha (3,702 acre) unit of the National Park System situated on the west bank of the Tennessee River in Hardin County, Tennessee (Fig. 1). The park was established in 1894 to preserve the scene of an important Civil War battlefield (battle of Shiloh, April 6-7, 1962). Although historic preservation is the park's principal purpose, important natural lands were included within its boundaries. This report is the first of a series reporting the botany and plant ecology of Shiloh (Butler and White, in press; White, in preparation). An explicit aim in this series is to discuss relevant resource management issues.

There are several reasons for assessing the park's vascular flora, one being the lack of previous field work in this region of Tennessee. Several specific goals included (1) the establishment of a park checklist and herbarium, (2) an assessment of the presence of rare and endangered plants on national, state, and local levels, (3) an inventory of exotic species, (4) an evaluation of the taxonomic status of Juniperus virginiana and its relatives in the park, and (5) an inventory of the flora of special habitats such as Bloody Pond, which receives active management to prevent eutrophication, and the Owl Creek old-aged bottomland and floodplain forest. The botanical significance of Shiloh has increased due to development, farming, pulpwood logging, and drainage of wetlands around the park. For all these reasons, a thorough assessment of the park's flora was deemed timely.

The plan of this report is as follows: First, the study area is described. Next, an outline of our methods is provided. Thereafter, project results are presented and discussed. The complete park checklist appears following the discussion. Two supplemental lists (checklists of woody plants and exotic species) follow the vascular plant checklist.

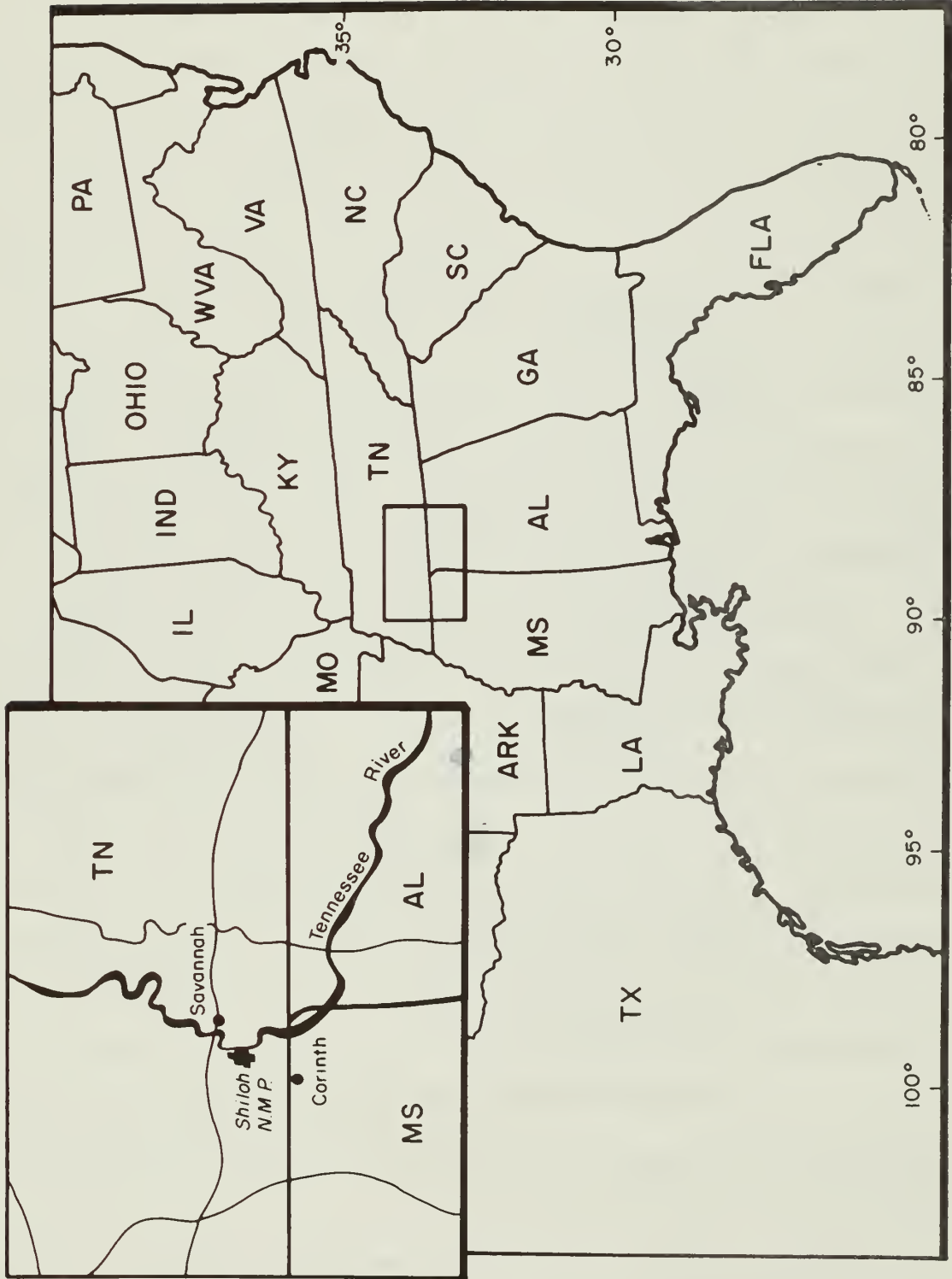


Figure 1. Location of Shiloh National Military Park.

THE STUDY AREA

The Shiloh upland is a gently rolling to nearly level plain developed on river terrace materials. Dissection is steepest in the eastern part of the park where tributary creeks (e.g., Dill Branch and several creeks to its south--Fig. 2) cut through the terrace deposits and descend ca 25 m (80 ft) over a .3 km (.2 mi) distance on their way to the Tennessee River. Shiloh is on the outside of a meander bend, and the eastern boundary thus consists of steep and eroding river bluffs ca 30 m (100 ft) high. Elevation ranges 51 m (165 ft), from 111 m (365 ft) on the Tennessee River (now "Kentucky Lake" because of a 1950 TVA impoundment) to 162 m (530 ft) along the southern boundary of the park. The park is mapped on the Pittsburg Landing and Counce USGS 7.5-minute quadrangle maps.

Drainage occurs eastward to the Tennessee River and northward to Owl Creek. Parts of Owl Creek have been channelized outside the park, but significant natural meandering still occurs along the northwest boundary of the park. Important bottomland habitat occurs at Owl Creek, including old-aged forest. Bottomlands also exist along the lower parts of other drainages. Floodplain forests occur along the Tennessee River, Owl Creek, and the lower ends of other drainages. Other wetlands include Bloody Pond (on the Shiloh Upland) and several temporary ponds which form where rain water perches on a fragipan layer in the soil (e.g., at Water Oaks Pond). Natural springs include Shiloh Springs and Rhea Springs along Peabody Road.

Physiography, Geology, and Soils.

Shiloh is located in the Western Valley physiographic unit of Tennessee (Luther 1977) between the Coastal Plain unit to the west and the Western

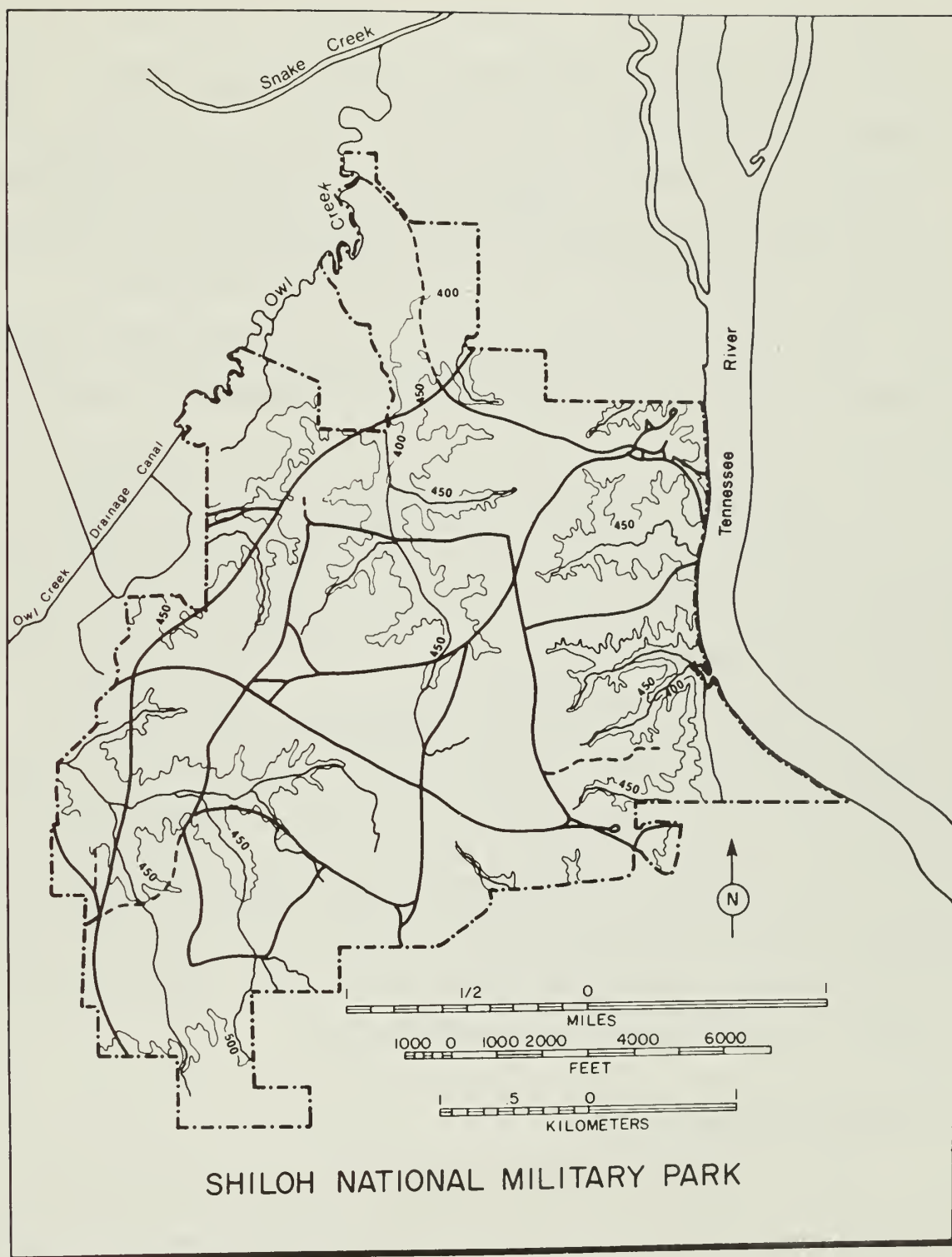


Figure 2. Topography of Shiloh National Military Park (adapted from Pittsburgh Landing and Counce USGS 7.5 minute quadrangle map). Park boundaries include recent land acquisitions and so are not identical to those shown on USGS maps.

Highland Rim to the east. The substrate consists of Quaternary and Tertiary river deposits and includes both channel and floodplain deposits. This material is ca 30 m (100 ft) thick and consists of sands, gravels, and silts. Some cherty materials were eroded from nearby Paleozoic rocks and deposited here. Some Cretaceous sandy and clayey deposits occur in the dissected ravines. Recent alluvium covers areas along major floodplains.

Rock outcrops are infrequent except along the Tennessee River. Here, compacted river deposits have the texture and appearance of sandstone. A coarse, conglomerate-like, flat-lying material occurs under the upper part of the river bluffs and also at a similar absolute elevation along the sides of creek ravines and in creek beds. It is resistant to erosion and seems to have slowed further dissection of the upland itself. No limestone occurs within Shiloh (Russell 1964, 1968).

Forty-three soil types have been described at Shiloh (USDA Soil Conservation Service 1962). Paden silt loams predominate on uplands and are strongly acid and low in fertility. A fragipan often occurs at a depth of .6 m (2 ft.). Waynesboro very gravelly sandy loams occur on ravine slopes. These are acid and also low in fertility. Waverly and Wolftever silt loams are important bottomland soils. These are acid, medium to low in fertility, and poorly drained.

Present Day Vegetation

Shiloh's vegetation can be classified into five major groups and 19 associations (Table 1). Mixed oak forest predominates on the uplands, except on old fields (dominated by pine and red cedar) or where fields are currently maintained. Mesic hardwoods dominate the ravines and river bluff slopes. These sites are moist but well drained. Floodplains and the

Table 1. Major vegetation types of Shiloh National Military Park.

1. Mixed oak upland forest
 - 1.1 Mixed oak upland forest with natural understory
 - 1.2 Mixed oak upland with open understory
 - 1.3 Upland old fields with red cedar, pines, and scattered openings
 - 1.4 Old fields with frequent Andropogon openings
 - 1.5 Pine plantations
 2. Mesic slope forests
 - 2.1 River bluff slopes--mixed hardwoods
 - 2.2 Ravine slopes--mixed hardwoods, beech often dominant
 3. Bottomland and alluvial forests
 - 3.1 Floodplain forests
 - 3.2 Swamp forests (standing water persistent)
 - 3.3 Mixed hardwood bottomlands on terraces and in tributary stream valleys
 - 3.4 Lowland old fields
 4. Other natural communities
 - 4.1 River bluffs
 - 4.2 Rock outcrops
 - 4.3 Upland ponds
 - 4.4 Springs and swampy headwaters of streams
 5. Cultural communities
 - 5.1 Mowed fields
 - 5.2 Cultivated fields
 - 5.3 Orchards
 - 5.4 Developed areas--lawns, plantings
-

terraces immediately above them are dominated by alluvial and mixed bottomland forests, respectively. Several less extensive types of natural vegetation and cultural vegetation are listed in Table 1. A detailed description of the landscape-vegetation relations of Shiloh will be published in a separate report in this series. However, general floristic descriptions of these communities will be given below. Habitat descriptions for all vascular plants are provided in the checklist.

