

THE VASCULAR FLORA AND VEGETATIONAL COMMUNITIES OF MISSISSINEWA WOODS IN RANDOLPH COUNTY, INDIANA

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ABSTRACT. Mississinewa Woods, owned by the Red-tail Conservancy, is located in the northwest corner of Randolph County, Indiana. The preserve is part of a long, thin riparian corridor along the Mississinewa River in the Midwest Corn Belt region. Except for the riparian corridor and a few small nearby wooded lots, Mississinewa Woods is surrounded by agricultural fields for miles in every direction. The inventory of the vascular flora indicates that the 15.4 ha site harbors significant regional plant diversity with 311 species and varieties representing 215 genera and 77 families. The 12 families containing ~ 59% of the documented species were Apiaceae, Asteraceae, Brassicaceae, Cyperaceae, Fabaceae, Lamiaceae, Liliaceae, Poaceae, Polygonaceae, Ranunculaceae, Rosaceae, and Scrophulariaceae. Of the documented flora, 233 (74.9%) were native, 78 (25.1%) were adventives, and 128 represented Randolph County Records. A detailed physiognomic analysis revealed that of the 233 native species, 49 species were woody, 146 were herbaceous vines or forbs, 37 were graminoids, and one is a fern or fern allies. Of the 78 adventives, seven are woody, 53 were herbaceous vines or forbs, and 18 were grasses. The Floristic Quality Index (FQI) for native species was 46.2 and a mean Coefficient of Conservatism (mean C) was 3.0. The FQI indicates that the site is of nature preserve quality but the low mean C indicates that it has few higher quality species. Although none of the plants documented at the site have state or federal status, there were two species which are uncommon to east-central Indiana, i.e., *Hibiscus laevis* and *Schoenoplectus pungens* var. *pungens*.

Keywords: Randolph County Indiana, floodplain woods, old-field flora, county records–vascular plants, Floristic Quality Index (FQI), plant communities, flora–Indiana

INTRODUCTION

Natural riparian communities form the interface between terrestrial and aquatic environments. As observed by Naiman et al. (1993), these landscape corridors are the most diverse dynamic, and complex biophysical habitats on the terrestrial portion of Earth. They serve diverse ecological roles such as and maintaining water quality (Lowrance et al. 1984, Phillips 1989), decreasing soil erosion (Castelle et al. 1994), and storing organic matter (Barling & Moore 1994). At the same time, riparian forest fragments are primary breeding and/or stop-over habitat for many wildlife species including amphibians and reptiles (Rudolph & Dickson 1990, Semlitsch & Bodie 2003), songbirds (Stauffer & Best 1980, Kinley & Newhouse 1997), and mammals (McComb 1993).

Despite the ecological importance of riparian habitat, parts of the Midwest Corn Belt region

and Indiana have lost over 80% of these woodlands (Swift 1984, IDNR 1996). And yet, although one of the most heavily modified natural vegetation types in the United States, riparian habitats are often the most sizable natural habitat features remaining in the Midwestern landscape (Bretthauer & Edgington 2002). Continuing loss of riparian forests in our region is particularly troublesome (Iverson et al. 1989) given their role in maintaining regional biodiversity and for resolving issues related to endangered species, cumulative effects, water yield and quality, and sustainability (Naiman et al. 1993).

On a microscale, Mississinewa Woods Nature Preserve is representative of riparian woodlands in Indiana and the impact of current agricultural practices. The site is located 21 km (~ 13 miles) northwest of Winchester, Indiana, in the Central Till Plain Natural Region (Homoya et al. 1985). The preserve is part of a long, thin riparian corridor along the Mississinewa River and is surrounded by agricultural fields for miles in

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every direction. In the preserve, the longest perpendicular from river to road and the adjacent row crops is less than 400 meters. Agriculture in the upper Wabash watershed, which includes the Mississinewa River, has greatly modified historic hydrological patterns (Pyron & Neumann 2008). This new pattern, with increased zero flow days and greater swings in water levels, influences the adjacent riparian woodlands community. Although Mississinewa Woods is small and isolated, the potential quality of the tract as a nature preserve was recognized about five years ago by Tom Swinford, Regional Ecologist, IDNR Division of Nature Preserves, and purchase by the Red-tail Conservancy (RTC), a regional landtrust in Muncie, Indiana, was completed in 2009 (Banks, Pers. Comm.).

An inventory of resources is the necessary first step in developing a long-term resource management plan. An inventory is the simplest means to document species diversity and is a fundamental step in monitoring changes that may occur in species composition. Additionally, measures of diversity are frequently seen as indicators of the well-being of ecological systems (Magurran 1988). There have been no published studies concerning the flora of Mississinewa Woods or adjacent stretches of the Mississinewa River riparian woodland (but see Stonehouse et al 2003). Thus, the goals in this study were (1) to inventory the vascular flora, including a visual estimate of the relative abundance and distribution of each species; (2) to describe the various habitats and summarize floral dominance for each; and (3) to identify areas of special concern (e.g., areas with rare or threatened plants, if any, and communities sensitive to disturbance).

SITE DESCRIPTION

Located in Randolph County, Mississinewa Woods is a 15.4 ha (38 acre) property located ~ 5.6 km ESE of Albany, Indiana and ~ 21 km NE of Winchester, IN (approximately 40°17'05.75"N, 85°10'39.72"W [NAD 83] at the southeast corner of the property on West River Road, or in the northwest quarter of Green Township) (Fig. 1). The property is part of a narrow riparian corridor along the Mississinewa River. The property is bordered on the south and most of the west by West River Road. The northwest, northern and eastern portions border on small woodland areas. The riparian corridor, including the

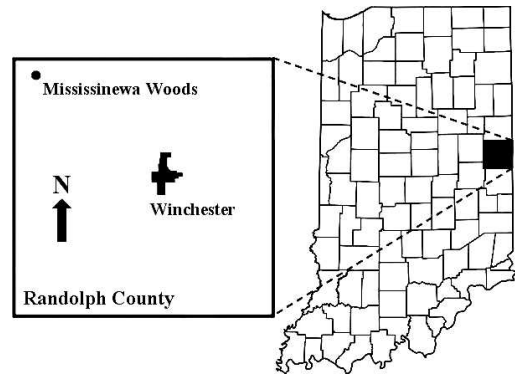


Figure 1.—Maps indicating the location of Mississinewa Woods within Randolph County (left) and the location of Randolph County within the state of Indiana (right). The Woods lies approximately 21 km NE of Winchester.

study site, is surrounded by agricultural fields extending several miles in all directions. The site was obtained in two actions. The eastern 22 acres were purchased from Pam Buchanan in late 2009. The western 16 acres were donated to RTC by Janet Burkhart in early 2010.

Although Mississinewa Woods contains a number of smaller habitat types, the majority of the site is a floodplain forest (Fig. 2). Other habitat types present include roadside fields along West River Road, a large centrally located old field used for hay production (~ 5 acres), the woodland edge along West River Road and the roadside fields, a riverbank community, several sand and gravel shorelines, and a wet meadow along the river. There is a narrow and fairly steep woodland slope from the road and/or roadside fields to the floodplain. Two vernal pools are located in the floodplain woods near the northern edge of the central field. Lastly, within the woods to the south and west of the central field, there is a wide drainage ditch running parallel to West River Road and emptying into the Mississinewa River.

Mississinewa Woods lies within the Central Till Plain Region. Specifically, it occurs in northern Randolph County near the southern border of the Bluffton Till Plain (Homoya et al. 1985). The preserve is within the Mississinewa Watershed (USGS Cataloging Unit 05120103) (EPA 2011). The Mississinewa River flows northwest into the Wabash River in the Upper Wabash Watershed (USGA Cataloging Unit 05120101).

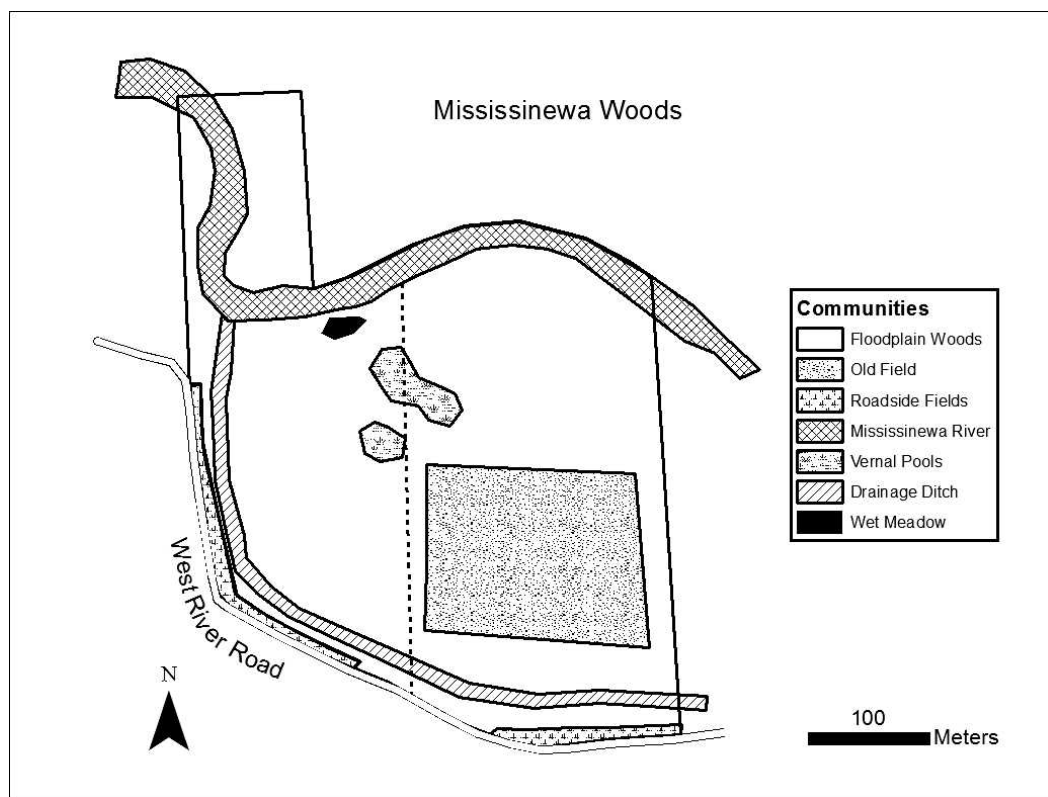


Figure 2.—Diagram illustrating the distribution of the major habitats at Mississinewa Woods, Randolph County, Indiana. To the right of the dotted line is the section of the property purchased from Pam Buchanan in late 2009, and to the left of the line is the section of the property donated by Janet Burkhardt in early 2010.

Two soil types (Fig. 3) are mapped for the majority of the site – Allison variant silty clay (An) and Saranac silty clay (Sa). Allison variant silty clay has a 0–2% slope and is frequently flooded, but it drains very well. The central old-field occurs on this soil type. Saranac silty clay also has a 0–2% slope and is frequently flooded, but it is very poorly drained. The large vernal pools occur on this soil type. The roadside fields and slopes from West River Road to the floodplain woods include Blount silt loam (BIA) in the eastern half of the site and Glynwood silt loam (GnB2) in the western half of the site. Both types have a 1–4% slope. However, BIA is poorly drained, while GnB2 is moderately well drained. According to the Indiana Historical Aerial Photo Index (IHAPI 2008), Mississinewa Woods was and has remained wooded since 1941 [no earlier maps are available]. Additionally, the large central hay field was also present in 1941.

METHODS

During the 2010 growing season, a foray every 7 to 10 days was made into the study area. Forays were made into every major habitat type and efforts were made to cover all areas within these habitats. Voucher specimens for each species observed were collected and deposited in the Ball State Herbarium (BSUH). Notes on vegetation consisted of a species list with visual estimates of distribution and relative abundance (see catalog of vascular plants, Appendix 1). Additionally, seasonal changes in the dominant vegetation (based on time of flowering) were noted for the various habitats. Nomenclature follows the USDA Plants Database (USDA 2011).

The floristic quality index (FQI) for Mississinewa Woods was determined using the program developed by the Conservation Design Forum in conjunction with Rothrock (2004). This program also calculates the mean

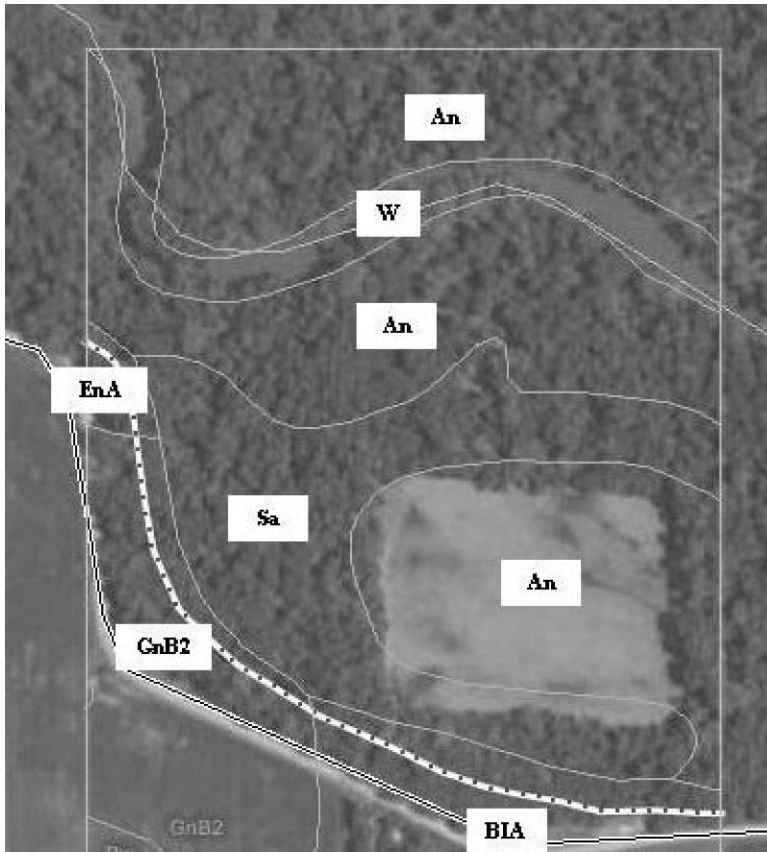


Figure 3.—Soil types and location in Mississinewa Woods, Randolph County, Indiana. An = Allison variant silty clay; BIA = Blount silt loam; EnA = Eldean variant loam; GnB2 = Glynwood silt loam; Sa = Saranac silty clay; W = Water (Mississinewa River).

Coefficient of Conservatism (Mean C), and the mean Wetland Indicator Status (Mean W). Additionally, it presents a detailed physiognomic analysis of the flora, both native and exotic (adventive). For a detailed description of how the FQI is determined and a explanation of C-values, see Swink & Wilhelm (1994), Rothrock (2004), and Rothrock & Homoya (2005). Briefly, C-values, which range from zero to ten, are an index of the fidelity of an individual species to undisturbed plant communities characteristic of the region prior to European settlement. The higher the C-value the more conserved the species is to an undisturbed habitat. All exotics are given a C-value of 0. The FQI is determined by multiplying the mean C for all species present by the square root of the total number of species. [For native FQI and mean C, only the native species are used.] A FQI greater than 35 suggests that a

site has remnant natural quality and contains some noteworthy remnants of natural heritage of the region (Rothrock & Homoya 2005, Swink & Wilhelm 1994).

RESULTS

The catalog of the vascular flora documented at Mississinewa Woods is listed in Appendix 1. The vascular flora consists of 311 species and varieties representing 215 genera and 77 families. Thirty-four families (~ 44% of the families) are represented by only one species and thirteen families (~ 17% of the families) are represented by only two species. Thirty families (~ 39% of the families) have three or more species. The twelve families with the highest number of species are the Asteraceae (38 species), Poaceae (32 species), Cyperaceae (23 species, including 19 *Carex* spp.), Lamiaceae (12 species), Liliaceae (12 species), Rosaceae (12 species), Apiaceae (10

species), Brassicaceae (10 species), Fabaceae (10 species), Polygonaceae (9 species), Ranunculaceae (9 species), and Scrophulariaceae (7 species). These twelve families account for 184 of the 311 species or ~ 59%, of the species documented.

The physiognomic analysis of the flora at Mississinewa Woods reveals some interesting information about plant composition (Table 1). Of the 311 species documented, 233 (74.9%) are native and 78 (25.1%) are adventives. Of the 233 native species, 49 species are woody, 146 are herbaceous vines or forbs, 37 are graminoids, and only one is a fern or fern allies. Of the 78 adventives, seven are woody, 53 are herbaceous vines or forbs, and 18 are grasses.

The Floristic Quality Indices (FQI) and the mean Coefficients of Conservatism (Mean C) for the site are in Table 2. For the native flora the FQI = 46.2 and the mean C = 3.0. An examination of Appendix 1 reveals that one plant, *Ranunculus hispidus* var. *caricetorum*, has a Coefficient of Conservatism (C) of 10 and one plant, *Carya laciniata*, has a C of 8, and seven species, including *Carex lacustris*, *Euonymus obovata*, *Fraxinus nigra*, *F. quadrangulata*, *Thalictrum thalictroides*, *Valeriana pauciflora* and *Zizia aurea*, have a C of 7. Of the 233 native species, only nine (~ 3.9%) have a C \geq 7. Of all 311 total species documented, 212 (~ 68.2%) have C \leq 3, including 111 species with C = 0 [78 exotic species and 33 native species], 25 species with C = 1, 34 species with C = 2, and 43 species with C = 3.

Based upon the Indiana Natural Heritage Data Center's records for Randolph County [this is the same plant list in the computer database of Keller et al. (1984)], there are 128 Randolph County records. None of the plants documented at the site have state RTE status (Division of Nature Preserves 2007).

HABITAT DESCRIPTIONS

Although primarily a floodplain forest along the Mississinewa River, Mississinewa Woods contains a number of other habitat types, including a woodland edge community along West River Road, a small fairly steep slope forest also along West River Road, roadside fields and a central old (hay) field, a riverbank community including a small wet meadow, a man-made drainage ditch that runs parallel to West River Road, several large vernal pools within the floodplain forest, and several gravel and sand bars along the river. Below is a

description of plants associated with each habitat.

Slope woodland and woodland edge.—The western two-thirds of the property running along West River Road [west of the entrance drive to the old-field] and to the north or east of the roadside fields, there is a rather steep, 3–4 m woodland slope. The herbaceous plants on this slope are the same as those of the adjacent floodplain forest. However, there are some notable differences in the woody vegetation. Tree species observed only in this habitat include *Fraxinus americana*, *Quercus muhlenbergii* and the only *Quercus alba* tree on the property. In addition *Crataegus crus-galli* was observed almost exclusively along the woodland edge or in open areas of this woodland slope. Although not part of the slope woodland, it should be pointed out that *Quercus rubra* only occurs along the woodland edge in the northeastern corner of the central old-field.

Floodplain forest.—Common to abundant tree species include *Acer negundo*, *Aesculus glabra*, *Carya laciniata*, *Celtis occidentalis*, *Fraxinus nigra*, *Gleditsia triacanthos* (especially south of the central field), *Platanus occidentalis* (especially along the river), *Populus deltoides*, and *Ulmus americana*. Common to abundant wood vines and shrubs include *Asimina triloba*, *Parthenocissus quinquefolia*, *Sambucus nigra* ssp. *canadensis*, and *Vitis riparia*. Common to abundant herbaceous species include *Acalypha rhomboidea*, *Ageratina altissima*, *Angelica atropurpurea*, *Claytonia virginica*, *Cryptotaenia canadensis*, *Fallopia scandens*, *Floerkea proserpinacoides*, *Galium aparine*, *Geum canadense*, *G. vernum*, *Hydrophyllum virginianum* (occurring in an area greater than 4 acres), *Impatiens capensis*, *Laportea canadensis*, *Lysimachia nummularia*, *Mertensia virginica*, *Phlox paniculata* (especially along the river), *Pilea pumila*, *Polygonum punctatum*, *Ranunculus hispidus caricetorum*, *Rudbeckia laciniata*, *Ruellia strepens*, *Rumex verticillatus*, *Sanicula odorata*, *Saururus cernuus*, *Solidago gigantea*, *Symphoricarpon cordifolium*, *S. lanceolatum*, *S. lateriflorum*, *Tovara virginiana*, *Trillium sessile*, *Verbesina alternifolia*, *Viola sororia*, *V. striata*, and *Zizia aurea*. Two notable herbaceous vine species are *Clematis virginiana* and *Echinocystis lobata*. There were many *Carex* spp., but the most abundant and widespread were *C. davisii*, *C. grayi*, *C. grisea*, *C. lupulina* and *C. muskingumensis*. Common to abundant grass species

Table 1.—Physiognomic analysis of the vascular flora documented at Mississinewa Woods, Randolph County, Indiana. A = annual, B = biennial, H = herbaceous, P = perennial, W = woody.

	Native species summary		Adventive species summary	
	Number	% of Total	Number	% of Total
# of species	233	74.9%	78	25.1%
Tree	32	10.3%	2	0.6%
Shrub	9	2.9%	5	1.6%
W-Vine	8	2.6%	0	0.0%
H-Vine	3	1.0%	0	0.0%
P-Forbs	105	33.8%	24	7.7%
B-Forbs	6	1.9%	11	3.5%
A-Forbs	32	10.3%	18	5.8%
P-Grass	10	3.2%	11	3.5%
A-Grass	4	1.3%	7	2.3%
P-Sedge	22	7.1%	0	0.0%
A-Sedge	1	0.3%	0	0.0%
Fern	1	0.3%	0	0.0%

include *Cinna arundinacea*, *Elymus glabriflorus*, *Glyceria striata*, *Leersia virginica*, *Phalaris arundinacea* (especially along the river), and *Poa sylvestris*.

Man-Made drainage ditch.—This ditch runs parallel to West River Road entering the property in the southeastern woods [woods south of the central old-field] and runs to the Mississinewa River near the northeast corner. It is a wide ditch, over 4 m at some points, with a muddy bottom. Although most of the plants occurring in this ditch are typical of the plants found in the bordering floodplain woodland, there are two notable species that occur only in this ditch, i.e., *Sium suave* and *Hibiscus laevis*. In Indiana *H. laevis* occurs primarily in the western half and a few scattered counties in the eastern half of the state (Yatskievych 2000). This is our first collection of this species in east-central Indiana.