Climate

Summers are hot and humid and winters mild. Mean July temperature is ca 29°C (82°F; climatic data taken from Ruffner and Bair 1977). Mean January temperature is ca 14°C (40°F). The average frostless period is 220 days. The average annual precipitation is 135 cm (53 inches). Violent thunderstorms occur (annual average: 53 thunderstorm days). Tornadoes have occasionally occurred, with catastrophic effects on vegetation. The most devastating recent tornado was in 1909 and is well documented in park files. In 1971 a cyclone damaged trees east of Bloody Pond (George Reaves, personal communication).

METHODS

The senior author made intensive collecting trips (3-10 days each) to the study area every other week between April and November, 1980. Additional trips were taken from February to April, 1981. All of the park's 1,498 ha (3,702 acres) were explored. Special efforts were made to collect all habitat types and to search for significant, rare taxa. Specimens were collected in duplicate; they were then dried, identified, labeled, and mounted. Duplicates of the collections were deposited at Shiloh National

Military Park (in the archives of the Park Headquarters building) and at Vanderbilt University, Nashville, Tennessee. The junior author has collected in the park periodically from November 1979 to September 1981 as part of ongoing efforts to understand and document the plant communities of the park.

A special effort was made to document the taxonomic relationships of red cedars (Juniperus spp.) at Shiloh because both native and horticultural genotypes were believed to be present. Special effort was made also to document the flora of Bloody Pond--a site which has received very active management.

The floristic affinities of the species are classified according to the system of Cain (1930, as modified by Thompson (1980). Eastern intraneous species are those which range throughout much of the eastern U.S. Eastern extraneous refers to those species with an eastern, primarily Appalachian distribution, which reach their western range limits within 100 miles of the Hardin County region. A southern intraneous species is primarily distributed within the southern U.S. but ranges north into central and eastern U.S. A southern extraneous species occupies the southeastern coastal and Mississippi alluvial plains and reaches its northern or eastern limits within 100 miles of the Hardin County region. A central intraneous species has a range restricted to the central and midwestern U.S., while a central extraneous species reaches its southern limit within 100 miles of the Hardin County region. Naturalized species are those non-native species which are now reproducing in the Shiloh region. The following references were used to determine geographic ranges--Clark (1971), Cronquist (1980), Duncan (1975), Elias (1980), Gleason and Cronquist (1963), Godfrey and Wooten (1979), and Radford, Ahles, and Bell (1968).

County records were checked against the floristic atlases and collections of the herbaria at Vanderbilt University and the University of Tennessee. They were also checked against collections in the Memphis State University herbarium. The rare plant lists of the Committee for Tennessee Rare Plants (1978) and the Tennessee Heritage Program were also consulted.

Abundance was judged as follows. A species was noted as abundant if it was observed frequently in a variety of habitats, as common if it was observed frequently in only certain habitats, as infrequent if it was observed only occasionally in certain habitats, and as rare if it was observed only once.

RESULTS AND DISCUSSION

General Characteristics of the Flora

Over 1,200 individual specimens were collected, documenting the presence at Shiloh of 655 vascular plant species (Table 2 and the Annotated Checklist that follows this discussion). Two species (Acer rubrum and Rhexia mariana) each have two varieties, making a total of 657 specific and infraspecific taxa. One-hundred and twelve families and 375 genera are present. These collections provide 407 (62 percent of the Shiloh flora) new county records for Hardin County, ample indication of the lack of previous botanical collecting in the area.

The five largest families were the Asteraceae (Aster family), Poaceae (grass family), Cyperaceae (sedge family), Fabaceae (pea family), and Rosaceae (Rose family) (Table 3), which together constitute 38 percent of the total flora. The five largest genera were Carex (the sedges), Quercus (the oaks), Aster (the asters), Panicum (the panic grasses), and Solidago

Table 2. Summary statistics for the flora of Shiloh National Military Park. Contribution of exotic species to the respective totals are shown in parentheses.

Group	No. Families	No. Genera	No. Species	No. Total Taxa
Pteridophytes	8	14	17 (0)	17 (0)
Gymnosperms	3	3	5 (0)	5 (0)
Angiosperms:				
Monocots	12	72	154 (22)	154 (22)
Dicots	89	286	479 (56)	481 (56)
	112	375	655 (78)	657 (78)

Table 3. The largest families and genera in the flora of Shiloh National Military Park. Families with 10 or more species and genera with five or more species are listed.

Family	No. Genera	No. Species	Genus	No. Species
Asteraceae	39	90	Carex	30
Poaceae	34	63	Quercus	15
Cyperaceae	6	43	Aster	13
Fabaceae	22	33	Panicum	12
Rosaceae	15	23	Solidago	10
Liliaceae	13	19	Carya	8
Scrophulariaceae	13	19	Eupatorium	8
Lamiaceae	11	19	Hypericum	5
Fagaceae	3	17	Juncus	5
Rubiaceae	6	11	Lespedeza	5
Polygonaceae	3	11	Lobelia	5
Apiaceae	7	10	Polygonum	5
Ranunculaceae	7	10	Rumex	5
			Scutellaria	5
			Smilax	5
			Viola	5

(the goldenrods), which together contribute 12 percent of the total flora. These families and genera are also among the largest north temperate families on a larger scale (Good 1953).

The park's woody plants comprise 25 percent of the total flora. There are 72 trees, 65 shrubs, and 26 woody vines (Appendix I). The tree flora is particularly rich in oaks (15 species) and hickories (8 species). Species of these groups occur in nearly every forest type from floodplains (Quercus lyrata, the overcup oak, and Carya aquatica, the water hickory) to dry uplands (Quercus marilandica, the blackjack oak, and Carya pallida, the sand hickory). Other large genera of woody plants include Acer (maples), Cornus (dogwood), Ilex (hollies), Rhus (sumacs), Smilax (greenbriers), Viburnum (viburnums), and Vitis (grapes), each with four species.

Geographic Relationships

Shiloh's flora contains 62.0 percent eastern species, 21.8 percent southern species, and 4.6 percent central species (Table 4). However, woody species (39.5 percent southern) are relatively more southern than herbaceous species (16.0 percent). Furthermore, over a third of the woody plants are extraneous, compared to only 14 percent of the herbs. The herbs are relatively more eastern in distribution (67.7 percent) than the woody plants (43.8 percent) and are relatively more intraneous (74 percent for the herbs versus 54.9 percent for the woody plants). The exact underlying causes of these differences are unknown. The reason for the composition of the flora as a whole is more clear--Shiloh lies between the Highland Rim to the east and the coastal plain to the west and south. This physiographic transition allows a mingling of eastern and southern species.

Table 4. Geographic affinities of the vascular plant taxa of Shiloh National Military Park (see text for definition of categories).

Geographic Affinity	Woody		Herbaceous		Total	
	No. Species	%	No. Species	%	No. Species	%
Eastern						
Intraneous	59	36.4	304	61.4	363	55.5
Extraneous	12	7.4	31	6.3	43	6.5
Total-eastern	71	43.8	335	67.7	406	62.0
Southern						
Intraneous	28	17.3	52	10.5	80	12.2
Extraneous	36	22.2	27	5.5	63	9.6
Total-southern	64	39.5	79	16.0	143	21.8
Central						
Intraneous	2	1.2	11	2.2	13	2.0
Extraneous	7	4.3	10	2.0	17	2.6
Total-central	9	5.5	21	4.2	30	4.6
Naturalized	18	11.1	60	12.1	78	11.9
TOTAL	162	24.7	495	75.3	657	100

Community Types

The most botanically diverse areas of the park occur in the Owl Creek bottomlands, along the northwestern boundary. Here there is periodic flooding, and the floodplains, together with the associated swamps and bottomlands, provide a variety of habitats. There is a soft hardwood community with hackberry (Celtis spp.), green ash (Fraxinus pensylvanica), and silver maple (Acer saccharinum) along the creek. In areas of persistent standing water there are gum swamps with tupelo gum (Nyssa aquatica) and sweetgum (Liquidambar styraciflua) as the dominant species. A small area of bald cypress (Taxodium distichum), with several specimens 75-90 cm diameter at breast height (dbh), occurs in this region. Itea virginica and Planera aquatica are common shrubs. The herb layer contains Sagittaria longirostra, Peltandra virginica, Saururus cernuus, Osmunda regalis, Osmunda cinnamomea, Onoclea sensibilis, and Woodwardia areolata.

In the hardwood bottoms, sweetgum and cherry-bark oak (Quercus pagoda) are the dominant trees. There is an old-growth stand, with some specimens reaching maximum size for both species. Sweetgum reaches the largest size, with specimens up to 142 cm dbh, and many 90-120 cm dbh. There are also cherry-bark oaks to 120 cm dbh. Other trees reaching large size are Michaux oak (Quercus michauxii), water oak (Quercus nigra), willow oak (Quercus phellos), overcup oak (Quercus lyrata), red maple (Acer rubrum), water hickory (Carya aquatica), and shagbark hickory (Carya ovata).

These stands of alluvial and bottomland hardwoods merit special attention because of the increasing rarity of old-growth communities in the region. They are a refuge for species allied with the southeastern

bottomland communities, and many southern species reach their northerly and easterly range limits in this particular region of Tennessee. The maintenance of these bottomlands and swamps in their natural condition would therefore preserve a rare community of species and offer sites for many kinds of floristic and ecological studies.

The mesic hardwood communities are dominated by beech (Fagus grandifolia), white oak (Quercus alba), sweetgum (Liquidambar styraciflua), and tulip poplar (Liriodendron tulipifera). Many of these trees surpass 100 cm dbh. In the understory are species more common to the south and east, such as Calycanthus floridus (strawberry bush), Ilex montana (mountain holly), Styrax grandifolia (styrax), and Halesia carolina (silverbell). The spring herb layer is rich, with such species as Hymenocallis occidentalis, Sanguinaria canadensis, Trillium recurvatum and Trillium stamineum, Uvularia grandiflora and Uvularia sessilifolia, and orchids such as Corallorhiza wisteriana, Tipularia discolor, and Habenaria clavellata. These hardwood slope forests are also infrequent in this region of Tennessee. Many eastern species (some of which are predominantly Appalachian in distribution) reach their western limit in mesic ravines, of which excellent examples are preserved at Shiloh.

The upland hills and flats are dominated by oaks (Quercus alba, Q. rubra, Q. falcata, Q. velutina, Q. marilandica, Q. stellata), with a mixture of other hardwoods (Nyssa sylvatica, Prunus serotina, Acer rubrum, Liquidambar styraciflua) and conifers (Pinus echinata, Juniperus virginiana). This kind of forest is widespread in this area of Tennessee. Of particular interest, however, is the remnant of a mature stand of white oak (Quercus alba) near the Indian Mounds. Here, trees reach 100 cm dbh. The understory of the upland hardwood stands is typically shrubby, with flowering dogwood (Cornus florida), canescent azalea (Rhododendron canescens), and deer berry (Vaccinium stamireum).

Bloody Pond and Other Upland Ponds

Soils of the uplands are a silty loam, and there is a compacted layer at about 60 cm, which causes temporary pools or ponds to form in shallow depressions. These temporary ponds are occupied by sedge communities, primarily involving various species of Carex. Bloody Pond is the only year-round upland pond. Species growing in and around the pond are Gratiola virginiana, Lindernia dubia, Juncus acuminatus, Eleocharis obtusa, Eleocharis tenuis, Polygonum hydropiperoides, and Potamogeton diversifolius.

Rare and Endangered Species

No nationally endangered or threatened plants were found at Shiloh (U.S. Fish and Wildlife Service 1980; Ayensu and DeFilipps 1978). One plant, Carex howei (a sedge), is on the Tennessee State rare plant list (Committee for Tennessee Rare Plants 1978) and the current Tennessee Heritage Program list. It is listed as a species of special concern and occurs on the Owl Creek bottoms. It has a fairly wide distribution in eastern North America but is scarce throughout its range. Protection of this species depends entirely on protection of its habitat. It occurs in a complex of old-growth bottomland and floodplain forest which has survived 140 yr of human activity in the area. However, channelization along Owl Creek southwest of the park is increasing the deposition of sand and gravel on floodplains within the park. Further drainage manipulation will have a detrimental effect on these bottomlands (Miller et al. 1978). During the current study a significant amount of tree mortality was observed among the large sweetgums of the Owl Creek floodplain, and increased sedimentation around these trees seems a likely cause.

An inspection of the Tennessee state rare plant list (Committee for Tennessee Rare Plants 1978) reveals that one additional species from Hardin County and seven species from nearby McNairy County are listed. These include three plants listed as threatened (Aster ericoides, Drosera capillaris, and Didiplis diandra) and five listed as of special concern (Cyperus plukenetii, Magnolia virginiana, Paspalum bifidum, Tridens flavus var. clingmanii, and Polygala mariana). None of these were found within the bounds of Shiloh National Military Park.