Vernal pools.—The two larger vernal pools are located on the eastern section of the property purchased from Pam Buchanan. The largest pool lies close to the northern end of the large central old-field, and the other lies near

the northwestern corner of the old-field. The third vernal pool is the smallest and is located in the western section of the property donated by Janet Burkhart. It is near the Mississinewa River. Because the spring and early summer of 2010 were very wet, all three pools held water into mid-June. The dominant tree species in the two larger pools is *Acer saccharinum*. The dominant shrub in the vernal pool near the SE corner of the old-field is *Cephalanthus occidentalis*. Two notable herbs occurring here are *Saururus cernuus*, which was abundant, and *Sagittaria latifolia*, which occurred only here and in the wet meadow along the river. The large vernal pool was dominated by *Carex muskingumensis*. The small vernal pool near the river was dominated by *C. muskingumensis* and *C. tribuloides*.

Wet meadow along the Mississinewa River.—This meadow was a low point on the river bank and served as a place where water drained from the floodplain woods into the river, but is also the site of a small seep. Plants that occurred only at this site include *Bidens tripartita*, *Epilobium coloratum*, *Ludwigia palustris*, *Mentha arvensis*, *Mimulus alatus*, *M. ringens*, *Penthorum sedoides*, *Polygonum pennsylvanicum*, and *Salix interior*. Other plants in and around the meadow include *Alisma subcordatum*, *Amaranthus tuberculatus*, *Bidens cernua*, *Helenium autumnale*, *Lysimachia ciliata*, *Polygonum punctatum*, *Rorippa palustris*, *Sagittaria latifolia*, and *Urtica dioica*. Grasses occurring in the meadow include *Echinochloa muricata*, *Leersia virginica*, and *Phalaris arundinacea*.

Table 2.—Floristic Quality summary for the vascular flora documented at Mississinewa Woods, Randolph County, Indiana. Mean C = mean Coefficient of Conservations, FQI = Floristic Quality Index. Total Species is native plus exotic species.

	Species count	Mean C	FQI
Native species	233	3.0	46.2
Total species	311	2.3	40.0

Gravel and sand bars along the river.—Two plants occurring only in this habitat were *Eleocharis erythropoda* and *Schoenoplectus pungens*. *Eleocharis erythropoda* occurs on a sand/clay bar on the south bank of the river and *S. pungens* occurs on a sand/gravel bar on the north bank of the river. Both were rare but locally common. *Schoenoplectus pungens* occurs primarily in the northern third of the state and in a few scattered counties elsewhere. Although it has been reported from Wayne County (USDA 2011), this is the first time our group has collected this species in east-central Indiana.

Roadside fields and central old-field.—Most of the exotic species documented in this study came from the fields, especially the roadside fields. The most common exotics species occurring in the roadside fields were *Alliaria petiolata*, *Cichorium intybus*, *Daucus carota*, *Lactuca serriola*, *Lamium purpureum*, *Lespedeza cuneata*, *Lysimachia nummularia*, *Pastinaca sativa*, *Plantago lanceolata*, *Securigera varia*, *Stellaria media*, *Trifolium* spp., *Verbascum* spp., and *Veronica serpyllifolia*. Exotic grasses included *Bromus inermis*, *Digitaria* spp., *Elymus repens*, *Panicum* spp., *Poa pratensis*, *Schedonorus phoenix*, and *Setaria pumila*. The most common native species in roadside fields were *Acalypha rhomboidea*, *Allium cernuum*, *Carex granularis*, *Chamaesyce* spp., *Erigeron* spp., *Fragaria virginiana*, *Galium aparine*, *Helianthus tuberosus*, *Plantago rugelii*, *Ratibida pinnata*, *Solidago altissima*, *Sorghastrum nutans*, and *Symphotrichum pilosum*.

The eastern-most section of the roadside field along West River Road served as a site where plant remains had been dumped for years. This organic material in this area was noticeable high and the site was dominated by many large-sized exotic plants species, many which only occurred at this spot. The most common exotics species included *Chenopodium album*, *Cirsium arvense*, *Dipsacus fullonum*, *Echinochloa crusgalli*, *Glechoma hederacea*, *Polygonum persicaria*, *Rumex crispus*, *Setaria faberi*, *Silene latifolia* ssp. *alba*, and *Sinapis arvensis*.

For many years, the central field had been cut annually for hay and was cut in August, 2010. Although some of the most common exotics species in this field were the same as the roadside fields, such as *Trifolium* spp., the most notable exotics in the central field were grasses, including *Agrostis gigantea*, *Alopecurus pratensis*, *Dactylis*

glomerata, *Phleum pratense*, *Poa pratensis*, and *Schedonorus phoenix*. Most of the native plant diversity occurred in the undisturbed border of the field and included *Amaranthus tuberculatus*, *Asclepias incarnata*, *A. syriaca*, *Bidens vulgata*, *Calystegia sepium*, *Cynanchum laeve*, *Heliopsis helianthoides*, *Lysimachia ciliata*, *Physalis longifolia* var. *subglabrata*, *Polygonum amphibium* var. *emersum*, *Rudbeckia laciniata*, *Ruellia strepens*, *Solanum carolinense*, *Solidago altissima*, *Symphotrichum pilosum*, *Teucrium canadense*, and *Valerianella umbilicata*. Because this field was very moist, especially during the spring and early summer, many sedges were common. *Carex* species included *C. aggregata*, *C. granularis*, *C. leavenworthii*, *C. molesta*, and *C. vulpinoidea*. Other sedges included *Cyperus esculentus* var. *leptostachyus*, which was abundant, and *Scirpus pendulus*, which was infrequent.

Disturbed soil.—During the summer of 2010, the Randolph County Highway Department replaced a drainage pipe under West River Road at the eastern edge of the property. This repair created an area of disturbed soil. The site was quickly colonized by many of the plants typical of the roadside fields. However, three species, all exotic species, were documented only in this site. These species included *Abutilon theophrasti*, *Hibiscus trionum*, and *Sida spinosa*.

DISCUSSION

The vascular flora at Mississinewa Woods included the same core of plants, and consequently plant families, reported for other sites in east central Indiana (Rothrock et al. 1993; Rothrock 1997; Ruch et al. 1998, 2002, 2004, 2007, 2008a, b, 2009, 2011; Stonehouse et al. 2003). The 13 plant families, accounting for over 50% of the plants reported at Mississinewa Woods and all the sites referred to above, are the Apiaceae, Asteraceae, Brassicaceae, Caprifoliaceae, Cyperaceae, Fabaceae, Lamiaceae, Liliaceae, Poaceae, Polygonaceae, Ranunculaceae, Rosaceae, and Scrophulariaceae (see Appendix 1). In the current study, these families accounted for 189 of the 311 species documented or ~61%.

The flora at Mississinewa Woods is dominated by herbaceous plant species (254 species or 82%) including forbs (196 species), vines (3), grasses (32 species), and sedges (23 species). Woody species (56 species) comprise 18% of the total species including trees (34 species), shrubs (14 species), and woody vines (8 species). Ferns

and their allies account for only one species, *Equisetum hyemale*, of the total. It is interesting to note that of the 78 exotic (adventive) species, 53 (~68%) were herbaceous, 18 (~23%) were grasses and only seven (~9%) were woody. In fact, there were more exotic grass species (18) than native ones (14).

The floristic quality index (FQI) for the native vascular flora of Mississinewa Woods was 46.2, with a mean Coefficient of Conservatism (mean C) of 3.0. The FQI suggests that this site is of remnant natural quality and contains some noteworthy remnants of natural heritage of the region (Rothrock & Homoya 2005, Swink & Wilhelm 1994). A comparison of the floristic quality indices of other sites to Mississinewa Woods is seen in Table 3 (Rothrock & Homoya 2005; Ruch et al. 2007, 2008a, 2008b, 2009, 2011; Stonehouse et al. 2003). Clearly, the FQI and mean C for this site are significantly lower than other sites studied in east-central Indiana, including Lick Creek Summit Nature Preserve and Botany Glen, both having nearly equal acreage to Mississinewa Woods. Additionally, Rothrock & Homoya (2005) have indicated that the best quality reference sites in central Indiana have a mean C ranging from 3.8–4.1. With a mean C of 3.0, Mississinewa Woods clearly falls well below these values.

Lastly, the FQI and mean C for all species, both native and adventives, provides additional information about the flora at the site. For all species the FQI = 40, or 6.2 units lower than the FQI for native species alone. Likewise, for all species, including adventives, the mean C is 2.3, compared to a mean C of 3.0 for native species alone. Rothrock & Homoya (2005) have suggested that natural quality of an area is compromised when adventive diversity lowers mean C ≥ 0.7 units. We documented 78 exotic species at Mississinewa Woods. From these numbers it would appear that the adventive flora is having a negative impact on the native flora. However, this statement is misleading. The majority of exotics occurred in the roadside fields, the central field, and along the river. The floodplain forest was nearly free of exotic species. Thus, based on the numbers it would appear that the adventive flora is having a negative impact on the native flora, but this is in fact only true for the fields.

The help understand how the site could obtain a FQI of nature preserve status with a low mean C, an examination of the Coefficient

of Conservatism (C) for all species documented at the site is necessary. Of the 311 total species documented at Mississinewa Woods, only nine, or 2.9%, had a value for C ≥ 7 . However, 212 species, or 68.2%, had a value for C ≤ 3 . Compare these numbers against Mounds State Park [FQI = 87.1; mean C = 3.6] and Lick Creek Summit Nature Preserve [FQI = 60.6; mean C = 3.1] (Ruch et al., 2008a; Tungsveick et al., 2012). Of the 584 total species documented at Mounds State Park, 113 [19.3%] had a value for C ≥ 7 , while 144 [24.7%] had a value for C ≤ 3 . Of the 387 total species documented at Lick Creek Summit Nature Preserve, 54 [14%] had a value for C ≥ 7 , while 212 [54.8%] had a value for C ≤ 3 .

Although floodplain forests are areas of high biodiversity and biomass (Mitsch & Gosselink, 2000; Naiman & Decamps, 1997), they typically do not contain many plant species with high C-values (Rothrock, 2004; Appendix 1). Because FQI is determined by multiplying the square root of the number of species by the mean C, a site with a low mean C could obtain a FQI indicating nature preserve status if a high number of species occur at the site. Thus, for Mississinewa Woods, the square root of 233 (number of native species) is ~15.3. Thus, 15.3 times the mean C = 3.02 would be a native FQI = 46.2.

Anthropogenic activities, both direct and indirect, have also contributed to the low mean C value. Direct human activities include the continual maintenance of a loop road from the central field northward to the river, a wide drainage ditch in the woods south and west of the central field, and the continued use of the large central field for hay production, including the year of this study. Such disturbed sites encourage the growth of low C-value plant species at the expense of the more desirable high C-value plants that grow in more conserved, less disturbed habitats (Swink & Wilhelm 1994). In addition, several exotic grass species, including *Alopecurus pratensis*, *Dactylis glomerata*, *Phleum pratense*, and *Poa pratensis*, have been introduced to enhance the quality of the hay.

Indirect human activity results from the seasonal flooding of the site by the Mississinewa River. Mississinewa Woods is part of a long thin riparian corridor along the river. Except for the riparian corridor and a few small nearby wooded lots, Mississinewa Woods is

Table 3.—Comparison of the native Floristic Quality Index and mean Coefficient of Conservatism for various site in east-central Indiana. Sites are arranged by ascending FQI values for native species. Mean C = native mean Coefficient of Conservations, FQI = Floristic Quality Index, * = unpublished data, NP = Nature Preserve, FWA = Fish and Wildlife Area.

Site	# of Native Species	Native FQI	Mean C	Acres	County
Mississinewa Woods NP	233	46.2	3.0	38	Randolph
Fogwell Forest NP	210	59.3	4.1	28	Allen
McVey Memorial Woods*	295	60.0	3.5	285	Randolph
Lick Creek Summit NP	304	68.4	3.9	39	Wayne
Botany Glen	301	68.5	4.0	45	Grant
Duning Woods NP*	308	71.9	4.1	121	Wayne
Hayes Arboretum	375	72.0	3.7	~400	Wayne
Ginn Woods	385	74.1	3.9	150	Delaware
Wilbur Wright FWA	468	77.3	3.9	1028	Henry
Mounds State Park	478	96.2	4.4	290	Madison

surrounded by agricultural fields for miles in all directions. The nearest population area is Albany, IN, which is located three miles downstream. In riparian wetlands, seasonal flooding contributes to high biodiversity by producing anaerobic conditions during times of flooding, importing and removing organic matter, and replenishing mineral nutrients (Mitsch & Gosselink, 2000; Naiman & Decamps, 1997). However, because Mississinewa Woods is surrounded by such an expanse of agricultural land, the season flooding also brings in elevated amounts of fertilizer and pesticides. Such chemicals alter soil chemistry which could alter the balance of diversity in favor of the less conserved, lower C-value species. In the 2010 growing season, the site was flooded in the spring and during the excessive rains in July. In both cases the flood waters flowed southward, reaching across two-thirds of the large central field.

Lastly, it should be noted that two species documented at Mississinewa Woods, i.e., *Hibiscus laevis* and *Schoenoplectus pungens* var. *pungens*, rarely occur in the eight county, east-central Indiana region. *Hibiscus laevis* is only reported from Grant County by both Deam (1940) and the USDA Plant Database (2011). It typically occurs in northern and western Indiana. *Schoenoplectus pungens* var. *pungens*,

which most frequently occurs in northern Indiana, has been reported in Grant and Wayne Counties in east-central Indiana (Deam, 1940; UDSA, 2011).

In summary, although Mississinewa Woods is of modest size and floristic quality, its location within the broad agriculture plain of east central Indiana, its riparian position, and its remnant woodland structure and species richness make it a significant resource for the conservation of regional biodiversity. Since the majority of exotics occur in the fields, it is recommended that the Red-tail Conservancy restore the fields back to the native floodplain forest.

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APPENDIX 1

CATALOG OF VASCULAR FLORA AT
MISSISSINEWA WOODS NATURE PRESERVE

(arranged alphabetically by family)

Listed are voucher specimens for all species observed at Mississinewa Woods Nature Preserve. Nomenclature follows the USDA Plants Database (USDA 2011). Each species report contains the following information: (1) current scientific name based on the USDA Plants Database; (2) current taxonomic synonyms, if appropriate; (3) common name(s), based primarily on Gleason & Cronquist (1991), Swink & Wilhelm (1994), Yatskievych (2000), and the USDA Plant Database (2011); (4) typical habitat(s) within the study site; (5) a visual estimate of its relative abundance; (6) its coefficient of conservatism (C-value) for Indiana (Rothrock 2004); and (7) the Ball State University Herbarium (BSUH) number(s).

The relative abundance for species is defined as follows: rare = ≤ 5 sites although a species may be abundant at one site; infrequent = occasional, not widespread throughout its potential habitats, but may be locally abundant at a site; common = common throughout its potential habitats and may be locally abundant at one or more sites; and abundant = common and numerous throughout its potential habitats.

The symbols in parentheses immediately preceding each species refer to the following: * = naturalized, non-native (exotic) species and # = Randolph County record. Species were deemed unreported for Randolph County (and hence considered a county record) if they did not appear in the computer database of Keller et al. (1984). There are 128 Randolph County records. None of the plants documented at the site have state rare or threatened status (Division of Nature Preserves 2011).

DIVISION EQUISETOPHYTA

Horsetails and Scouring Rushes

Equisetaceae (Horsetail Family)

(#) *Equisetum hyemale* L. var. *affine* (Engelm.) A.A. Eat.; Common or Tall Scouring Rush; Floodplain woods along north side of Mississinewa River; Rare but locally abundant; C = 2; BSUH 17344.

DIVISION MAGNOLIOPHYTA

Angiosperms

Acanthaceae (Acanthus Family)

Ruellia strepens L.; Smooth Ruellia, Limestone Wild Petunia; Floodplain woods north of central

field and northern border of central field; Abundant; C = 4; BSUH 17444.

Aceraceae (Maple Family)

Acer negundo L.; Boxelder; Ash-leaved Maple; Floodplain woods; Abundant; C = 1; BSUH 17660.

Acer nigrum Michx. f.; SYN: *Acer saccharum* s. *nigrum*; Black Maple; Southern floodplain woods along ditch; Infrequent; C = 6; BSUH 17410, 17470.

Acer saccharinum L.; Silver Maple; Floodplain woods; Abundant; C = 1; BSUH 17678.

Acer saccharum Marshall; Sugar Maple; Woodland edge along River Road and drier areas of floodplain woods; Infrequent; C = 4; BSUH 17421.

Agavaceae (Century-Plant Family)

(*#) *Yucca filamentosa* L.; SYN: *Yucca smalliana* Fernald, *Y. flaccida* Haw.; Spanish Bayonet, Adam's Needle, Weak-Leaf Yucca; Dry hillside along River Road, planted; Rare; C = 0; BSUH 17457.

Alismataceae (Water-Plantain Family)

Alisma subcordatum Raf.; SYN: *Alisma plantago-aquatica* L. ssp. *subcordatum* (Raf.) Hultén; American, Southern, or Common Water Plantain; Muddy shore of Mississinewa River; Rare; C = 2; BSUH 17481, 17650.

Sagittaria latifolia Willd.; Common or Broad-Leaf Arrowhead; Vernal pool in floodplain woods and wet meadow along Mississinewa River; Infrequent; C = 3; BSUH 17513, 17520.

Amaranthaceae (Amaranth Family)

(*#) *Amaranthus retroflexus* L.; Redroot, Rough Pigweed, Redroot Amaranth; Roadside along River Road; Rare; C = 0; BSUH 17376.

Amaranthus tuberculatus (Moq.) J.D. Sauer; SYN: *Acnida altissima* (Riddell) Moq. ex Standl., *Acnida subnuda* (S. Watson) Standl.; Common Water Hemp, Rough-Fruited Amaranth; Old field and along the Mississinewa River; Common; C = 1; BSUH 17341, 17374, 17648.

Anacardiaceae (Cashew Family)

(#) *Toxicodendron radicans* (L.) Kuntze ssp. *negundo* (Greene) Gillis; Common or Eastern Poison Ivy; Widespread; Abundant; C = 1; BSUH 17594.

Annonaceae (Custard Apple Family)

Asimina triloba (L.) Dunal; Pawpaw; Floodplain woods; Common; C = 6; BSUH 17592, 17671.

Apiaceae (Carrot Family)

Angelica atropurpurea L.; Great or Purple-Stemmed Angelica; Floodplain woods and southern border of central field; Common; C = 6; BSUH 17612.

Chaerophyllum procumbens (L.) Crantz var. *procumbens*; Wild, Spreading or Common Streambank Chervil; Floodplain woods; Abundant; C = 2; BSUH 17666, 17704.

Cicuta maculata L. var. *maculata*; Spotted or Common Water Hemlock; Floodplain woods, especially south of central field; Common; C = 6; BSUH 17617.

Cryptotaenia canadensis (L.) DC.; Canadian Honewort; Floodplain woods; Abundant; C = 3; BSUH 17408.

(*) *Daucus carota* L.; Wild Carrot, Queen Anne's-Lace; Roadside fields, Infrequent; C = 0; BSUH 17460.

Osmorhiza longistylis (Torr.) DC.; Long-styled Sweet Cicely, Aniseroot; Floodplain woods; Common; C = 3; BSUH 17725.

(*) *Pastinaca sativa* L.; Wild Parsnip; Roadside fields; Rare; C = 0; BSUH 17559.

(#) *Sanicula odorata* (Raf.) K.M. Pryer & L.R. Phillippe; SYN: *Sanicula gregaria* Bickn.; Cluster Sanicle, Clustered Black Snakeroot; Floodplain woods; Abundant; C = 2; BSUH 17695.

(#) *Sium suave* Walter; (Hemlock) Water Parsnip; In drainage ditch, southern floodplain woods; Rare but locally common; C = 5; BSUH 17478, 17536.

Zizia aurea (L.) W.D.J. Koch; Golden Alexanders, Golden Zizia; Floodplain woods; Abundant; C = 7; BSUH 17451, 17542.

Apocynaceae (Dogbane Family)

Apocynum cannabinum L.; SYN: *Apocynum sibiricum* Jacq.; Dogbane, American Indian Hemp; Fields; Infrequent; C = 2; BSUH 17624.

Araceae (Arum Family)

Arisaema dracontium (L.) Schott; Green Dragon, Dragon Root; Floodplain woods; Infrequent; C = 5; BSUH 17447.

Aristolochiaceae (Birthwort Family)

Asarum canadense L.; SYN: *Asarum acuminatum* (Ashe) E.P. Bicknell, *Asarum reflexum* E.P. Bicknell; (Canadian) Wild Ginger; Floodplain woods north of central field; Common, locally abundant; C = 5; BSUH 17667.

Asclepiadaceae (Milkweed Family)

Asclepias incarnata L.; Swamp Milkweed; Central old field; Rare, one plant; C = 4; BSUH 17515.

Asclepias syriaca L.; Common Milkweed; Central field; Infrequent, but locally common; C = 1; BSUH 17469.

(#) *Asclepias tuberosa* L. ssp. *interior* Woodson; Butterflyweed; Roadside field; Rare, two plants; C = 4; BSUH 17370.

(#) *Cynanchum laeve* (Michx.) Pers.; SYN: *Ampelamus albidus* (Nutt.) Britt.; Sandvine, Bluevine, Honeyvine; Central old field; Rare; C = 1; BSUH 17636.

Asteraceae (Aster Family)

(#) *Achillea millefolium* L.; Common Yarrow, Common Milfoil; Roadside fields; Infrequent; C = 0; BSUH 17425.

Ageratina altissima (L.) R.M. King & H. Rob.; SYN: *Eupatorium rugosum* Houtt.; White Snakeroot; Floodplain woods; Abundant; C = 2; BSUH 18482.

Ambrosia artemisiifolia L. var. *elatior* Descourt.; Common or Annual Ragweed; Roadside fields; Infrequent; C = 0; BSUH 17625.

Ambrosia trifida L.; Giant Ragweed; Floodplain woods and roadside fields; C = 0; BSUH 17396.