Forty-three of the native species (7.4 percent of the total) are considered rare within the park, though not considered rare within their total range. This figure is within the range often reported for local, regional, or national floras on North Temperate continents (e.g., Ayensu and DeFilipps 1978). There appears to be no underlying common denominator for these rare plants. They are found in both rare habitats (e.g., pond shores) and common ones (e.g., upland forests) as well as frequently disturbed habitats (e.g., river edges) and old aged forest (e.g., Owl Creek bottoms). They are also found across moisture and vegetation gradients. We conclude that this pattern of rarity is similar to other areas in Eastern North America and has no cause particular to Shiloh itself.

Exotic Species

Seventy-eight (11.9 percent) of Shiloh's 655 species are not indigenous to the Hardin County region (Appendix II and Table 4). Sixty species are herbaceous, while 18 are woody. Families with large numbers of exotic species are the Poaceae (grass family) with 15 species, the Fabaceae (pea family) with 12 species, and the Rosaceae (rose family) with 6 species. The alien flora includes species from Europe (66 percent of the total--Appendix II), Eurasia (29 percent), East Asia (25 percent), the

Mediterranean region (1 percent), Old World areas (6 percent--Europe, North Africa, Middle East), and tropical America (9 percent). As might be expected, a total of 80 percent of the exotic plants are thus from the North Temperate Eastern Hemisphere. Two species (Magnolia grandiflora and Maclura pomifera) are native to other regions within the southern U.S. and have become naturalized in the Shiloh region. Two herbaceous species (Poa pratensis and Plantago aristata) have spread to the Shiloh area from native ranges north and west of the park.

Not all of the alien species represent a threat to the park's native vegetation. Most (69 percent, designated with an "F" in Appendix II) are found only in habitats frequently disturbed by man (i.e., fields, roadsides, and lawns). A few of these can also be found in thickets along streams (where flooding repeatedly disturbs native vegetation) and in recent windthrows in upland forest. Without such disturbances, however, these plants do not invade native vegetation. Examples include Dactylis glomerata (orchard grass), Amaranthus hybridus (Amaranthus), Chenopodium album (pigweed), Taraxacum officinale (dandelion), Hypericum perforatum (St. John's wort), and Daucus carota (Queen Anne's lace).

A second group of alien species also poses little threat. These are species which persist on the sites of original cultivation in the park but do not spread from these sites (such species are designated "P" in Appendix II and make up 18 percent of the total list). Many woody plants are included in this group (e.g., Malus pumila, apple; Pyrus communis, pear; Lagerstroemia indica, crepe myrtle), as well as a few herbs (Belamcanda chinensis, blackberry lily; Hemerocallis fulva, day lily; Muscari racemosa, grape hyacinth).

A final group of exotic species, and one more troubling to park managers,

includes those which are invading native vegetation and/or are likely to persist in native vegetation for many years (invasive plants, designated "I" in Appendix II and making up 13 percent of the total list). Woody plants are prominent in this group--8 of the 10 species are woody--because such plants are large, long-lived perennials. A full documentation of the current status of important woody exotic plants is properly beyond the scope of this report and will be the focus of another publication in this series. A general description of these invasive exotic plants follows.

Lonicera japonica (Japanese honeysuckle) is by far the most widespread and problematic of the exotic species. Japanese honeysuckle invades fields, forest edges, and forest interiors. It is especially abundant in mesic streamside vegetation. It is present throughout the park and often occurs in large patches. Although introduced into the U.S. in 1806 (Rheder 1940), it was probably not established at Shiloh during the time of the battle (Andrews 1919 presents the best historical data), since human occupation at that time had only occurred for ca 40 yr. This point is of some consequence since the presence of honeysuckle during the battle of Shiloh could be taken to mean it was part of the historic scene management seeks to protect or re-create. Unfortunately, there is little direct evidence on this point. Examination of historic photos certainly suggests that it is presently more abundant than it was 50 to 90 years ago, but this spans a period during which fire was repeatedly used to clear underbrush in forest stands.

Pueraria lobata (kudzu) is of potential concern but presently occurs only in one small section of the park. It has been subjected to recent spraying and cutting (Dean Berg, personal communication). Hedera helix (English ivy) now covers a large area around Pittsburg Landing, both in

the open and on forest trees. Vinca minor (periwinkle), like Hedera, spreads vegetatively from original plantings but covers less total area in the park and is of less concern. Ligustrum sinense (privet) has spread along forest edges and roadsides and near homesites on the uplands of the park. It is of potential concern in some upland oak forests but has not been noted to be invading forest interiors. Magnolia grandiflora (southern magnolia) saplings are occasionally seen in mesic slope forests. They have spread there from cultivated trees on the upland. This species is native further south, on the coastal plain. Invasion and growth rates are currently slow and it remains to be seen if this tree can survive to maturity.

Albizia julibrissin (mimosa) and Paulownia tomentosa (princess tree) are both shade intolerant, early successional trees which spread along roads and into fields. Although they will be outcompeted by native trees over long spans of time, they are capable of persisting in old fields for many decades and will become conspicuous parts of the regrowth if allowed to remain.

The two invasive herbs at Shiloh (Appendix II) are Eulalia viminea (a Japanese grass) and Cardiospermum halicacabum (balloon vine). The latter is infrequent in floodplains and is of little direct concern. However, Eulalia viminea seems to be increasing invading many areas in the Southeast. It is found along paths, roads, and in semiopen and moist forest areas. There is no literature on its ecology or control.

Juniperus Virginiana and Its Varieties

There has been some question in the past whether the park has an alien species problem regarding non-native forms of Juniperus virginiana (eastern red cedar) (George Reaves, personal communication). The eastern

red cedar is native to the Shiloh region, but several horticultural varieties have been introduced on the battlefield and in the national cemetery, presumably because of their somber and funereal appearance. During this study, collections of Juniperus were made throughout the park. From an examination of these specimens, as well as observations on Juniperus populations in the field, it must be concluded that non-native forms are indeed present and have interbred with native forms. The most conspicuous non-native varieties are those with drooping branches. However, there are all degrees of variation from ascending to drooping branches, and from regular to irregular overall tree form. Thus, it is difficult and somewhat arbitrary to ascertain the genetic status of a given individual. As long as there are cultivated forms of this species, the problem is likely to persist, even if eradication of the more conspicuous non-native forms on uncultivated sites were attempted. At present, we must conclude that easy genetic tests do not exist to establish relationships for any particular individual tree.

Some of the non-native forms of red cedar were planted by the Civilian Conservation Corps in the 1930's (Dean Berg, personal communication). Discussions with George Reaves (Historian at Shiloh National Military Park) and an inspection of archival materials (maps and reports) at the park revealed a number of proposed woody plant landscaping programs dating from 1934 and 1935. It is unknown how many of these plans were carried out. In addition, it is unclear if the plants that appear on the maps were already present or were being sited for possible planting. It is worth noting, however, that the proposed planting program was large (one map cites 23 species and 89,281 individual plants; another lists 50 species and 45,059 individual plants) and listed both native and exotic species.

The planting program was proposed soon after the National Park Service (USDI) took over management of Shiloh from the Department of the Army. It might have represented a response to years of heavy use of fire in the park, which cleared out forest understories and maintained views of battle monuments. Although these plantings (assuming for the moment that they actually took place) could affect our interpretation of the "native" park flora, we are unlikely to ever know the full story of the program. The plantings could have, for example, reintroduced species eliminated by frequent burning, or introduced species native in the area but previously unknown in the park. Lacking definite evidence, we have accepted as native those species on the proposed planting lists which are generally distributed in the Shiloh area.

CONCLUSIONS

1. Shiloh National Military Park contains a diverse flora and protects significant natural communities, including old-aged forests, in a region of Tennessee where preservation of such tracts is rare.
2. The flora contains both southern and eastern elements which reflect their geographic position between the Western Highland Rim and Coastal Plain physiographic provinces.
3. No rare plants of national significance were found. One plant of special concern in Tennessee, Carex howei (a sedge), is found in a swamp forest at the Owl Creek bottoms area. Protection of its habitat in the park is sufficient for its survival.
4. Seventy-eight exotic species are found in the park. Ten are of potential

management concern. The worst problems currently involve Lonicera japonica (Japanese honeysuckle) and Hedera helix (English ivy). Although they were both introduced into the U.S. before the historic period of interest (1862), neither are deemed historic features of Shiloh.

5. Native and non-native forms of Juniperus virginiana have interbred, producing a complex genetic situation. No easy method of identifying non-native forms is currently practical.

REFERENCES CITED

- Andrews, E. F. 1919. The Japanese honeysuckle in the eastern United States. *Torreyana* 19:37-43.
- Ayensu, E. S., and R. A. DeFilipps. 1978. Endangered and threatened plants of the United States. Smithsonian Institution Press and World Wildlife Fund, Washington, D.C. 403 pp.
- Butler, T., and P. S. White. In press. Exotic woody plants of Shiloh National Military Park, Tennessee: A population survey of aggressive species. USDI, National Park Service, Southeast Regional Office Research/Resour. Manage. Rep. series.
- Cain, S. A. 1930. Certain floristic affinities of the trees and shrubs of the Great Smoky Mountains and vicinity. *Butler Univ. Bot. Stud.* 1:129-150.
- Clark, R. C. 1971. The woody plants of Alabama. *Annals Mo. Bot. Garden* 58:99-242.
- Committee for Tennessee Rare Plants. 1978. The rare vascular plants of Tennessee. *J. Tenn. Acad. Sci.* 53:128-133.
- Cronquist, A. 1980. Vascular flora of the Southeastern United States. Vol. 1. Asteraceae. The University of North Carolina Press, Chapel Hill. 261 pp.
- Duncan, W. H. 1975. Woody vines of the southeastern United States. University of Georgia Press, Athens. 76 pp.
- Elias, T. S. 1980. The complete trees of North America. Book Division, Times Mirror Magazines, Inc., New York. 948 pp.
- Gleason, H. A., and A. Cronquist. 1963. Manual of vascular plants of northeastern United States and adjacent Canada. D. Van Nostrand Co., New York. 810 pp.
- Godfrey, R., and J. W. Wooten. 1979. Aquatic and wetland plants of southeastern United States. University of Georgia Press, Athens. 712 pp.
- Good, R. 1953. The geography of the flowering plants. Longmans, Green, and Co., London. 452 pp.
- Luther, E. T. 1977. Our restless earth. University of Tennessee Press, Knoxville. 94 pp.
- Miller, Wihry, and Lee. 1978. A report of the field inspection of the Owl Creek Bottomlands, performed March 21, 1978 (unpublished).
- Radford, A. E., H. E. Ahles, and C. R. Bell. 1968. Manual of vascular flora of the Carolinas. University of North Carolina Press, Chapel Hill. 1183 pp.

- Rheder, A. 1940. A manual of cultivated trees and shrubs. Macmillan Co., New York. 996 pp.
- Ruffner, J. A., and F. E. Bair (eds.) 1977. The weather almanac. Avon Publ., New York. 728 pp.
- Russell, E. E. 1964. Geologic map of the Pittsburg Landing Quadrangle. Tennessee Department of Conservation, Division of Geology. Nashville.
- Russell, E. E. 1968. Geologic map of the Counce Quadrangle. Tennessee Department of Conservation, Division of Geology, Nashville.
- Thompson, R. L. 1980. Woody vegetation and floristic affinities of Mingo Wilderness Area, a northern terminus of southern floodplain forest, Missouri. *Castanea* 45:194-212.
- USDA, Soil Conservation Service. 1962. Soil and capability map, Hardin County, Tennessee. University of Tennessee and County Soil Conservation District. No pagination.
- U.S. Fish and Wildlife Service. 1980. Endangered and threatened wildlife and plants: review of plant taxa for listing as endangered or threatened. Federal Register 45(242):82480-82569.
- White, P. S. In preparation. Vegetation-landscape relations at Shiloh National Military Park. USDI, National Park Service, Southeast Regional Office Research/Resour. Manage. Rep. series.

AN ANNOTATED CHECKLIST OF VASCULAR PLANTS FROM
SHILOH NATIONAL MILITARY PARK

Explanation of Checklist format:

Within the major categories of vascular plants (Pteridophyta, Gymnospermae, Monocotyledoneae, and Dicotyledoneae), the families are listed alphabetically. Genera and species are arranged alphabetically within the families. After each species or infraspecific taxon appear descriptions of (1.) habitat, (2) abundance, and (3) geographic affinity. Abbreviations of geographic affinity are:

east. - eastern
so. - southern
cent. - central
int. - intraneous
ext. - extraneous

All new county records (Hardin County, Tennessee) are marked with an asterisk (*).

PTERIDOPHYTA

ASPIDIACEAE

Athyrium filix-femina (L.) Roth. Mesic slopes and bottoms; common; east. int.
Cystopteris protrusa (Weatherby) Blasdell. Stream banks; rare; east. int.
Onoclea sensibilis L. Swamps; common; east. int.
Polystichum acrostichoides (Michx.) Schott. Mesic woods; common; east. int.
Thelypteris hexagonoptera (Michx.) Weatherby. Mesic woods; common; east. int.
Thelypteris noveboracensis (L.) Niewl. Stream banks; infrequent; east. int.
Woodsia obtusa (Spreng.) Torr. Rock walls at cemetery; rare; east. int.