(#) *Bidens bipinnata* L.; Spanish Needles; Roadside field; Rare, planted (?); C = 0; BSUH 17641.

(#) *Bidens cernua* L.; Nodding Bur Marigold, Nodding Beggar's-Ticks; Floodplain woods along Mississinewa River; Infrequent; C = 2; BSUH 17647.

Bidens frondosa L.; Common or Devil's Beggar's-Ticks; Border of central field; Rare, but locally common; C = 1; BSUH 17339.

Bidens tripartita L.; SYN: *Bidens comosa* (Gray) Wieg.; Three-lobe Beggar's-Ticks, Straw-Stem Beggar's-Ticks, Swamp Tickseed; Banks of the Mississinewa River and the wet meadow on the river; Infrequent; C = 2; BSUH 17347, 17653.

(#) *Bidens vulgata* Greene; Tall Beggar's-Ticks, Big Devil's Beggar's-Ticks; Floodplain woods and southern border of central field; Common, locally abundant; C = 0; BSUH 17371, 17654.

(*) *Cichorium intybus* L.; Chicory; Roadside fields; Common; C = 0; BSUH 17492, 17588.

(*#) *Cirsium arvense* (L.) Scop.; Field or Canada Thistle; Roadside field (dump); Rare but locally common; C = 0; BSUH 17620.

Cirsium discolor (Muhl.) Spreng.; Field or Pasture Thistle; Dry roadside fields; Rare, two plants; C = 3; BSUH 17399, 17475.

(#) *Conyza canadensis* (L.) Cronquist var. *canadensis*; SYN: *Erigeron canadensis* L.; (Canadian) Horseweed; Roadside fields; Infrequent; C = 0; BSUH 17375, 17629.

Erigeron annuus (L.) Pers.; Annual Fleabane, Eastern Daisy Fleabane, Whitetop; Roadside fields; Abundant; C = 0; BSUH 18448.

Erigeron philadelphicus L.; Philadelphia Daisy or Fleabane, Marsh Fleabane; Roadside fields; Infrequent; C = 3; BSUH 17724.

Eupatorium purpureum L. var. *purpureum*; SYN: *Eupatoriadelphus purpureus* (L.) King & H. Rob.; Green-Stemmed, Purple-Node, or Sweet-Scented Joe Pye Weed; Bank of drainage ditch to river, west side of property; Rare, one site with five plants; C = 5; BSUH 17490.

(*#) *Gaillardia pulchella* Frong. var. *pulchella*; Blanket-Flower, Firewheel; Roadside field, planted (?); C = 0; BSUH 17496.

Helenium autumnale L. var. *autumnale*; Common Sneezeweed; Riverbank along Mississinewa River; Infrequent; C = 3; BSUH 17343, 17359.

Helianthus tuberosus L.; Jerusalem Artichoke; Floodplain forest and roadside fields; Common, locally abundant; C = 2; BSUH 17351, 17392.

Heliopsis helianthoides (L.) Sweet var. *helianthoides*; False Sunflower, Smooth Oxeye; Border of central field; Common; C = 4; BSUH 17516.

Lactuca floridana (L.) Gaertn.; SYN: *Lactuca floridana* var. *villosa* (Jacq.) Cronquist, *Mulgedium floridanum* (L.) de Candolle; Blue or Woodland Lettuce; Floodplain forest; Common; C = 5; BSUH 17391.

(*#) *Lactuca serriola* L.; SYN *Lactuca scariola* L.; Prickly Lettuce; Roadside field; Infrequent; C = 0; BSUH 17471.

Packera aurea (L.) Á. Löve & D. Löve; SYN: *Senecio aureus* L.; Heart-leaved Groundsel, Golden Ragwort; Floodplain woods south of central field; Rare but locally common; C = 4; BSUH 17544.

(#) *Packera glabella* (Poir.) C. Jeffrey; SYN: *Senecio glabellus* Poir.; Butterweed, Yellowtop; Floodplain woods south of central field; Rare; C = 0; BSUH 17700.

Ratibida pinnata (Vent.) Barnh.; SYN: *Rudbeckia pinnata* Vent.; Gray-Headed Coneflower, Pinnate Prairie Coneflower; Roadside fields; Abundant; C = 5; BSUH 17498.

Rudbeckia laciniata L. var. *laciniata*; Cut-Leaf Coneflower, Wild Golden Glow; Floodplain woods woodland edge around central field; Abundant; C = 3; BSUH 17380.

Silphium perfoliatum L. var. *perfoliatum*; Cup Plant; Floodplain woods; Infrequent but locally common; C = 4; BSUH 17446, 18485.

Solidago altissima L.; SYN: *Solidago canadensis* L. var. *scabra* Torr. & A. Gray; Canada or Tall Goldenrod; Fields; Common; C = 0; BSUH 17356.

(#) *Solidago gigantea* Aiton; Late or Giant Goldenrod; Floodplain woods; Abundant; C = 4; BSUH 17389.

Symphotrichum cordifolium (L.) Nesom; SYN: *Aster cordifolius* L.; Common Blue Wood Aster, Common Blue Heart-Leaved Aster; Drier sites in floodplain woods; Abundant; C = 5; BSUH 17526.

(#) *Symphotrichum lanceolatum* (Willd.) G.L. Nesom; SYN: *Aster lanceolatus* Willd. var. *simplex* (Willd.) A.G. Jones, *Aster simplex* Willd.; White Panicle Aster, Eastern Lined Aster; Floodplain woods especially north and west of the central field; Abundant; C = 3; BSUH 17658.

(#) *Symphotrichum lateriflorum* (L.) Á. Löve & D. Löve var. *lateriflorum*; SYN: *Aster lateriflorus* (L.) Britton; Goblet, Calico, or Side-Flowering Aster; Floodplain woods; Abundant; C = 3; BSUH 17657.

Symphotrichum pilosum (Willd.) G.L. Nesom var. *pilosum*; SYN: *Aster pilosus* var. *pilosus* Willd.; Heath Aster, Awl Aster, Hairy White Old-Field Aster, Goodbye-Meadow; Dry fields; Infrequent but locally abundant; C = 0; BSUH 17656.

(*) *Taraxacum officinale* Weber ssp. *officinale*; Common Dandelion; C = 0; BSUH 17586.

(*#) *Tragopogon lamottei* Rouy; SYN: *Tragopogon pratensis* L.; Common Goat's Beard, Jack-Go-To-Bed-At-Noon; C = 0; BSUH 17723.

Verbesina alternifolia (L.) Britton ex Kearney; SYN: *Actinomeris alternifolia* (L.) DC.; Wingstem; Floodplain woods and border of central field; Common; C = 3; BSUH 17483.

Vernonia gigantea (Walt.) Trel. ssp. *gigantea*; Tall Ironweed; C = 2; BSUH 17381.

(#) *Xanthium strumarium* L. var. *glabratum* (DC.) Cronquist; SYN: *Xanthium chinense* Mill.; Rough Cocklebur; Riverbank along Mississinewa River; Infrequent; C = 0; BSUH 17348, 17363.

Balsaminaceae (Touch-Me-Not Family)

Impatiens capensis Meerb.; SYN: *Impatiens biflora* Walter; Spotted Touch-Me-Not, Orange Jewelweed; Floodplain woods, especially south of central field; Abundant; C = 2; BSUH 17480, 17615.

(#) *Impatiens pallida* Nutt.; Pale Touch-Me-Not, Yellow Jewelweed; North of Mississinewa River in northwest corner of property; Rare, one large colony; C = 4; BSUH 17346.

Betulaceae (Birch Family)

Carpinus caroliniana Walter ssp. *virginiana* (Marsh.) Furlow; SYN: *Carpinus caroliniana* Walter var. *virginiana* (Marsh.) Fernald; Muscledwood, Blue Beech; Riverbank along Mississinewa River; Infrequent; C = 5; BSUH 17334, 17365, 17373.

Bignoniaceae (Trumpet-Creeper Family)

(#) *Catalpa speciosa* Warder; Northern Catalpa, Cigar Tree; Woodland edge near entrance road to central field; Rare, one tree; C = 0; BSUH 17338.

Boraginaceae (Borage Family)

(#) *Mertensia virginica* (L.) Pers. ex Link; Virginia or Eastern Bluebells; Floodplain forest, especially north of the central field; Abundant; C = 6; BSUH 17571, 17587.

Brassicaceae (Mustard Family)

(*#) *Alliaria petiolata* (Bieb.) Cavara & Grande; SYN: *Alliaria officinalis* Andr. ex M. Bieb., *Alliaria alliaria* (L.) Britton; Garlic Mustard; Roadside fields and floodplain woods, especially south of central field; Abundant; C = 0; BSUH 17662, 17668, 17696.

(#) *Arabis shortii* (Fernald) Gleason; SYN: *Arabis dentata* (Torr.) Torr. & A. Gray; Toothed Rockcress, Short's Rockcress; In crutch of a dead tree near the river; Rare, one plant; C = 5; BSUH 17714.

(*) *Barbarea vulgaris* W.T. Aiton; (Garden) Yellow Rocket, Bitter Winter Cress; Roadside fields; Rare; C = 0; BSUH 17661.

(*) *Sinapis arvensis* L. ssp. *arvensis*; SYN: *Brassica kaber* (DC.) L.C. Wheeler; Charlock, Wild Mustard; Roadside field (dump); C = 0; BSUH 17712.

(*) *Capsella bursa-pastoris* (L.) Medik.; Shepherd's Purse; Roadside fields; Infrequent; C = 0; BSUH 17676.

Cardamine bulbosa (Schreb. ex Muhl.) Britton, Sterns & Poggenb.; SYN: *Cardamine rhomboidea* (Pers.) DC.; Bulbous Bittercress, White Spring Cress; Floodplain woods; Common and locally abundant; C = 4; BSUH 17718.

Cardamine concatenata (Michx.) Sw.; SYN: *Dentaria laciniata* Muhl. ex Willd.; Cut-Leaved or Five-Parted Toothwort; Floodplain woods; Common; C = 4; BSUH 17577.

Iodanthus pinnatifidus (Michx.) Steud.; Purple Rocket; Floodplain woods especially north of the central field; Common; C = 6; BSUH 17555, 17713.

(*#) *Lepidium campestre* (L.) W.T. Aiton; Field Pepper Grass or Pepperweed, Field Cress; Roadside fields; Infrequent; C = 0; BSUH 17726.

Rorippa palustris (L.) Besser ssp. *fernaldiana* (Butters & Abbe) Jonsell; SYN: *Rorippa islandica* (Oeder) Borbás ssp. *fernaldiana* (Butters & Abbe) Hultén; Common Yellow Cress, Fernald's Yellow Cress; Muddy riverbank; Rare; C = 2; BSUH 17488.

Campanulaceae (Bellflower Family)

Campanulastrum americanum (L.) Small; SYN: *Campanula americana* L.; Tall or American Bellflower; Floodplain woods south of the central field; Common, but locally abundant; C = 4; BSUH 17501.

Lobelia siphilitica L.; Great Blue Lobelia; North of Mississinewa River, northwest corner of property; Rare; C = 3; BSUH 17364.

Caprifoliaceae (Honeysuckle Family)

(*#) *Lonicera x bella* Zabel; Showy Fly or Bell's Honeysuckle; Floodplain woods south of the central field; Rare; C = 0; BSUH 17675.

(*#) *Lonicera morrowii* A. Gray; Morrow's Honeysuckle; Floodplain forest south of the central field; Infrequent; C = 0; BSUH 17674.

Sambucus nigra L. ssp. *canadensis* (L.) R. Bolli; SYN: *Sambucus canadensis* L.; Common Elder or Elderberry; Floodplain woods; Common; C = 2; BSUH 17598.

(*#) *Viburnum opulus* L. var. *opulus*; Guelder Rose, European High-Bush Cranberry; Floodplain forest south of the central field; Rare, but locally common; C = 0; BSUH 17567.

Viburnum prunifolium L.; Black Haw; High, dry area in floodplain woods just north of the NW corner of the central field; Rare; C = 4; BSUH 17679.

Caryophyllaceae (Pink Family)

(*#) *Cerastium fontanum* Baumg. ssp. *vulgare* (Hartm.) Greuter & Burdet; SYN: *Cerastium vulgatum*

L.; Common Mouse-Ear Chickweed, Big Chickweed; Roadside fields; Infrequent; C = 0; BSUH 17707.

(*#) *Dianthus armeria* L.; Deptford Pink; Roadside field along entrance road to central field; Rare; C = 0; BSUH 17517.

(*#) *Silene latifolia* Poir. ssp. *alba* (Mill.) Greuter & Burdet; Evening, White or Bladder Campion; Roadside field (dump); Rare; C = 0; BSUH 17435.

(*) *Stellaria media* (L.) Vill.; Common Chickweed; Roadside fields; Common; C = 0; BSUH 17670.

Celastraceae (Staff-tree Family)

Euonymus obovatus Nutt.; Running Strawberry-Bush; Dry, raised area in floodplain woods; Rare, but locally common; C = 7; BSUH 17395.

Chenopodiaceae (Goosefoot Family)

(*#) *Chenopodium album* L. var. *album*; Lamb's-Quarters, Pigweed; Roadside field (dump); Rare, but locally abundant; C = 0; BSUH 17630.

Commelinaceae (Spiderwort Family)

(*#) *Commelina communis* L.; Common or Asiatic Dayflower; Roadside field on south side of property and in the floodplain woods along the entrance road to the central field; Infrequent, but locally abundant; C = 0; BSUH 17616.

Tradescantia subaspera Ker-Gawl. var. *subaspera*; Zigzag or Broad-Leaved Spiderwort; Floodplain woods north of the central field; Infrequent; C = 4; BSUH 17468, 17522.

Convolvulaceae (Morning-glory Family)

Calystegia sepium (L.) R. Br. ssp. *sepium*; Common or Typical Hedge-Bindweed, Hedge False Bindweed; Central old field; Abundant; C = 1; BSUH 17497.

(*#) *Ipomoea hederacea* Jacq.; Ivy-Leaved Morning-Glory; Central old field; Infrequent; C = 0; BSUH 17340.

Cornaceae (Dogwood Family)

(#) *Cornus drummondii* C.A. Mey.; Rough-leaved Dogwood; Woodland edge around central field; Infrequent; C = 2; BSUH 17619.

Crassulaceae (Stonecrop Family)

(#) *Penthorum sedoides* L.; Ditch Stonecrop; Wet meadow next to Mississinewa River; Rare; C = 2; BSUH 17633.

Cucurbitaceae (Gourd Family)

Echinocystis lobata (Michx.) Torr. & A. Gray; SYN: *Sicyos lobata* Michx.; Balsam Apple, Wild Cucumber; Floodplain woods and border along central field; Common; C = 3; BSUH 17503, 17635.

Cuscutaceae (Dodder Family)

(#) *Cuscuta gronovii* Willd. ex Schult. var. *gronovii*; Common Dodder; Scaldweed; Floodplain woods on *Laportea canadensis*; Rare; C = 2; BSUH 17386.

Cyperaceae (Sedge)

(#) *Carex aggregata* Mack.; Smooth Clustered Sedge; Floodplain forest and central field; Abundant; C = 2; BSUH 17527, 17537.

Carex blanda Dewey; Common Wood Sedge; Central field and woodland edge; Abundant; C = 1; BSUH 17531.

Carex conjuncta Boott; Green-Headed Fox Sedge, Soft Fox Sedge; Central field and woodland edge; Infrequent; C = 6; BSUH 17534.

Carex davisii Schwein. & Torr.; Awned Graceful Sedge, Davis' Sedge; Floodplain woods, especially south of central field; Abundant; C = 3; BSUH 17540.

Carex frankii Kunth; Bristly Cattail Sedge, Frank's Sedge; Floodplain woods south of central field, along the entrance road to the field; Rare; C = 2; BSUH 17621.

Carex granularis Muhl.; Pale Sedge, Limestone Meadow Sedge; Central field and moist roadside fields; Abundant; C = 2; BSUH 17541.

Carex grayi Carey; Common Bur Sedge; Floodplain woods; Abundant; C = 5; BSUH 17546, 17689.

(#) *Carex grisea* Wahlenb.; Wood Gray Sedge, Inflated Narrow-Leaf Sedge; Floodplain woods; Abundant; C = 3; BSUH 17403, 17547.

Carex jamesii Schwein.; Grass Sedge; Floodplain woods north of central field; Common and locally abundant; C = 4; BSUH 17532.

Carex lacustris Willd.; Common Lake Sedge, Hairy Sedge; Floodplain woods north of central field; Common; C = 7; BSUH 17561.

(#) *Carex leavenworthii* Dewey; SYN: *Carex cephalophora* Muhl. ex Willd. var. *leavenworthii* (Dewey) Kük.; Dwarf Bracted Sedge, Leavenworth's Sedge; Central field; Abundant; C = 1; BSUH 17538, 17539.

Carex lupulina Muhl. ex Willd.; Common Hop Sedge; Floodplain forest; Common; C = 4; BSUH 17437, 17601.

(#) *Carex molesta* Mack. ex Bright; Field Oval Sedge; Fields; Abundant; C = 2; BSUH 17401, 17402, 17548.

(#) *Carex muskingumensis* Schwein.; Swamp Oval Sedge, Muskingum Sedge; Floodplain woods, especially associated with vernal pools; C = 6; BSUH 17436, 17454, 17600.

(#) *Carex radiata* (Wahlenb.) Small; Straight-Styled Wood Sedge, Eastern Star Sedge; Floodplain woods south of central field; Infrequent, but locally common; C = 4; BSUH 17545.

Carex shortiana Dewey; Short's Sedge; Floodplain woods along entrance road to central field; Rare, but locally common; C = 3; BSUH 17533, 17550.

Carex stipata Muhl.; Common Fox Sedge; Floodplain woods south of central field; Infrequent; C = 2; BSUH 17535.

Carex tribuloides Wahlenb. var. *tribuloides*; Awl-Fruited Oval Sedge, Blunt Broom Sedge; Floodplain woods, especially associated with vernal pools; Rare; C = 5; BSUH 17622.

Carex vulpinoidea Michx.; Brown Fox Sedge; Central field; Common and locally abundant; C = 2; BSUH 17432.

Cyperus esculentus L. var. *leptostachyus* Boeckeler; Yellow or Field Nut-Sedge; Central field; Abundant; C = 0; BSUH 17528.

(#) *Eleocharis erythropoda* Steud.; Red-Rooted Spike Rush; Riverbank and sand/clay bar along Mississinewa River; Rare, but locally common; C = 2; BSUH 17530.

(#) *Schoenoplectus pungens* (Vahl.) Palla var. *pungens*; SYN: *Scirpus americanus* auct. non Pers.; Chairmaker's Rush, Common Threesquare; Riverbank and sand/gravel bar along Mississinewa River; Rare, but locally common; C = 3; BSUH 17529.

(#) *Scirpus pendulus* Muhl.; Red or Rufous Bulrush; Central field near entrance road; Rare; C = 2; BSUH 17604.

Dipsacaceae (Teasel Family)

(*) *Dipsacus fullonum* L.; SYN: *Dipsacus sylvestris* Huds., *Dipsacus fullonum* L. ssp. *sylvestris* (Huds.) Clapham; Fuller's or Common Teasel; Roadside field near the dump; Rare, but locally common; C = 0; BSUH 17493.

Elaeagnaceae (Oleaster Family)

(*#) *Elaeagnus umbellata* Thunb. var. *parvifolia* (Wall. ex Royle) C.K. Schneid.; Autumn Olive; Woodland edge roadside and along central field; Rare; C = 0; BSUH 17369.

Euphorbiaceae (Spurge Family)

Acalypha rhomboidea Raf.; SYN: *Acalypha virginica* L. var. *rhomboidea* (Raf.) Cooperr.; Common Three-Seeded Mercury; Roadside fields and floodplain woods; Common; C = 0; BSUH 17632.

(#) *Chamaesyce maculata* (L.) Small; SYN: *Euphorbia maculata* L.; Milk Purslane, Spotted Spurge, Spotted Sandmat, Creeping Spurge; Roadside; Infrequent; C = 0; BSUH 17367.

(#) *Chamaesyce nutans* (Lag.) Small; SYN: *Euphorbia nutans* Lag.; (Small) Eyebane, Nodding Spurge; Roadside; Abundant; C = 0; BSUH 17352, 17400, 17491, 17646.

Fabaceae (Pea or Bean Family)

Gleditsia triacanthos L.; Honey Locust; Floodplain woods, especially south of central field; Abundant; C = 1; BSUH 17474, 17564, 17680.

(#) *Gymnocladus dioica* (L.) K. Koch; Kentucky Coffeetree; Floodplain woods; Infrequent, but locally common; C = 4; BSUH 17556.

(*#) *Lespedeza cuneata* (Dum. Cours.) G. Don; Silky Bushclover, Sericea Lespedeza; Roadside field, south side, between entrance road and curve in River Road; Rare, but locally common; C = 0; BSUH 17350, 17627.

(*#) *Medicago lupulina* L.; Black Medic; Fields; Infrequent; C = 0; BSUH 17553.

(*#) *Medicago sativa* L.; Common Alfalfa; Central field; Infrequent; C = 0; BSUH 17465.

(*#) *Melilotus officinalis* (L.) Lam.; Yellow Sweet Clover; Roadside fields; Rare; C = 0; BSUH 17420.

(*#) *Securigera varia* (L.) Lassen; SYN: *Coronilla varia* L.; Crown Vetch; Roadside field east of entrance road to central field; Infrequent, but locally common; C = 0; BSUH 17566.

(*#) *Trifolium hybridum* L.; Alsike Clover; Central field; Infrequent; C = 0; BSUH 17554.

(*#) *Trifolium pratense* L.; Red Clover; Fields, especially roadside; Common; C = 0; BSUH 17693.

(*#) *Trifolium repens* L.; White Clover; Roadside fields near dump; Infrequent; C = 0; BSUH 17692.

Fagaceae (Beech Family)

(#) *Quercus alba* L.; White Oak; Woodland edge along River Road; Rare; C = 5; BSUH 17433.

(#) *Quercus macrocarpa* Michx.; Bur Oak; Floodplain woods; Infrequent; C = 5; BSUH 17449, 17453.