ASPLENIACEAE

Asplenium platyneuron (L.) Oakes. Mesic slopes; common; east. int.

BLECHNACEAE

*Woodwardia areolata (L.) Moore. Swamps; common; east. int.

LYCOPODIACEAE

Lycopodium flabelliforme (Fern.) Blanchard. Uplands woods; rare; east. int.

OPHIOGLOSSACEAE

Botrychium dissectum Spreng. Mesic slopes and bottoms; infrequent; east. int.
Botrychium virginianum (L.) Sw. Mesic slopes and bottoms; common; east. int.

OSMUNDACEAE

Osmunda cinnamomea L. Swamps and bottoms; common; east. int.
Osmunda regalis L. Swamps and bottoms; common; east. int.

POLYPODIACEAE

Polypodium polypodioides (L.) Watt. On blufftop trees; infrequent; east, int.

PTERIDACEAE

Adiantum pedatum L. Mesic slopes; infrequent; east. int.

Pteridium aquilinum (L.) Kuhn. Upland woods; infrequent; east. int.

SPERMATOPHYTAGYMNOSPERMAE

CUPRESSACEAE

**Juniperus virginiana* L. Uplands woods and old field; abundant; east. int.

PINACEAE

**Pinus echinata* Mill. Young upland woods; common; so. ext.

**Pinus taeda* L. Young upland woods; infrequent; so. ext.

**Pinus virginiana* Mill. Upland woods; infrequent; east. ext.

TAXODIACEAE

**Taxodium distichum* (L.) Rich. Swamps; infrequent; so. ext.

ANGIOSPERMAEMONOCOTYLEDONEAE

ALISMATACEAE

**Sagittaria longirostra* (Micheli) J. G. Smith. Bottoms and pond margins; infrequent; east. int.

AMARYLLIDACEAE

**Agave virginica* L. Dry woodland borders; infrequent; so. int.

**Hymenocallis occidentalis* (LeConte) Kunth. Mesic woods; infrequent; cent. int.

**Hypoxis hirsuta* (L.) Cov. Grassy roadsides; common; east. int.

ARACEAE

**Acorus calamus* L. Hardwood bottoms; rare; east. int.

Arisaema dracontium (L.) Schott. Stream valleys and swamps; common; east. int.

Arisaema triphyllum (L.) Schott. Mesic slopes and bottoms; common; east. int.

**Peltandra virginica* (L.) Kunth. Swamps; common; east. int.

COMMELINACEAE

**Commelina erecta* L. River bank below cemetery wall; infrequent; east. int.

Commelina virginica L. Stream banks; common; east. int.

**Tradescantia ohiensis* Raf. Mesic slopes and terraces; infrequent; east. int.

Tradescantia subaspera Ker. River slopes; infrequent; cent. int.

CYPERACEAE

- **Carex albolutescens* Schw. Upland pools; common; east. int.
- Carex amphibola* Steud. Mesic slopes; common; east. int.
- **Carex annectens* (Bickn.) Bickn. Upland woods; rare; east. int.
- **Carex bailey* Britt. Ravine bottoms; infrequent; east. ext.
- Carex blanda* Dewey. Stream banks; common; east. int.
- **Carex bromoides* Schk. Swamps; infrequent; east. int.
- Carex caroliniana* Schw. Upland pools and woods; common; east. int.
- Carex cephalophora* Muhl. Upland woods; common; east. int.
- **Carex complanata* Torr. & Hook. Upland woods; common; east. int.
- Carex crinata* Lam. Stream valleys; common; east. int.
- Carex debilis* Michx. Stream banks; infrequent; east. int.
- **Carex flaccosperma* Dewey. Upland pools; infrequent; east. int.
- Carex frankii* Kunth. Swamps; infrequent; east. int.
- Carex grayii* Carey. Mesic woods; common; east. int.
- **Carex howei* Mackenzie. Swamps; rare; east. int.
- Carex intumescens* Rudge. Mesic woods; common; east. int.
- Carex laevivaginata* (Kukenth.) Mackenzie. Stream valley; infrequent; east int.
- Carex leptalea* Wahl. Ravine bottoms; infrequent; east. int.
- Carex louisianica* Bailey. Swamps; rare; so. ext.
- Carex lupulina* Muhl. Mesic woods; common; east. int.
- **Carex lurida* Wahl. Stream shallows; infrequent; east. int.
- **Carex muhlenbergii* Schk. Open upland woods; common; east. int.
- Carex oxylepis* Torr. & Hook. Ravine slopes; infrequent; so. ext.
- **Carex physorhyncha* Liebmann. Mesic woods; common; so. ext.
- **Carex picta* Steud. Ravine slopes; infrequent; cent. int.
- Carex retroflexa* Muhl. Stream banks; infrequent; east. int.
- **Carex rosea* Schk. River bottoms; infrequent; east. int.
- **Carex seorsa* Howe. Stream banks, in mud; infrequent; east. ext.
- **Carex typhina* Michx. River bottoms; infrequent; east. int.
- **Carex venusta* Dewey. Stream valleys; common; so. ext.
- **Cyperus esculentus* L. Muddy river bottoms; infrequent; east. int.
- **Cyperus filiculmis* Vahl. Eroded river banks; rare; east. int.
- Cyperus iria* L. Cultivated fields; infrequent; naturalized from Eurasia.
- **Cyperus ovularis* (Michx.) Torr. Roadside banks and ditches; common; east. int.
- Cyperus retrofractus* (L.) Torr. var. *dipsaciformis* (Fern.) Kukenth. Roadside banks and ditches; common; so. ext.
- Cyperus strigosus* L. Roadside banks and ditches; infrequent; east. int.
- Eleocharis obtusa* (Willd.) Schultes. Pond and stream margins; common; east. int.
- **Eleocharis tenuis* (Willd.) Schultes. Upland pools; common; east. int.
- Fimbristylis autumnalis* (L.) R. & S. Pond and stream margins; common; east. int.
- **Rhynchospora corniculata* (Lam.) Gray. Swamps and bottoms; infrequent; so. ext.
- **Scirpus atrovirens* Willd. Roadside ditches; common; east. int.
- Scirpus cyperinus* (L.) Kunth. Roadside ditches and streams; infrequent; east. int.
- **Scirpus polyphyllus* Vahl. Roadside ditches and streams; infrequent; east. ext.

DIOSCOREACEAE

- **Dioscorea battatas* Dcne. Mesic woods; common; naturalized from China.
- **Dioscorea villosa* L. Mesic woods; common; east. int.

IRIDACEAE

- **Belamcanda chinensis* (L.) DC. Road banks; infrequent; naturalized from Asia.
- **Iris cristata* Ait. Mesic woods; common; cent. int.
- **Sisyrinchium angustifolium* Mill. Open upland woods; common; east. ext.

JUNCACEAE

- Juncus acuminatus* Michx. Pond margins and streams; infrequent; east. int.
- **Juncus brachycarpus* Engelm. Upland pools; common; east. int.
- Juncus coriaceous* MacKenzie. Ravine slopes; infrequent; east. int.
- Juncus tenuis* Willd. Upland fields and woods; common; east. int.
- **Juncus validus* Coville. Ravine slopes; infrequent; so. ext.
- **Luzula bulbosa* (Wood) Rydberg. Upland fields; common; east. int.

LILIACEAE

- **Allium canadense* L. Mesic woods; abundant; east. int.
- **Asparagus officinalis* L. Waste places; infrequent; naturalized from Europe.
- **Hemerocallis fulva* L. Upland fields; infrequent; naturalized and persistent after cultivation.
- **Medeola virginiana* L. Ravine slopes and bottoms; infrequent; east. int.
- **Muscari racemosa* (L.) Mill. Mowed fields; infrequent; naturalized from Europe and persistent after cultivation.
- **Northoscordum bivalve* (L.) Britt. Bottomlands; common; so. int.
- **Ornithogalum umbellatum* L. Mowed fields; infrequent; naturalized from Europe.
- **Polygonatum biflorum* (Walt.) Ell. Mesic woods; common; east. int.
- **Smilacina racemosa* (L.) Desf. Mesic woods; common; east. int.
- **Smilax bona-nox* L. Open river banks; common; so. int.
- **Smilax glauca* Walt. Stream valleys; common; east. int.
- **Smilax herbacea* L. var. *lasioneuron* (Small) Rydb. Mesic slopes; common; east. int.
- Smilax hispida* Muhl. Floodplain thickets; common; east. int.
- Smilax rotundifolia* L. Hardwood bottoms; abundant; east. int.
- Trillium recurvatum* Beck. Wooded slopes above river; common; cent. ext.
- Trillium stamineum* Harb. Wooded slopes above creek floodplain; common; cent. ext.
- Uvularia grandiflora* Sm. Mesic woods; infrequent; east. ext.
- Uvularia sessilifolia* L. Mesic woods; infrequent; east. ext.
- **Yucca filamentosa* L. Open upland woods; infrequent; so. ext.

NAJADACEAE

- **Potamogeton diversifolium* Raf. Ponds and swamps; common; east. int.

ORCHIDACEAE

- **Corallorhiza wisteriana* Conrad. Mesic woods, stream valleys; rare; east. int.
- **Habenaria clavellata* (Michx.) Spreng. Mesic woods, stream banks; infrequent; east. int.
- **Spiranthes cernua* (L.) Rich. Dry woodland borders; rare; east. int.
- Spiranthes tuberosa* Raf. Dry woodland borders; rare; so. int.
- **Tipularia discolor* (Pursh) Nutt. Mesic hardwood slopes; rare; east. int.

POACEAE

- **Agrostis scabra* Willd. Roadside ditches; infrequent; east. int.
- **Aira elegans* Willd. Open upland woods; infrequent; naturalized from Europe.
- **Andropogon scoparius* Michx. Old fields; common; east. int.
- **Andropogon ternarius* Michx. Old fields; common; so. int.
- **Anthoxanthum odoratum* L. Open upland woods; common; naturalized from Europe.
- Aristida dichotoma* Michx. Muddy upland fields; infrequent; east. int.
- **Aristida longespica* Poir. Muddy upland fields; infrequent; east. int.
- Aristida oligantha* Michx. Cultivated fields; common; east. int.
- **Arundinaria gigantea* (Walt.) Chapm. Floodplains, river bottoms; common; so. int.
- **Brachyletrum erectum* (Screb.) Beauv. Mesic slopes; common; east. int.
- Bromus commutatus* Schrader. Old fields; infrequent; naturalized from Europe.
- **Bromus purgans* L. River slopes; infrequent; east. int.
- Chasmanthium latifolium* (Michx.) Yates. River banks and bottoms; common; so. int.
- Chasmanthium laxum* (L.) Yates. Ravine slopes; common; so. ext.
- Chasmanthium sessiliflorum* (Poir.) Yates. Ravine slopes; common; so. ext.
- **Cinna arundinacea* L. Roadside ditches; infrequent; east. int.
- **Cynodon dactylon* (L.) Pers. Fields and yards; abundant; naturalized from Old World.
- Dactylus glomerata* L. Mesic slopes; common; naturalized from Europe.
- Danthonia spicata* (L.) Beauv. Stream valleys; common; east. int.
- Digitaria sanguinalis* (L.) Scop. Old fields; common; naturalized from Europe.
- Echinochloa microstachya* (Wieg.) Rydb. Cultivated fields; infrequent; east. ext.
- **Echinochloa muricata* (Beauv.) Fern. Field ditches; infrequent; east. int.
- **Eleusine indica* (L.) Gaertn. Roadsides and river slopes; common; naturalized from Old World.
- **Elymus riparius* Wieg. Bottomland openings; infrequent; east. ext.
- Elymus virginicus* L. var. *virginicus*. River banks; infrequent; east. int.
- Eragrostis hypnoides* (Lam.) BSP. Pond margins; rare; east. int.
- Eragrostis spectabilis* (Pursh) Steud. Old fields; common; east. int.
- **Erianthus giganteus* (Walt.) Muhl. Old fields; common; so. ext.
- **Eulalia viminea* (Trin.) Kuntze. Fields and woods; abundant; naturalized from tropical Asia.
- **Festuca elatior* L. Waste places; common; naturalized from Europe.
- Glyceria striata* (Lam.) Hitchc. Stream banks; infrequent; east. int.
- **Holcus lanatus* L. Mowed fields; infrequent; naturalized from Europe.
- **Hordeum pusillum* Nutt. Upland woods; common; east. int.
- **Leersia oryzoides* (L.) Sw. Swamp margins; infrequent; east. int.
- **Leersia virginica* Willd. Swamps; common; east. int.
- **Leptochloa filiformis* (Lam.) Beauv. Eroded river banks; infrequent; so. int.
- **Melica mutica* Walt. Upland woods; common; so. int.
- **Panicum anceps* Michx. Fields and ditches; common; so. int.
- **Panicum clandestinum* L. Stream banks; common; east. int.
- Panicum commutatum* Schult. Floodplains; common; east. int.
- **Panicum dichotomiflorum* Michx. Sandy stream banks; infrequent; east. int.
- Panicum lanuginosum* Ell. Old fields; common; east. int.
- **Panicum linearifolium* Scribn. Upland woods; common; east. int.

- Panicum microcarpon* Muhl. Stream banks; infrequent; east. int.
 **Panicum philadelphicum* Bernh. Field ditches; infrequent; east. int.
Panicum polyanthes Schult. Ravine bottoms; infrequent; east. int.
 **Panicum rigidulum* Nees. Pond margins; rare; east. int.
Panicum scoparium Lam. Hardwood bottoms; infrequent; so. int.
 **Panicum stipitatum* Nash. Stream banks; infrequent; east. int.
 **Paspalum boscianum* Fluegge. Sandy stream banks; infrequent; so. ext.
Paspalum laeve Michx. Old fields; common; so. int.
Paspalum dilatatum Poir. Swamps; infrequent; naturalized from South America.
Paspalum pubiflorum Rupr. Roadside ditches; infrequent; so. int.
 **Poa autumnalis* Muhl. Ravine slopes; common; east. int.
 **Poa pratensis* L. Woods and fields; abundant; naturalized from northern U.S. and Europe.
 **Poa sylvestris* Gray. Ravine slopes; infrequent; east. int.
Setaria geniculata (Lam.) Beauv. Roadside ditches; common; so. int.
 **Setaria italica* (L.) Beauv. Cultivated fields; infrequent; naturalized from Old World.
Setaria viridis (L.) Beauv. Open river slopes; common; naturalized from Eurasia.
 **Sorghum halapense* (L.) Pers. Waste places and fields; abundant; naturalized from the Mediterranean.
 **Sphenopholis intermedia* (Rydb.) Rydb. Mowed fields; common; east. int.
Sphenopholis nitida (Biehler) Scribn. Ravine slopes; common; east. int.
 **Tridens flava* (L.) Hitchc. Fields and open woods; abundant; east. int.

DICOTYLEDONEAE

ACANTHACEAE

- **Dicliptera brachiata* (Pursh) Spreng. Floodplain woods; rare; cent. int.
 **Justicia ovata* (Walt.) Lindau. Openings in swamps; infrequent; so. ext.
Ruellia caroliniensis (Walt.) Steud. Open upland woods; common; east. int.
 **Ruellia strepens* L. Hardwood bottoms; common; east. int.

ACERACEAE

- **Acer negundo* L. Floodplain woods; common; east. int.
 **Acer rubrum* L. var. *rubrum*. Mesic woods; common; east. int.
 **Acer rubrum* L. var. *drummondii* (H. & A.) Sarg. Swamps and hardwood bottoms; common; so. ext.
 **Acer saccharinum* L. Floodplain woods; common; east. int.
Acer saccharum Marsh. Mesic woods; upper slopes; infrequent; east. ext.

AIZOACEAE

- **Mollugo verticillata* L. Cultivated fields; common; naturalized from tropical America.

AMARANTHACEAE

- Amaranthus hybridus* L. Cultivated fields; infrequent; naturalized from tropical America.

ANACARDIACEAE

- Rhus aromatica* Ait. Bluffs and ridgecrests; infrequent; east. int.
Rhus copallina L. Upland thickets; common; east. int.
 **Rhus glabra* L. Upland thickets; common; east. int.
Rhus radicans L. Woods and open areas; abundant; east. int.

ANNONACEAE

- **Asimina triloba* (L.) Dunal. Mesic woods; common; east. int.

APIACEAE

- **Chaerophyllum taintureiri* Hook. Mesic woods; common; so. int.
 **Cryptotaenia canadensis* (L.) DC. Mesic slopes; infrequent; east. int.
 **Daucus carota* L. Waste places; infrequent; naturalized from Eurasia.
Osmorhiza longistylis (Torr.) DC. Mesic slopes, ravines; common; east. int.
 **Sanicula canadensis* L. Mesic slopes; infrequent; east. int.
 **Sanicula gregaria* Bickn. Mesic slopes; infrequent; east. int.
 **Sanicula smallii* Bickn. Upland woods; common; so. ext.
 **Thaspium barbinode* (Michx.) Nutt. Mesic slopes; rare; east. int.
 **Thaspium trifoliatum* (L.) Gray. Mesic slopes; rare; east. int.
 **Trepocarpus aethusae* Nutt. River slopes; rare; so. ext.

APOCYNACEAE

- Amsonia tabernaemontana* Walt. Wooded slopes and uplands; infrequent;
 so. int.
 **Trachelospermum difforme* (Walt.) Gray. River bottom thickets; infrequent;
 so. ext.
 **Vinca minor* L. Upland woods; infrequent; naturalized from Europe.

AQUIFOLIACEAE

- Ilex decidua* Walt. Mesic woods; common; so. ext.
Ilex montana (T. & G.) Gray. Mesic ravines; rare; east. ext.
Ilex opaca Ait. Mesic slopes and stream valleys; infrequent; so. int.
Ilex verticillata (L.) Gray. Swamps and stream banks; common; east. ext.

ARALIACEAE

- **Aralia spinosa* L. Low roadsides; infrequent; so. int.
 **Hedera helix* L. River banks and around cemetery; infrequent; naturalized
 from Europe and persistent after cultivation.

ARISTOLOCHIACEAE

- **Aristolochia serpentaria* L. Mesic slopes, river slopes; infrequent;
 east. int.
 **Aristolochia tomentosa* Sims. River and creek banks; common; cent. int.
 **Asarum canadense* L. Mesic woods; common; east. ext.

ASCLEPIADACEAE

- **Asclepias perennis* Walt. Swamps; infrequent; so. ext.
- **Asclepias tuberosa* L. Dry woodland borders; infrequent; east. int.
- **Asclepias variegata* L. Dry woodland borders; infrequent; east. int.
- **Cyanchum laeve* (Michx.) Persoon. Sandy river banks; infrequent; naturalized from Europe.
- **Gonolobus gonocarpus* (Walt.) Perry. Wooded stream valleys; rare; so. int.

ASTERACEAE

- Achillea millefolium* L. Old fields; waste places; common; east. int.
- **Ambrosia artemisiifolia* L. Old fields; waste places; abundant; east. int.
- Ambrosia bidentata* Michx. Fields and roadsides; infrequent; cent. ext.
- **Ambrosia trifida* L. Old fields and waste places; abundant; east. int.
- Antennaria plantaginifolia* (L.) Richards. Mowed fields, roadsides; common; east. int.
- **Antennaria solitaria* Rydb. Mowed fields and roadsides; common; so. int.
- **Aster concolor* L. Pine woods, open areas; infrequent; so. ext.
- **Aster drummondii* Lindl. Dry woodland edges; common; cent. ext.
- Aster dumosus* Lindl. Fields and roadsides; common; east. int.
- Aster hemisphericus* Alex. Oak-pine woods; common; cent. int.
- **Aster lateriflorus* (L.) Britton. Bottoms, open areas; common; east. int.
- Aster patens* Ait. var. *patens*. Upland woods; common; east. int.
- Aster pilosus* Willd. var. *pilosus*. Old fields; common; east. int.
- **Aster sagittifolius* Willd. Upland woods, blufftops; infrequent; east. int.
- **Aster shortii* Lindl. Upland woods, blufftops; infrequent; east. ext.
- **Aster simplex* Willd. Bottomlands, open places; common; east. int.
- **Aster solidagineus* Michx. Oak-pine woods; common; east. int.
- Aster undulatus* L. Dry woodland edges; common; east. ext.
- **Aster vimineus* Lam. Roadsides, moist places; infrequent; so. ext.
- Bidens aristosa* (Michx.) Britton. Swamps; infrequent; east. int.
- **Bidens bipinnata* L. Stream banks; infrequent; east. int.
- **Bidens frondosa* L. Swamps; infrequent; east. int.
- **Bidens polylepis* Blake. Old fields; common; cent. ext.
- Boltonia diffusa* Ell. Roadsides, moist places; common; east. int.
- **Cacalia atriplicifolia* L. Wet woodland borders; infrequent; east. int.
- Chrysopsis graminifolia* (Michx.) Ell. Field ditches, open woods; infrequent; so. int.
- Chrysopsis mariana* (L.) Ell. Oak-pine woods; common; east. ext.
- **Cirsium horridulum* Michx. var. *horridulum*. Mowed fields; common; so. ext.
- Conyza canadensis* (L.) Cronq. var. *canadensis*. Old fields; common; east. int.
- Coreopsis major* Walt. Oak-pine woods; common; so. ext.
- Coreopsis pubescens* Ell. Upland woods, open places; common; so. int.
- Coreopsis tripteris* L. River slopes; open places; rare; east. int.
- **Eclipta alba* (L.) Hassk. River slopes, disturbed places; infrequent; east. int.
- Elephantopus carolinianus* Raeushel. Dry roadsides; common; so. int.
- Elephantopus tomentosus* L. Open upland woods; common; so. int.
- **Erechtites hieracifolia* (L.) Raf. Old fields; infrequent; east. int.
- **Erigeron annua* (L.) Pers. Roadsides, waste places; common; east. int.
- Erigeron philadelphicus* L. Old fields, open woods; abundant; east. int.
- **Erigeron strigosus* Muhl. ex Willd. Roadsides; common; east. int.

- **Eupatorium aromaticum* L. River bank, sandy places; infrequent; east. int.
- Eupatorium coelestinum* L. Roadside ditches; common; so. int.
- Eupatorium fistulosum* Barratt. Stream banks; common; so. int.
- Eupatorium hyssopifolium* L. var. *hyssopifolium*. Dry woodland borders; common; so. int.
- **Eupatorium perfoliatum* L. Open upland woods; infrequent; east. int.
- Eupatorium rotundifolium* L. var. *rotundifolium*. Open upland woods; common; east. ext.
- **Eupatorium rugosum* Houttuyn. Open bottomland woods; common; east. int.
- Eupatorium serotinum* Michx. Mesic woods, ditches; common; east. int.
- **Gnaphalium obtusifolium* L. Roadsides, open places; common; east. int.
- **Helenium amarum* (Raf.) H. Rock. Roadsides, gravelly places; common; east. int.
- Helenium flexuosum* Raf. Dry roadbanks; common; so. int.
- **Helianthus angustifolius* L. Upland woods; infrequent; so. int.
- Helianthus hirsutus* Raf. Uplands woods; common; east. int.
- Helianthus microcephalus* T. & G. River slopes; infrequent; east. int.
- **Helianthus silphioides* Nutt. Dry woodland borders; infrequent; cent. ext.
- **Hieracium gronovii* L. Old fields, woodland borders; common; east. int.
- Hypochoeris radicata* L. Orchards; infrequent; naturalized from Eurasia.
- **Iva annua* L. Dry woodland borders; infrequent; east. int.
- Krigia biflora* (Walt.) Blake. Mowed fields; common; east. int.
- Krigia dandelion* (L.) Nutt. Mowed fields; common; so. int.
- **Kuhnia eupatorioides* L. Stream banks; infrequent; east. int.
- **Lactuca canadensis* L. Old fields; common; east. int.
- **Lactuca floridana* (L.) Gaertn. Open upland woods; infrequent; east. int.
- **Liatris squarrosa* (L.) Michx. Dry woodland borders; infrequent; east. int.
- **Liatris squarrulosa* Michx. Dry woodland borders; infrequent; so. int.
- **Melanthera nivea* (L.) Small. River banks and slopes, open places; infrequent; so. ext.
- Mikania scandens* (L.) Willd. Stream thickets; infrequent; so. ext.
- Pluchea camphorata* (L.) DC. Open upland woods; infrequent; so. int.
- **Prenanthes altissima* L. Stream banks; infrequent; east. int.
- **Pyrrhopappus carolinianus* (Walt.) DC. Old fields; common; so. int.
- **Rudbeckia fulgida* Ait. var. *fulgida*. Upland ditches, wet places; infrequent; east. int.
- **Rudbeckia hirta* L. var. *pulcherrima* Farw. Roadbanks, woodland edges; common; east. int.
- Senecio anonymus* A. Wood. Open upland woods; common; east. ext.
- Senecio glabellus* Poiret. Upland pools; common; east. int.
- Silphium trifoliatum* L. var. *latifolium* A. Gray. Dry woodland borders; infrequent; so. int.
- Solidago arguta* Ait. var. *caroliniana* A. Gray. Stream valleys, common; so. int.
- **Solidago caesia* L. Stream banks; common; east. int.
- **Solidago canadensis* L. Old fields; common; east. int.
- **Solidago gigantea* Ait. Riverbanks and slopes; common; east. int.
- **Solidago hispida* Muhl. Open upland woods; common; east. int.
- **Solidago nemoralis* Ait. var. *haleana* Fern. Old fields; abundant; east. int.
- Solidago odora* Ait. var. *odora*. Oak-pine woods; common; east. int.
- **Solidago patula* Muhl. var. *patula*. Swamps; infrequent; east. int.
- **Solidago rugosa* Miller ssp. *aspera* (Ait.) Cronq. Stream banks; common; east. int.

- Solidago ulmifolia* Muhl. Mesic woods; common; east. int.
 **Taraxacum officinale* Weber. Mowed fields; abundant; naturalized from Eurasia.
Verbesina alternifolia (L.) Britton. Open riverbanks; common; east. int.
 **Verbesina virginica* L. Open riverbanks; common; so. int.
 **Vernonia gigantea* (Walt.) Trelease ex Branner & Coville ssp. *gigantea*. Stream valleys; common; so. int.
 **Vernonia missurica* Raf. Floodplain woods; rare; cent. ext. -
 **Xanthium strumarium* L. Cultivated fields; common; east. int.