Quercus muhlenbergii Engelm.; Yellow, Chinkapin, or Chinquapin Oak; Woodland edge along River Road; Infrequent; C = 4; BSUH 17558.

Quercus rubra L.; Northern Red Oak; Woodland edge, NE corner of central field; Rare, but locally common; C = 4; BSUH 17412.

Fumariaceae (Fumitory Family)

(#) *Dicentra cucullaria* (L.) Bernh.; Dutchman's Breeches; Raised ditch bank in floodplain woods south of central field; Rare; C = 6; BSUH 17574.

Geraniaceae (Geranium Family)

Geranium maculatum L.; Wild Geranium; Floodplain woods; Infrequent; C = 4; BSUH 17681.

Hippocastanaceae (Horse-chestnut Family)

Aesculus glabra Willd.; Ohio Buckeye; Floodplain woods; Common; C = 5; BSUH 17663, 17687.

Hydrophyllaceae (Waterleaf Family)

Hydrophyllum virginianum L. var. *virginianum*; Virginia or Eastern Waterleaf; Floodplain woods, especially north of central field; Abundant, 5+ acres; C = 4; BSUH 17715.

(#) *Phacelia purshii* Buckley; Miami Mist; Floodplain woods, south of central field and west of

entrance road to field; Infrequent, but locally common; C = 3; BSUH 17698.

Iridaceae (Iris Family)

Iris virginica L. var. *shrevei* (Small) E.S. Anderson; SYN: *Iris schrevei* Small; Blue Flag, Shreve's Iris; Floodplain woods and vernal pools; Infrequent; C = 5; BSUH 17419.

(#) *Sisyrinchium angustifolium* Mill.; Stout Blue-Eyed Grass, Narrow-Leaved Blue-Eyed Grass; Roadside fields; Infrequent; C = 3; BSUH 17422.

Juglandaceae (Walnut Family)

Carya cordiformis (Wangenh.) K. Koch; Bitternut Hickory; Floodplain woods; Infrequent; C = 5; BSUH 17605.

(#) *Carya laciniosa* (Michx. f.) G. Don; Shellbark Hickory; Floodplain woods; Abundant; C = 8; BSUH 17563.

Juglans nigra L.; Black Walnut; Border of central field; Infrequent; C = 2; BSUH 17413.

Juncaceae (Rush Family)

(#) *Juncus tenuis* Willd.; Path Rush, Poverty Rush; Floodplain woods south of central field in entrance road; Rare; C = 0; BSUH 17409, 17623.

Lamiaceae (Mint Family)

(*) *Glechoma hederacea* L.; Ground Ivy, Gill-Over-the-Ground, Creeping Charlie; Floodplain woods and roadside fields; Common, and locally abundant; C = 0; BSUH 17572.

(*#) *Lamium amplexicaule* L.; Henbit (Dead Nettle); Roadside field near entrance drive to central field; Infrequent; C = 0; BSUH 17584, 17672.

(*#) *Lamium purpureum* L.; Purple Dead Nettle; Roadside fields and floodplain south of central field; Infrequent, but locally abundant; C = 0; BSUH 17583.

Lycopus americanus Muhl.; Common or American Water Horehound; Floodplain woods and southern border of central field; Infrequent, but locally abundant; C = 3; BSUH 17357.

(#) *Lycopus uniflorus* Michx.; Northern Water Horehound or Bugleweed; Floodplain woods; Infrequent, but locally abundant; C = 5; BSUH 17353.

Mentha arvensis L.; SYN: *Mentha arvensis* L. var. *villosa* (Benth.) S.R. Stewart; Field or Wild Mint; Wet meadow next to the Mississinewa River; Rare, but locally common; C = 4; BSUH 17652.

Monarda fistulosa L.; Wild Bergamot; Floodplain woods; Infrequent, but locally common; C = 3; BSUH 17525.

Physostegia virginiana (L.) Benth. var. *virginiana*; Obedient-Plant, False Dragonhead; Open floodplain woods along Mississinewa River, sandy substrate; Rare; C = 5; BSUH 17333.

(* *Prunella vulgaris* L.; Common Self Heal, Lawn Prunella; Fields; Infrequent; C = 0; BSUH 17462.

Scutellaria lateriflora L. var. *lateriflora*; Mad-Dog or Blue Skullcap; Floodplain woods south of central field; Rare, but locally common; C = 4; BSUH 17479.

Stachys tenuifolia Willd.; SYN: *Stachys tenuifolia* Willd. var. *hispida* (Pursh) Fernald, *Stachys hispida* Pursh; Smooth Hedge-Nettle; Floodplain woods; common; C = 4; BSUH 17477, 17499, 17509.

Teucrium canadense L.; SYN: *Teucrium canadense* L. var. *virginicum* (L.) Eaton; American or Canadian Germander; Central field; Infrequent, but locally common; C = 3; BSUH 17519.

Lemnaceae (Duckweed Family)

Lemna minor L.; Common, Small, or Lesser Duckweed; Quite cove along Mississinewa River; Rare, but locally abundant; C = 3; BSUH 17731.

Liliaceae (Lily Family)

(#) *Allium burdickii* (Hanes) A.G. Jones; SYN: *Allium tricoccum* Ait. var. *burdickii* Hanes; Narrow-leaf Wild Leek; Floodplain woods north of central field; Infrequent; C = 6; BSUH 17459, 17576.

(#) *Allium canadense* L. var. *canadense*; Wild or Meadow Garlic; Woodland edge of roadside fields; Common; C = 1; BSUH 17459.

(#) *Allium cernuum* Roth. var. *cernuum*; Nodding Wild Onion; Dry roadside field, top of slope; Rare, but locally common; C = 4; BSUH 17476.

(*#) *Allium vineale* L. ssp. *vineale*; Field or Wild Garlic, Scallions; Roadside; Rare; C = 0; BSUH 17610.

(*#) *Asparagus officinalis* L.; Garden Asparagus; Central field; Rare; C = 0; BSUH 17360.

Camassia scilloides (Raf.) Cory; Early-Blooming Wild Hyacinth, Atlantic Camas; Floodplain woods north of central field; Common; C = 5; BSUH 17673, 17719.

(#) *Erythronium albidum* Nutt.; White Trout Lily, White Adder's Tongue, White Fawn Lily; Floodplain woods; Common; C = 3; BSUH 17568.

(*#) *Hemerocallis fulva* (L.) L.; Orange Day Lily; Roadside field and floodplain woods; Rare, but locally abundant [two colonies]; C = 0; BSUH 17590.

(*#) *Narcissus poeticus* L.; Poet's Narcissus; Floodplain woods NW of central field near Mississinewa River; Infrequent (planted); C = 0; BSUH 17580.

(*#) *Narcissus pseudonarcissus* L.; Daffodil; Floodplain woods NW of central field near Mississinewa River; Infrequent (planted); C = 0; BSUH 17579.

(*#) *Ornithogalum umbellatum* L.; Common Star-of-Bethlehem; Roadside fields; Rare, two colonies; C = 0; BSUH 17708.

Trillium sessile L.; Toadshade, Sessile Trillium, Sessile-Flowered Wake-Robin; Floodplain woods; Abundant; C = 4; BSUH 17573.

Limnanthaceae (Meadow-foam Family)

Floerkea proserpinacoides Willd.; False Mermaid (Weed); Floodplain woods; Abundant; C = 5; BSUH 17570.

Malvaceae (Mallow Family)

(*#) *Abutilon theophrasti* Medik.; Velvetleaf; Disturbed soil; Rare; C = 0; BSUH 17655.

(#) *Hibiscus laevis* All.; SYN: *Hibiscus militaris* Cav.; Halberd-Leaved Rose-Mallow or Marsh-Mallow; Floodplain woods south of central field in the drainage ditch; Rare, but locally common; C = 4; BSUH 17378.

(*) *Hibiscus trionum* L.; Flower-of-an-Hour; Disturbed soil; Rare; C = 0; BSUH 17732.

(*#) *Sida spinosa* L.; Prickly Sida, Prickly Mallow, Prickly Fanpetals; Disturbed soil; Rare; C = 0; BSUH 17733.

Menispermaceae (Moonseed Family)

(#) *Menispermum canadense* L.; Common Moonseed; Floodplain woods; Infrequent; C = 3; BSUH 17443, 17461.

Moraceae (Mulberry Family)

(*#) *Maclura pomifera* (Raf.) C.K. Schneid.; SYN: *Toxylon pomiferum* Raf.; Osage-Orange, Hedge Apple; Border of central field; Rare; C = 0; BSUH 17557.

(*#) *Morus alba* L.; White Mulberry; Woodland edge along River Road and border of central field; Abundant; C = 0; BSUH 15677.

Oleaceae (Olive Family)

(#) *Fraxinus americana* L.; White Ash; Woodland edge along River Road; Infrequent; C = 4; BSUH 17434.

(#) *Fraxinus nigra* Marsh.; Black Ash; Floodplain woods; Common; C = 7; BSUH 17455, 17591.

Fraxinus pennsylvanica Marsh.; SYN: *Fraxinus pennsylvanica* Marsh. var. *subintegerrima* (Vahl) Fernald, *F. pennsylvanica* Marsh. var. *lanceolata* (Borkh.) Sarg.; Green Ash; Floodplain woods border of central field; Common; C = 1; BSUH 17688.

Fraxinus quadrangulata Michx.; Blue Ash; Dry, raised area of floodplain woods near the river; Rare; C = 7; BSUH 17397.

Onagraceae (Evening Primrose Family)

Circaea lutetiana L. ssp. *canadensis* (L.) Aschers. & Magnus; Common or Broadleaf Enchanter's Nightshade; Floodplain woods and woodland edge along River Road; Common; C = 2; BSUH 17504, 17628.

Epilobium coloratum Biehler; Eastern, Cinnamon or Purple-Leaf Willow-Herb; Band of Mississinewa River, especially in wet meadows; C = 3; BSUH 17345.

Ludwigia palustris (L.) Elliot; Common Water Purslane, Marsh Purslane, Marsh Seedbox; Border

between the river and a wet meadow; Rare; C = 3; BSUH 17362.

Oenothera biennis L.; Common Evening Primrose; Bank of Mississinewa River; Rare; C = 0; BSUH 17387.

Oxalidaceae (Wood Sorrel Family)

Oxalis fontana Bunge; Lady's Wood Sorrel; Floodplain woods south of central field; Infrequent; C = 0; BSUH 17511.

Oxalis stricta L.; Upright Yellow Wood Sorrel, Common Yellow Oxalis; Roadside fields; Common; C = 0; BSUH 17565.

Phytolaccaceae (Pokeweed Family)

Phytolacca americana L.; American Pokeweed or Pokeberry; Floodplain woods; Infrequent; C = 0; BSUH 17486.

Plantaginaceae (Plantain Family)

(*#) *Plantago lanceolata* L.; English or Narrow-leaf Plantain, Buckhorn; Roadside fields; Common; C = 0; BSUH 17710.

Plantago rugelii Decne.; American or Red-Stalked Plantain; Roadside fields; Abundant; C = 0; BSUH 17458.

Platanaceae (Plane-tree Family)

Platanus occidentalis L.; American Sycamore; Floodplain woods, especially along the Mississinewa River; Common; C = 3; BSUH 17456, 17703.