BALSAMINACEAE

- **Impatiens capensis* Meerb. Stream banks and ditches; common; east. int.

BERBERIDACEAE

- Podophyllum peltatum* L. Moist open woods; abundant; east. int.

BETULACEAE

- Alnus serrulata* (Ait.) Willd. Stream banks; common; east. int.
Betula nigra L. Floodplain woods; common; so. int.
Carpinus caroliniana Walt. Mesic woods; common; east. int.
Corylus americana Walt. Hardwood bottoms; infrequent; east. int.
Ostrya virginiana (Mill.) K. Koch. Mesic woods; common; east. int.

BIGNONIACEAE

- Anisostichus capreolata* (L.) Bureau. Bottomlands; common; so. int.
Campsis radicans (L.) Seem. Moist areas, waste places; abundant; east. int.
 **Catalpa speciosa* Warder. River bank woods; rare; cent. ext. and persistent after cultivation.

BORAGINACEAE

- Cynoglossum virginianum* L. Mesic slopes and ravines; common; east. int.
Heliotropium indicum L. Floodplain open areas; infrequent; naturalized from Brazil.
Myotis macrosperma Engelm. Dry uplands; common; so. int.

BRASSICACEAE

- Arabis thaliana* (L.) Heyn. Old fields; infrequent; naturalized from Eurasia.
 **Arabis laevigata* (Muhl.) Poir. Mesic woods; infrequent; east. int.
Cardamine bulbosa (Schreb.) BSP. Swamps; common; east. int.
Cardamine hirsuta L. Fields; abundant; naturalized from Old World.
Dentaria diphylla Michx. Mesic woods; infrequent; east. ext.
Dentaria laciniata Muhl. Mesic woods, upper slopes; east. int.
 **Draba verna* L. Mowed fields; common; naturalized from Eurasia.
 **Iodanthus pinnatifidus* (Michx.) Steud. Mesic slopes; common; cent. ext.
 **Rorippa sessiliflora* (Nutt.) Hitchc. Sandy riverbanks; rare; east. int.

CALYCANTHACEAE

- **Calycanthus floridus* L. Wooded creek valleys and ravines; infrequent; so. ext.

CAMPANULACEAE

- **Campanula americana* L. Wooded river slopes; infrequent; east. int.
 **Lobelia cardinalis* L. Streams and swamps; infrequent; east. int.
Lobelia inflata L. Dry open woods; common; east. int.
 **Lobelia puberula* Michx. Stream banks; infrequent; so. int.
 **Lobelia siphilitica* L. Mesic slopes and terraces; east. int.
 **Lobelia spicata* Lam. var. *leptostachys* (A. DC.) Mack. & Bush. Dry woodland edges; infrequent; so. int.
 **Triodanis perfoliata* (L.) Nieuwl. Waste places; common; east. int.

CAPRIFOLIACEAE

- Lonicera japonica* Thunb. Woods and waste places; abundant; naturalized from eastern Asia.
 **Sambucus canadensis* L. Upland woods; common; east. int.
 **Symphoricarpos orbiculatus* Moench. Stream banks; infrequent; east. int.
Triosteum angustifolium L. Moist slopes and terraces; rare; east. int.
 **Viburnum acerifolium* L. Upland woods; common; east. int.
 **Viburnum dentatum* L. Upland woods; common; east. int.
 **Viburnum nudum* L. Upland woods; infrequent; so. ext.
Viburnum rufidulum Raf. Upland woods; common; so. int.

CARYOPHYLLACEAE

- **Arenaria serpyllifolia* L. Mowed fields; common; naturalized from Eurasia.
Cerastium nutans Raf. Mowed fields; common; east. int.
 • *Silene stellata* (L.) Ait. f. Mesic slopes; infrequent; east. int.
Silene virginica L. Mesic woods; common; east. int.
 **Stellaria media* (L.) Cyrill. Fields and woodland borders; abundant; naturalized from Old World.
 **Stellaria pubera* Michx. Mesic woods; common; east. int.

CELASTRACEAE

- **Celastrus scandens* L. Wooded bluffs; infrequent; east. ext.
Euonymus americanus L. Mesic woods; abundant; so. int.

CHENOPODIACEAE

- **Chenopodium album* L. Cultivated fields; infrequent; naturalized from Eurasia.
 **Chenopodium ambrosioides* L. Riverbanks; infrequent; naturalized from tropical America.

CISTACEAE

- **Lechea minor* L. Mowed fields; common; east. int.

CONVOLVULACEAE

- **Convolvulus sepium* L. Roadsides, thickets; common; east. int.
- **Cuscuta compacta* Juss. Swamps; common; east. int.
- **Cuscuta gronovii* Willd. Swamps; common; east. int.
- **Cuscuta pentagona* Engelm. Swamps; infrequent; east. int.
- **Ipomea hederacea* (L.) Jacq. Roadsides; infrequent; naturalized from tropical America.
- **Ipomea lacunosa* L. Stream and swamp thickets; abundant; east. int.
- **Ipomea pandurata* (L.) G. F. W. Meyer. River slopes, thickets; east. int.

CORNACEAE

- Cornus amomum* Mill. Upland woods; common; east. ext.
- **Cornus florida* L. Upland woods, mesic slopes; common; east. int.
- Cornus racemosa* Lam. Upland woods; infrequent; east. ext.
- Cornus stricta* Lam. Swamps; common; so. ext.

CRASSULACEAE

- Penthorum sedoides* L. Swamps, open places; infrequent; east. int.
- **Sedum ternatum* Michx. Ravine slopes, cherty places; infrequent; east. int.

CUCURBITACEAE

- **Melothria pendula* L. Floodplain woods; infrequent; so. int.
- **Sicyos angulatus* L. Sandy riverbanks; infrequent; east. int.

EBENACEAE

- **Diospyros virginiana* L. Woodlands, old fields; common; east. int.

ERICACEAE

- **Chimaphila maculata* (L.) Pursh. Upland woods; rare; east. ext.
- Kalmia latifolia* L. Blufftops; infrequent; east. ext.
- Oxydendron arboreum* (L.) DC. Upland woods; infrequent; so. int.
- Rhododendron canescens* (Michx.) Sweet. Upland woods; common; so. ext.
- Vaccinium arboreum* Marsh. Upland woods; abundant; so. int.
- **Vaccinium atrococcum* (Gray) Heller. Pine woods; infrequent; so. ext.
- **Vaccinium stamineum* L. Upland woods; abundant; east. int.

EUPHORBIACEAE

- **Acalypha rhomboidea* Raf. Mesic woods; common; east. int.
- **Acalypha virginica* L. Cultivated fields; common; east. int.
- **Croton monanthogynus* Michx. Roadsides, riverbanks; common; cent. int.
- **Crotonopsis elliptica* Willd. Roadsides; common; east. int.
- Euphorbia corollata* L. Upland woods; common; east. int.
- **Euphorbia maculata* L. Cultivated fields; common; east. int.
- **Euphorbia supina* Raf. Roadbed crevices; common; east. int.
- **Phyllanthus caroliniensis* Walt. Swamps; open places; rare; east. int.

FABACEAE

- **Albizia julibrissin* Durazz. Upland woods, fields; infrequent; naturalized from Asia.
- Apios americana* Medic. Stream thickets; infrequent; east. int.
- Cassia fasciculata* Michx. Dry woodland borders; common; east. int.
- Cassia marilandica* L. Stream valleys; infrequent; cent. int.
- **Cassia nictitans* L. Dry woodland borders; common; east. int.
- **Cassia obtusifolia* L. Eroded riverbank; rare; so. int.
- **Cercis canadensis* L. Mesic woods; common; east. int.
- **Clitoria mariana* L. Mesic woodland borders; infrequent; east. int.
- Crotalaria sagittalis* L. Dry woodland borders; common; east. int.
- **Desmodium glutinosum* (Muhl.) Wood. Mesic slopes; common; east. int.
- **Desmodium nudiflorum* (L.) DC. Open upland woods; common; east. int.
- **Desmodium viridiflorum* (L.) DC. Stream banks; common; east. int.
- **Dioclea multiflora* (T. & G.) C. Mohr. River bottom thickets; rare; cent. ext.
- **Galactia regularis* (L.) BSP. Open upland woods; infrequent; so. ext.
- **Gleditsia triacanthos* L. Mesic woods; infrequent; cent. int.
- **Lathyrus latifolius* L. Dry woodland borders; infrequent; naturalized from Europe.
- **Lespedeza cuneata* (Dumont) G. Don. Roadbanks; common; naturalized from Asia.
- Lespedeza repens* (L.) Bart. Waste places; common; east. int.
- **Lespedeza stipulacea* Maxim. Fields; common; naturalized from Asia.
- **Lespedeza striata* (Thunb.) H. & A. Roadside ditches; common; naturalized from Asia.
- **Lespedeza virginica* (L.) Britt. Cultivated fields; common; east. int.
- **Melilotus alba* Desr. Dry woodlands; infrequent; naturalized from Eurasia.
- Psoralea psoralioides* (Walt.) Cory var. *eglandulosa* (Ell.) Freeman. Dry woodlands; infrequent; so. int.
- **Pueraria lobata* (Willd.) Ohwi. Fence row; rare; naturalized from Japan.
- Robinia pseudoacacia* L. Riverbank thickets; infrequent; cent. ext.
- **Schrankia microphylla* (Dryand.) Macbr. Dry woodlands; common; so. int.
- **Stylosanthes biflora* (L.) BSP. Roadsides and fields; common; east. int.
- **Tephrosia virginiana* (L.) Pers. Open upland woods; common; east. int.
- **Trifolium pratense* L. Fields; common; naturalized from Eurasia.
- **Trifolium procumbens* L. Fields; common; naturalized from Eurasia.
- **Trifolium repens* L. Fields; common; naturalized from Eurasia.
- **Vicia angustifolia* Reichard. Fields and open woods; common; naturalized from Europe.
- **Wisteria sinensis* (Sims) Sweet. Roadside thickets; infrequent; naturalized from Asia.

FAGACEAE

- Castanea dentata* (Marsh.) Borkh. Upland woods; infrequent; east. ext.
- Fagus grandifolia* Ehrh. Mesic woods; abundant; east. int.
- **Quercus alba* L. Wooded uplands and slopes; abundant; east. int.
- **Quercus borealis* Michx. f. Mesic woods; common; east. int.
- **Quercus coccinea* Muenchh. Upland woods; infrequent; east. ext.
- **Quercus falcata* Michx. Upland woods; abundant; so. int.

- Quercus lyrata* Walt. Hardwood bottoms; infrequent; so. ext.
 **Quercus marilandica* Muenchh. Upland woods; common; so. int.
 **Quercus michauxii* Nutt. Hardwood bottoms; common; so. ext.
 **Quercus muehlenbergii* Engelm. Mesic woods; common; cent. ext.
 **Quercus nigra* L. Mesic woods; common; so. ext.
 **Quercus pagoda* Raf. Hardwood bottoms; common; so. ext.
 **Quercus palustris* Muenchh. Hardwoods bottoms; infrequent; cent. ext.
 **Quercus phellos* L. Hardwood bottoms; infrequent; so. int.
Quercus shumardii Buckl. Mesic woods; infrequent; so. int.
 **Quercus stellata* Wang. Upland woods; abundant; so. int.
 **Quercus velutina* Lam. Wooded uplands and slopes; common; east. int.

FUMARIACEAE

- Corydalis flavula* (Raf.) DC. Ravines, mesic slopes; rare; east. int.

GERANIACEAE

- **Geranium carolinianum* L. Old fields; common; east. int.
Geranium maculatum L. Mesic woods; infrequent; east. int.

HAMAMELIDACEAE

- Hamamelis virginiana* L. Upland thickets; infrequent; east. ext.
 **Liquidambar styraciflua* L. Wooded uplands, slopes, and bottoms; abundant;
 so. int.

HIPPOCASTANACEAE

- **Aesculus pavia* L. Upland woods; infrequent; so. ext.

HYDROPHYLLACEAE

- **Hydrolea uniflora* Raf. Pond and swamp margins; infrequent; cent. int.
Nemophila microcalyx (Nutt.) Fisch. & Mey. River slopes, woodland edges;
 infrequent; so. int.

HYPERICACEAE

- Ascyrum hypericoides* L. Roadbanks, dry woods; common; so. int.
Hypericum gentianoides (L.) BSP. Muddy upland fields; rare; east. int.
 **Hypericum perforatum* L. Pond and stream margins; infrequent; naturalized
 from Europe.
Hypericum prolificum L. Blufftops, river slopes; common; east. int.
 **Hypericum punctatum* Lam. Dry woodland borders; common; east. int.
 **Hypericum walteri* Gmelin. Swamps; infrequent; so. ext.

JUGLANDACEAE

- **Carya aquatica* (Michx. f.) Nutt. Swamps; rare; so. ext.
Carya cordiformis (Wang.) K. Koch. Wooded slopes and uplands; common;
 east. int.
Carya glabra (Mill.) Sweet. Upland woods; common; east. int.

- Carya laciniosa* (Michx. f.) Loud. Hardwood bottoms; infrequent; cent. ext.
- **Carya ovalis* (Wang.) Sarg. Wooded slopes and uplands; common; east. int.
- Carya ovata* (Mill.) K. Koch. Mesic woods; common; east. int.
- **Carya pallida* Ashe. Upland woods; infrequent; so. ext.
- Carya tomentosa* (Poir.) Nutt. Upland woods; common; east. int.
- **Juglans nigra* L. Mesic woods; infrequent; east. int.

LAMIACEAE

- Blephilia ciliata* (L.) Benth. Mesic woods; infrequent; east. int.
- **Collinsonia canadensis* L. Mesic woods; rare; east. int.
- Lamium amplexicaule* L. Fields; abundant; naturalized from Eurasia.
- **Lycopus americanus* Muhl. Upland ditches and seepages; infrequent; east. int.
- **Lycopus virginicus* L. Swamps; common; east. int.
- **Monarda fistulosa* L. Dry woodland borders; infrequent; east. int.
- Prunella vulgaris* L. Roadsides, moist woods; common; east. int.
- Pycnanthemum incanum* (L.) Michx. Mesic woods; rare; east. ext.
- **Pycnanthemum pilosum* Nutt. Upland ditches; rare; cent. ext.
- **Pycnanthemum tenuifolium* Schrader. Open upland woods; rare; east. int.
- **Pycnanthemum torreyi* Benth. Dry woodland borders; infrequent; east. ext.
- **Salvia lyrata* L. Fields; common; east. int.
- Scutellaria elliptica* Muhl. var. *hirsuta* (Short) Fern. Bottomlands; common; east. ext.
- **Scutellaria incana* Biehler var. *incana*. Pine woods; rare; east. ext.
- **Scutellaria integrifolia* L. Upland ditches; infrequent; so. int.
- **Scutellaria lateriflora* L. Swamps; common; east. int.
- **Scutellaria parvula* Michx. Grassy roadsides and fields; common; east. int.
- **Stachys tenuifolia* Willd. Stream valleys; infrequent; east. int.
- Trichostema dichotomum* L. Dry woodland borders; infrequent; east. int.

LAURACEAE

- Lindera benzoin* (L.) Blume. Mesic woods; common; east. int.
- **Sassafras albidum* (Nutt.) Nees. Wooded slopes and uplands; common; east. int.

LINACEAE

- **Linum medium* (Planch.) Britt. Upland woods; common; east. int.

LOGANIACEAE

- Polypremum procumbens* L. Dry roadbanks; common; so. int.
- **Spigelia marilandica* L. Mesic woods; infrequent; so. int.

LORANTHACEAE

- Phoradendron flavescens* (Pursh) Nutt. Upland woods; infrequent; so. int.

LYTHRACEAE

- **Lagerstroemia indica* L. Upland woods; rare; persistent after cultivation; native of Asia, possibly naturalized.
- Rotala ramosior* (L.) Koehne. Pond margins; rare; east. int.

MAGNOLIACEAE

- **Liriodendron tulipifera* L. Mesic slopes; common; east. int.
- **Magnolia grandiflora* L. Stream valleys; infrequent; naturalized from outer coastal plain and persistent after cultivation.

MALVACEAE

- **Hibiscus syriacus* L. Mesic slopes; rare; naturalized from Asia.
- **Sida spinosa* L. Cultivated fields; common; east. int.

MELASTOMATACEAE

- Rhexia mariana* L. var. *mariana*. Roadside ditches and seepages; infrequent; so. int.
- **Rhexia mariana* L. var. *interior* (Pennell) Kral & Bostick. Roadside ditches and seepages; infrequent; cent. ext.
- Rhexia virginica* L. Swamps; infrequent; east. int.

MENISPERMACEAE

- **Cocculus carolinus* (L.) DC. Floodplain woods; infrequent; so. int.
- Menispermum canadense* L. Floodplain woods; infrequent; east. ext.

MORACEAE

- **Broussonetia papyrifera* (L.) Vent. Upland woods; rare; naturalized from China and Japan.
- **Maclura pomifera* (Raf.) Schneid. Mesic slopes; rare; naturalized from south-central U.S.
- **Morus rubra* L. Mesic woods; common; east. int.

NYSSACEAE

- Nyssa aquatica* L. Swamps; common; so. ext.
- **Nyssa sylvatica* L. Wooded uplands, slopes, and bottoms; abundant; east. int.

OLEACEAE

- **Chionanthus virginicus* L. Upland woods; rare; so. ext.
- **Forestiera acuminata* (Michx.) Poir. Swamps; infrequent; so. ext.
- Franxinus americana* L. Mesic slopes; common; east. int.
- **Fraxinus pensylvanica* Marsh. Floodplain woods; common; east. int.
- **Ligustrum sinense* Lour. Upland thickets; infrequent; naturalized from China.

ONAGRACEAE

- Circaea lutetiana* L. ssp. *canadensis* (L.) Asch. & Mag. Mesic slopes; common; east. ext.
- Jussiaea decurrens* (Walt.) DC. Swamp borders; infrequent; so. ext.
- **Ludwigia alternifolia* L. Roadside ditches, seepages; common; east. int.
- **Ludwigia glandulosa* Walt. Swamp borders; infrequent; so. ext.
- **Ludwigia palustris* (L.) Ell. Muddy stream banks; common; east. int.
- **Oenothera biennis* L. Waste places; common; east. int.

OROBANCHACEAE

- **Conopholis americana* (L.) Wallr. Blufftops and slopes; common; east. int.
- **Epifagus virginiana* (L.) Bart. Mesic slopes; common; east. int.

OXALIDACEAE

- **Oxalis corniculata* L. Waste places; infrequent; east. int.
- **Oxalis fontana* Bunge. Mesic woodland borders; common; east. int.
- Oxalis stricta* L. Dry open woodlands; common; east. int.
- **Oxalis violacea* L. Dry woodland borders; common; east. int.

PAPAVERACEAE

- Sanguinaria canadensis* L. Mesic slopes; common; east. int.

PASSIFLORACEAE

- **Passiflora incarnata* L. Waste places; common; so. int.
- Passiflora lutea* L. Mesic slopes; rare; so. int.

PHYRMACEAE

- **Phyrma leptostachya* L. Mesic slopes; infrequent; east. int.

PHYTOLACCACEAE

- **Phytolacca americana* L. Waste places; common; east. int.

PLANTAGINACEAE

- **Plantago aristata* Michx. Fields; common; naturalized from southwestern U.S.
- **Plantago lanceolata* L. Roadsides, waste places; common; naturalized from Eurasia.
- **Plantago virginica* L. Open upland woods; common; east. int.

PLATANACEAE

- **Platanus occidentalis* L. Swamps and floodplain woods; common; east. int.

POLEMONIACEAE

- Phlox divaricata* L. Mesic slopes; common; east. int.
- Phlox paniculata* L. Floodplain woods; infrequent; east. int.
- Phlox pilosa* L. Open upland woods; common; east. int.
- Polemonium reptans* L. Mesic slopes; infrequent; east. int.

POLYGONACEAE

- **Brunnichia cirrhosa* Gaertn. Stream valleys; infrequent; so. ext.
- Rumex acetosella* L. Mowed and cultivated fields; common; naturalized from Eurasia.
- **Rumex altissimus* Wood. Stream banks; infrequent; east. int.
- **Rumex crispus* L. Cultivated fields; infrequent; naturalized from Europe.

- **Rumex obtusifolius* L. Stream banks; infrequent; naturalized from Europe.
- **Rumex verticillatus* L. Swamps; rare; east. int.
- **Polygonum hydropiperoides* Michx. Stream and pond margins; common; east. int.
- Polygonum pensylvanicum* L. Roadside banks; common; east. int.
- Polygonum punctatum* Ell. Muddy swamp margins; infrequent; east. int.
- **Polygonum sagittatum* L. Roadside ditches and seepages; common; east. int.
- **Polygonum virginianum* L. Wooded slopes and uplands; common; east. int.

PORTULACACEAE

- Claytonia virginica* L. Fields and woodlands; abundant; east. int.

PRIMULACEAE

- **Lysimachia ciliata* L. Swamp margins; infrequent; east. int.

RANUNCULACEAE

- Anemone virginiana* L. Dry woodland borders; infrequent; east. int.
- Anemonella thalictroides* (L.) Spach. Mesic uplands and ravines; common; east. int.
- **Clematis crispa* L. Stream valleys; rare; so. ext.
- Cimicifuga racemosa* (L.) Nutt. Stream valleys, ravines; common; east. int.
- Delphinium tricornis* Michx. Mesic slopes, ravines; infrequent; east. int.
- **Isopyrum biternatum* (Raf.) T. & G. Mesic slopes; infrequent; east. int.
- Ranunculus abortivus* L. Mesic woodland borders, fields; common; east. int.
- Ranunculus fascicularis* Muhl. Yards; infrequent; east. int.
- **Ranunculus micranthus* Nutt. Mesic woodland borders; infrequent; east. ext.
- Ranunculus recurvatus* Poir. Mesic slopes; infrequent; east. int.

RHAMNACEAE

- **Ceanothus americanus* L. var. *pitcheri* T. & G. Dry woodland borders; east. int.
- **Rhamnus carolinus* L. Dry woodland borders; infrequent; so. int.

ROSACEAE

- **Agrimonia gyroseopala* Wallr. Mesic slopes; infrequent; east. ext.
- Amelanchier arborea* (Michx. f.) Fern. Wooded uplands and slopes; common; east. int.
- **Aronia arbutifolia* (L.) Ell. Mesic slopes; rare; so. ext.
- **Aronia melanocarpa* (Michx.) Ell. Upland woods; infrequent; east. ext.
- **Chaenomeles lagenaria* (Loisel.) Koidz. Upland woods; rare; persistent after cultivation, native of Japan, possibly naturalized.
- **Crataegus crus-galli* L. Upland woods; infrequent; east. int.
- **Crataegus punctata* Jacq. River slopes; infrequent; east. int.
- **Crataegus viridis* L. Hardwood bottoms; infrequent; so. ext.
- **Duchesnea indica* (Andr.) Focke. Upland fields; common; naturalized from Asia.
- **Fragaria virginiana* Duchesne. Upland fields; common; east. int.
- **Geum virginianum* L. Mesic slopes; common; east. int.
- **Gillenia stipulata* (Muhl.) Trel. Dry woodland borders; common; east. int.

- **Malus angustifolia* (Ait.) Michx. Upland woods; common; so. ext.
- **Malus pumila* Miller. Fields; rare; persistent after cultivation and possibly naturalized (from Asia).
- **Potentilla simplex* Michx. Dry woodland borders; common; east. int.
- Prunus angustifolia* Marsh. Upland thickets; infrequent; so. int.
- **Prunus serotina* Ehrh. Wooded slopes and uplands; common; east. int.
- **Pyrus communis* L. Upland woods; rare; persistent after cultivation and possibly naturalized (from Eurasia).
- Rosa carolina* L. Upland woods; common; east. int.
- **Rosa cathayensis* Bailey. Upland thickets; rare; persistent after cultivation, native of China, possibly naturalized.
- **Rubus argutus* Link. Upland woods, open places; common; so. int.
- **Rubus bifrons* Vest. Upland thickets; rare; naturalized from Eurasia.
- **Rubus trivialis* Michx. Mesic woods; common; so. int.

RUBIACEAE

- Cephalanthus occidentalis* L. Swamps; infrequent; east. int.
- Diodia teres* Walt. Fields and roadsides; abundant; east. int.
- **Diodia virginiana* L. Stream and pond margins; common; so. int.
- **Galium aparine* L. Stream banks; common; east. int.
- **Galium circaezens* Michx. Mesic slopes; common; east. int.
- **Galium obtusum* Bigel. Open upland woods; infrequent; east. int.
- Houstonia caerulea* L. Upland woods and fields; common; east. int.
- Houstonia purpurea* L. Upland woods; common; east. int.
- Houstonia pusilla* Schoepf. Fields and roadsides; common; east. int.
- **Mitchella repens* L. Stream valleys and ravines; common; east. int.
- **Sherardia arvensis* L. Upland woods; infrequent; naturalized from Europe.

SALICACEAE

- **Populus deltoides* Marsh. Floodplain woods; common; east. int.
- **Salix nigra* L. Floodplain woods; common; east. int.

SANTALACEAE

- Commandra umbellata* (L.) Nutt. Upland woods; rare; east. ext. (collected a few meters outside of park boundary).

SAPINDACEAE

- **Cardiospermum halicacabum* L. Cultivated fields, floodplain woods; common; naturalized from tropical America.

SAPOTACEAE

- Bumelia lycioides* (L.) Pers. Swamps; infrequent; so. int.

SAURURACEAE

- Saururus cernuus* L. Swamps; common; east. int.

SAXIFRAGACEAE

- Decumaria barbara* L. Mesic woods; abundant; so. ext.
Heuchera americana L. Upland woods and slopes; infrequent; east. int.
Hydrangea arborescens L. var. *discolor* Ser. Stream banks, ravine slopes; common; east. int.
Hydrangea quercifolia Bartr. Mesic slopes, ravines; infrequent; so. ext.
Itea virginica L. Swamps; common; so. ext.
Saxifraga virginicensis Michx. Mesic cherty slopes; common; east. int.

SCROPHULARIACEAE

- **Agalinis fasciculata* (Ell.) Raf. Dry woodland borders; infrequent; so. ext.
Agalinus gattingeri Small. Old fields; infrequent; cent. int.
Agalinis purpurea (L.) Pennell. Open upland woods; infrequent; east. int.
Agalinis tenuifolia (Vahl) Raf. Dry woodland borders; infrequent; east. int.
Aureolaria flava (L.) Farw. Ridges and dry slopes; infrequent; east. int.
Aureolaria pectinata Nutt. Open upland woods; common; so. int.
Chelone glabra L. Swamps; infrequent; east. ext.
Dasistoma macrophylla (Nutt.) Raf. Mesic slopes; infrequent; cent. int.
Gratiola virginiana L. Swamps and pond margins; common; east. int.
Lindernia dubia (L.) Pennell. Swamps and pond margins; infrequent; east. int.
Mimulus alatus Ait. Mesic woods; infrequent; east. int.
Paulownia tomentosa (Thunb.) Steud. Upland woods; rare; naturalized from China.
Pedicularis canadensis L. Stream banks; infrequent; east. int.
Penstemon calycosus Small. Mesic woods; rare; east. ext.
Penstemon pallidus Small. Upland woods; rare; east. ext.
Scrophularia marilandica L. Mesic slopes; infrequent; east. int.
Verbascum blattaria L. Waste places; infrequent; naturalized from Eurasia.
Verbascum thapsus L. Waste places; infrequent; naturalized from Eurasia.
Veronica arvensis L. Fields; common; naturalized from Eurasia.

SOLANACEAE

- **Datura stramonium* L. Cultivated fields; infrequent; east. int.
Physalis angulata L. Cultivated fields; common; so. int.
Physalis longifolia Nutt. Eroded riverbank; rare; east. int.
Solanum carolinense L. Roadsides and fields; common; so. int.
Solanum nigrum L. Sandy riverbanks; rare; east. int.

STAPHYLEACEAE

- Staphylea trifolia* L. Mesic slopes; common; east. int.

STYRACACEAE

- **Halesia carolina* L. Mesic slopes; rare; so. ext.
Styrax grandifolia Ait. Mesic slopes; infrequent; so. ext.

TILIACEAE

Tilia heterophylla Vent. Blufftops, river slopes; infrequent; cent. ext.

ULMACEAE

- **Celtis laevigata* Willd. Floodplain woods; common; so. int.
- Planera aquatica* (Walt.) Gmel. Swamps; infrequent; so. ext.
- **Ulmus alata* Michx. Upland woods; common; so. int.
- **Ulmus americana* L. Mesic slopes, swamps; common; east. int.
- Ulmus rubra* Muhl. Mesic slopes; infrequent; east. int.

URTICACEAE

- **Boehmeria cylindrica* (L.) Sw. Mesic woods; common; east. int.
- **Laportea canadensis* (L.) Wedd. Roadside ditches, seepages; common; east. int.
- **Pilea pumila* (L.) Gray. Mesic woods; common; east. int.

VALERIANACEAE

- **Valerianella locusta* (L.) Betcke. Ditches, seepages; rare; naturalized from Europe.
- Valerianella radiata* (L.) Dufr. Fields, roadsides; common; so. int.

VERBENACEAE

- **Verbena simplex* Lehm. Open upland woods; common; east. int.
- **Verbena urticifolia* L. River bottoms; infrequent; so. ext.

VIOLACEAE

- **Cubelium concolor* (Forst.) Raf. Mesic slopes; rare; east. ext.
- **Viola affinis* LeConte. Uplands, slopes, bottoms; abundant; east. int.
- **Viola palmata* L. Hardwood bottoms; infrequent; east. int.
- Viola pedata* L. Open upland woods; infrequent; east. int.
- Viola rafinesquii* Greene. Fields; common; east. int.
- **Viola sororia* Willd. Mesic slopes; rare; east. ext.

VITACEAE

- **Ampelopsis arborea* (L.) Koehne. Floodplain woods; infrequent; so. ext.
- **Ampelopsis cordata* Michx. River banks and bottoms; common; so. int.
- **Parthenocissus quinquefolia* (L.) Planch. Wooded slopes and uplands; abundant; east. int.
- Vitis aestivalis* Michx. Upland thickets; infrequent; east. int.
- Vitis cinerea* Engelm. Upland thickets; infrequent; so. ext.
- **Vitis palmata* Vahl. Sandy river bank; rare; so. ext.
- Vitis rotundifolia* Michx. Wooded slopes and bottoms; abundant; so. int.

APPENDIX I. A checklist of the woody plants of Shiloh National Military Park.

TREES:

Acer negundo	Quercus alba
Acer rubrum var. rubrum	Quercus borealis
Acer rubrum var. drummondii	Quercus coccinea
Acer saccharinum	Quercus falcata
Acer saccharum	Quercus lyrata
Albizia julibrissin	Quercus marilandica
Amelanchier arborea	Quercus michauxii
Betula nigra	Quercus muehlenbergii
Broussonetia papyrifera	Quercus nigra
Carpinus caroliniana	Quercus pagoda
Carya aquatica	Quercus palustris
Carya cordiformis	Quercus phellos
Carya glabra	Quercus shumardii
Carya laciniata	Quercus stellata
Carya ovalis	Quercus velutina
Carya ovata	Robinia pseudoacacia
Carya pallida	Salix nigra
Carya tomentosa	Sassafras albidum
Castanea dentata	Taxodium distichum
Catalpa speciosa	Tilia heterophylla
Celtis laevigata	Ulmus alata
Diospyros virginiana	Ulmus americana
Fagus grandifolia	Ulmus rubra
Fraxinus americana	
Fraxinus pennsylvanica	
Gleditsia triacanthos	
Juglans nigra	
Juniperus virginiana	
Liquidambar styraciflua	
Liriodendron tulipifera	
Maclura pomifera	
Magnolia grandiflora	
Malus angustifolia	
Malus pumila	
Morus rubra	
Nyssa aquatica	
Nyssa sylvatica	
Ostrya virginiana	
Oxydendrum arboreum	
Paulownia tomentosa	
Pinus echinata	
Pinus taeda	
Pinus virginiana	
Planera aquatica	
Platanus occidentalis	
Populus deltoides	
Prunus angustifolia	
Prunus serotina	
Pyrus communis	

SHRUBS AND SMALL TREES

Aesculus pavia
 Alnus serrulata
 Aralia spinosa
 Ascyrum hypericoides
 Aronia arbutifolia
 Aronia melanocarpa
 Arundinaria gigantea
 Asimina triloba
 Bumelia lycioides
 Calycanthus floridus
 Ceanothus americanus
 Cephalanthus occidentalis
 Cercis canadensis
 Chaenomeles lagenaria
 Chionanthus virginicus
 Cornus amomum
 Cornus florida
 Cornus racemosa
 Cornus stricta
 Corylus americana
 Crataegus crus-galli

APPENDIX I (Continued).

SHRUBS AND SMALL TREES (Continued)

Crataegus punctata
Crataegus viridis
Euonymus americanus
Forestiera acuminata
Halesia carolina
Hamamelis virginiana
Hibiscus syriacus
Hydrangea arborescens
Hydrangea quercifolia
Hypericum prolificum
Ilex decidua
Ilex montana
Ilex opaca
Ilex verticellata
Itea virginica
Kalmia latifolia
Lagerstroemia indica
Ligustrum sinense
Lindera benzoin
Mitchella repens
Phoradendron flavescens
Rhamnus carolinus
Rhododendron canescens
Rhus aromatica
Rhus copallia
Rhus glabra
Rosa carolina
Rosa cathayensis
Rubus argutus
Rubus bifrons
Rubus trivialis
Sambucus canadensis
Staphylea trifolia
Styrax grandifolia
Symphoricarpos orbiculatus
Vaccinium arboreum
Vaccinium atrococcum
Vaccinium stamineum
Viburnum acerifolium
Viburnum dentatum
Viburnum nudum
Viburnum rufidulum
Vinca minor
Yucca filamentosa

WOODY VINES:

Ampelopsis arborea
Ampelopsis cordata
Aniostichus capreolata
Aristolochia tomentosa
Brunnichia cirrhosa
Campsis radicans
Celastrus scandens
Cocculus carolinus
Decumaria barbara
Dioclea multiflora
Hedera helix
Lonicera japonica
Menispermum canadense
Parthenocissus quinquefolia
Pueraria lobata
Rhus radicans
Smilax bona-nox
Smilax glauca
Smilax hispida
Smilax rotundifolia
Trachelospermum difforme
Vitis aestivalis
Vitis cinerea
Vitis palmata
Vitis rotundifolia
Wisteria sinensis

APPENDIX II. A checklist of exotic species of Shiloh National Military Park.
(I = invasive species; P = persistent after cultivation;
F = species of fields, lawns, and roadsides)

Species	Place of origin	Species	Place of origin
WOODY SPECIES:			
<i>Albizia julibrissin</i> (I)	Asia	<i>Digitaria sanguinalis</i> (F)	Europe
<i>Broussonetia papyrifera</i> (P)	Asia	<i>Dioscorea battatas</i> (F)	China
<i>Chaenomeles lagenaria</i> (P)	Japan	<i>Draba verna</i> (F)	Eurasia
<i>Hedera helix</i> (I)	Europe	<i>Duchesnea indica</i> (F)	Asia
<i>Hibiscus syriacus</i> (P)	Asia	<i>Eleusine indica</i> (F)	Old World
<i>Lagerstroemia indica</i> (I)	Asia	<i>Eulalia viminea</i> (I)	Tropical Asia
<i>Ligustrum sinense</i> (I)	China	<i>Festuca elatior</i> (F)	Europe
<i>Lonicera japonica</i> (I)	Asia	<i>Heliotropum indicum</i> (F)	Brazil
<i>Maclura pomifera</i> (P)	South-central U.S.	<i>Hemerocallis fulva</i> (P)	Europe
<i>Magnolia grandiflora</i> (I)	N. American Coastal Plain	<i>Holcus lanatus</i> (F)	Europe
<i>Malus pumila</i> (P)	Asia	<i>Hypericum perforatum</i> (F)	Europe
<i>Paulownia tomentosa</i> (I)	China	<i>Hypochoeris radicata</i> (F)	Eurasia
<i>Pueraria lobata</i> (I)	Japan	<i>Ipomea hederacea</i> (F)	Tropical America
<i>Pyrus communis</i> (P)	Eurasia	<i>Lespedeza striata</i> (F)	Asia
<i>Rosa cathayensis</i> (P)	China	<i>Lamium amplexicaule</i> (F)	Eurasia
<i>Rubus bifrons</i> (P)	Eurasia	<i>Lathyrus latifolius</i> (F)	Europe
<i>Vinca minor</i> (I)	Europe	<i>Lespedeza cuneata</i> (F)	Asia
<i>Wisteria sinensis</i> (P)	Asia	<i>Lespedeza stipulacea</i> (F)	Asia
		<i>Melilotus alba</i> (F)	Eurasia
		<i>Mullugo verticillata</i> (F)	Tropical America
		<i>Muscari racemosa</i> (P)	Europe
		<i>Ornithogalum umbellatum</i> (P)	Europe
HERBACEOUS SPECIES:			
<i>Aira elegans</i> (F)	Europe	<i>Paspalum dilatatum</i> (F)	South America
<i>Amaranthus hybridus</i> (F)	Tropical America	<i>Plantago aristata</i> (F)	Southwestern U.S.
<i>Anthoxanthum odoratum</i> (F)	Europe	<i>Plantago lanceolata</i> (F)	Eurasia
<i>Arabidopsis thaliana</i> (F)	Eurasia	<i>Poa pratensis</i> (F)	Northern U.S. and Europe
<i>Arenaria serpyllifolia</i> (F)	Eurasia	<i>Rumex acetosella</i> (F)	Eurasia
<i>Asparagus officinalis</i> (F)	Europe	<i>Rumex crispus</i> (F)	Europe
<i>Belamcanda chinensis</i> (P)	Asia	<i>Rumex obtusifolius</i> (F)	Europe
<i>Bromus commutatus</i> (F)	Europe	<i>Setaria italica</i> (F)	Old World
<i>Cardamine hirsuta</i> (F)	Old World	<i>Setaria viridis</i> (F)	Eurasia
<i>Cardiospermum halicacabum</i> (I)	Tropical America	<i>Sherardia arvensis</i> (F)	Europe
<i>Chenopodium album</i> (F)	Eurasia	<i>Sorghum halepense</i> (F)	Mediterranean
<i>Chenopodium ambrosioides</i> (F)	Tropical America	<i>Stellaria media</i> (F)	Old World
<i>Cynachum laeve</i> (F)	Europe	<i>Taraxacum officinale</i> (F)	Eurasia
<i>Cynodon dactylon</i> (F)	Old World	<i>Trifolium pratense</i> (F)	Eurasia
<i>Cyperus iria</i> (F)	Eurasia	<i>Trifolium procumbens</i> (F)	Eurasia
<i>Dactylis glomeratus</i> (F)	Europe	<i>Trifolium repens</i> (F)	Eurasia
<i>Daucus carota</i> (F)	Eurasia	<i>Valerianella locusta</i> (F)	Europe
		<i>Verbascum blattaria</i> (F)	Eurasia
		<i>Verbascum thapsus</i> (F)	Eurasia
		<i>Veronica arvensis</i> (F)	Eurasia
		<i>Vicia angustifolia</i> (F)	Europe



As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environment and cultural value of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