Poaceae (Grass Family)

(*#) *Agrostis gigantea* Roth; Redtop; Fields; Common; C = 0; BSUH 17494.

(*#) *Alopecurus pratensis* L.; Meadow Foxtail; Central field; Abundant; C = 0; BSUH 17659.

(*#) *Bromus commutatus* Schrad.; SYN: *Bromus racemosus* L.; Hairy Chess, Hairy or Meadow Brome; Roadside fields; Infrequent; C = 0; BSUH 17428.

(*) *Bromus inermis* Leysser; Smooth or Hungarian Brome; Roadside fields; Common, locally abundant; C = 0; BSUH 17427.

Cinna arundinacea L.; Common Wood Reed; Floodplain woods; Abundant; C = 4; BSUH 17379.

(*) *Dactylis glomerata* L.; Orchard Grass; Central field; Common; C = 0; BSUH 17404.

(*#) *Digitaria ischaemum* (Schreb.) Schreb. ex Muhl.; Smooth Crab Grass; Roadside fields; Common; C = 0; BSUH 17644.

(*) *Digitaria sanguinalis* (L.) Scop.; Northern or Hairy Crab Grass; Roadside fields; Abundant; C = 0; BSUH 17626.

(*) *Echinochloa crusgalli* (L.) P. Beauv.; Barnyard Grass; Roadside field near dump; Infrequent, but locally common; C = 0; BSUH 17543.

(#) *Echinochloa muricata* (P. Beauv.) Fernald; Rough Barnyard Grass; Bank of the Mississinewa River; Infrequent; C = 1; BSUH 17729.

(#) *Elymus glabriflorus* (Vasey ex L.H. Dewey) Scribn. & C.R. Ball; SYN: *Elymus virginicus* L.; Floodplain woods; Abundant; C = 3; BSUH 17429.

(*#) *Elymus repens* (L.) Gould; SYN: *Elytrigia repens* (L.) Nevski.; Quack Grass; Roadside fields; Infrequent, but locally abundant; C = 0; BSUH 17450.

Elymus virginicus L.; Virginia Wild Rye; Floodplain woods; Frequent; C = 3; BSUH 17452.

Eragrostis pectinacea Nees ex Steud. var. *pectinacea*; Carolina or Tufted Lovegrass; Roadside fields; Infrequent; C = 0; BSUH 17642.

(#) *Festuca subverticillata* (Pers.) E. Alexeev; SYN: *Festuca obtusa* Biehler; Nodding Fescue; Floodplain woods; Common; C = 4; BSUH 17431.

Glyceria striata (Lam.) Hitchc.; Fowl Manna Grass; Floodplain woods, especially around vernal pools; Abundant; C = 4; BSUH 17430.

(*) *Hordeum jubatum* L.; Fox-Tail Barley; Squirrel-Tail Grass; Central field; Rare; C = 0; BSUH 17597, 17606.

Leersia virginica Willd.; White Grass; Floodplain woods; Abundant; C = 4; BSUH 17640.

(#) *Muhlenbergia frondosa* (Poir.) Fernald; Common Satan Grass, Wirestem Muhly; Sandy creek bank along Mississinewa River; Rare; C = 3; BSUH 17645.

Muhlenbergia schreberi J.F. Gmel.; Nimblewill; Floodplain woods south of central field, in and along the entrance road; Rare but locally abundant; C = 0; BSUH 17377.

Panicum capillare L.; (Old) Witch-Grass; Roadside field in disturbed areas; Rare; C = 0; BSUH 17336.

(#) *Panicum dichotomiflorum* Michx.; Knee-Grass, Fall Panic Grass; Roadside field in disturbed areas; Rare; C = 0; BSUH 17734.

(*#) *Phalaris arundinacea* L.; Reed Canary Grass; Floodplain woods, especially along the Mississinewa River; Common, but often locally abundant; C = 0; BSUH 17415.

(*) *Phleum pratense* L.; Timothy Grass; Central field; Common; C = 0; BSUH 17609.

(*) *Poa annua* L.; Speargrass, Annual Blue Grass; Roadside fields and open areas of floodplain woods; Infrequent; C = 0; BSUH 17728.

(*) *Poa compressa* L.; Canada Blue Grass; Roadside field near dump; Rare but locally abundant; C = 0; BSUH 17611.

(*) *Poa pratensis* L.; Kentucky Blue Grass; Fields; Abundant; C = 0; BSUH 17691.

Poa sylvestris A. Gray; Forest or Woodland Blue Grass; Floodplain woods; Abundant; C = 5; BSUH 17552.

(*) *Schedonorus phoenix* (Scop.) Holub; SYN: *Lolium arundinaceum* (Schreb.) S.J. Darbyshire, *Festuca arundinacea* Schreb., *Festuca elatior* L. var.

arundinacea (Schreb.) Wimm.; Tall Fescue; Fields, especially roadside fields; Abundant; C = 0; BSUH 17406.

(*#) *Setaria faberi* Herrm.; Nodding or Giant Foxtail-Grass, Japanese Bristlegrass; Roadside fields, especially near dump; Infrequent, but locally common; C = 0; BSUH 17473.

(*) *Setaria pumila* (Poir.) Roem. & Schult. ssp. *pumila*; SYN: *Setaria glauca* (L.) Beauv.; Yellow Foxtail-Grass; Roadside fields; Infrequent; C = 0; BSUH 17472.

Sorghastrum nutans (L.) Nash; Indian Grass; Roadside fields; Common; C = 4; BSUH 17643.

Polemoniaceae (Phlox Family)

Phlox divaricata L. ssp. *divaricata*; Blue Phlox, Woodland Phlox; Floodplain woods; Common; C = 5; BSUH 17664.

(#) *Phlox paniculata* L.; Garden, Summer or Fall Phlox; Floodplain woods north of central field, especially along the Mississinewa River; Common; C = 3; BSUH 17508.

Polemonium reptans L. var. *reptans*; Greek Valerian, Spreading Jacob's Ladder; Floodplain woods; Common; C = 5; BSUH 17665.

Polygonaceae (Smartweed Family)

Polygonum amphibium L. var. *emersum* Michx.; SYN: *Polygonum coccineum* Muhl. ex Willd., *Persicaria amphibia* (L.) Gray var. *emersa* (Michx.) J.C. Hickman; Water Smartweed, Long-Root Smartweed; NW corner of central field; Rare, one small colony; C = 4; BSUH 17638.

(*#) *Polygonum cespitosum* Blume var. *longisetum* (Bruijn) A.N. Steward; SYN: *Persicaria caespitosa* (Blume) Nakai var. *longiseta* (Bruijn) C.F. Reed, *Polygonum longisetum* Bruijn; Creeping Smartweed, Oriental Lady's Thumb; Floodplain woods along river, west side of property; Infrequent, but locally common; C = 0; BSUH 17649.

Polygonum pensylvanicum L.; SYN: *Persicaria pensylvanica* (L.) Small; Pennsylvania Smartweed, Pinkweed; Wet meadow next to Mississinewa River; Rare, but locally common; C = 0; BSUH 17361, 17651.

(*) *Polygonum persicaria* L.; SYN: *Persicaria vulgaris* Webb & Moq., *Polygonum dubium* Stein; Spotted Lady's Thumb; Roadside field near dump; Rare, but locally common; C = 0; BSUH 17372, 17398.

Polygonum punctatum Elliott var. *confertiflorum* (Meisn.) Fassett; SYN: *Persicaria punctata* (Elliott) Small var. *leptostachya* (Meisn.) Small; Dotted Smartweed; Floodplain wood; Abundant; C = 3; BSUH 17631.

Polygonum scandens L. var. *scandens*; SYN: *Fallopia scandens* (L.) Holub; Climbing False Buckwheat; Floodplain woods and woodland edge; Abundant; C = 0; BSUH 17337.

Polygonum virginianum L.; SYN: *Tovara virginiana* (L.) Raf., *Persicaria virginiana* (L.) Gaertn.; Jumpseed, Virginia Knotweed; Floodplain woods; Abundant; C = 3; BSUH 17484, 17639.

(*#) *Rumex crispus* L. ssp. *crispus*; Curly Dock, Sour Dock; Roadside field near dump; Rare, but locally common; C = 0; BSUH 17405.

(#) *Rumex verticillatus* L.; Swamp Dock; Floodplain woods, especially north of and west of central field; Abundant; C = 5; BSUH 17417, 17614.

Portulacaceae (Purslane Family)

Claytonia virginica L. var. *virginica*; Virginia Spring Beauty; Floodplain woods; Abundant; C = 2; BSUH 17581.

Primulaceae (Primrose Family)

Lysimachia ciliata L.; Fringed Loosestripe; NW corner of central field and riverbank along Mississinewa River; Infrequent, but locally common; C = 4; BSUH 17464.

(*#) *Lysimachia nummularia* L.; Moneywort; Creeping Jenny; Floodplain woods and roadside fields; Abundant; C = 0; BSUH 17424.

Ranunculaceae (Buttercup Family)

Anemone canadensis L.; Canada Anemone, Meadow Anemone; NW woodland border of central field, next to deer stand; Rare, but locally common; C = 4; BSUH 17442.

(#) *Clematis virginiana* L.; Virgin's Bower, Devil's Darning Needles; Open floodplain woods north of central field, next to Mississinewa River; Rare, but one very large colony; C = 3; BSUH 17388, 17467.

(#) *Delphinium tricorne* Michx.; Dwarf Larkspur, Spring or Rock Larkspur; Floodplain woods east of central field; Common this site; C = 5; BSUH 17683.

Enemion biternatum Raf.; SYN: *Isopyrum biternatum* Torr. & Gray; (Eastern) False Rue Anemone; Floodplain woods; Infrequent; C = 5; BSUH 17575.

Ranunculus abortivus L.; Small-Flowering Crowfoot; Little-Leaf Buttercup, Kidney-Leaved Crowfoot; Floodplain woods; Infrequent; C = 0; BSUH 17569.

(#) *Ranunculus hispidus* Michx. var. *caricetorum* (Greene) T. Duncan; SYN: *Ranunculus caricetorum* Greene, *Ranunculus septentrionalis* Poir. var. *caricetorum* (Greene) Fernald; Bristly or Hispid Buttercup, Swamp Buttercup; Floodplain woods, widespread; Abundant; C = 10; BSUH 17562, 17701.

(#) *Ranunculus hispidus* Michx. var. *nitidus* (Chapm.) T. Duncan; SYN: *Ranunculus septentrionalis* Poir., *Ranunculus septentrionalis* Poir. var. *nitidus* (Chapm.) Chapm.; Bristly Buttercup; Floodplain woods near the NW corner of the central field; Rare, one very large colony; C = 5; BSUH 17441, 17702.

Thalictrum revolutum DC.; Waxy-Leaved or Skunk Meadow Rue; Floodplain woods south of central field; Common; C = 5; BSUH 17384, 17440.

Thalictrum thalictroides (L.) Eames & Boivin; SYN: *Anemonella thalictroides* (L.) Spach.; Rue Anemone; Floodplain woods; Infrequent; C = 7; BSUH 17720.

Rosaceae (Rose Family)

(#) *Agrimonia gryposepala* Wallr.; Tall Hairy Agrimony; Floodplain woods and woodland edge; Infrequent; C = 2; BSUH 17385, 17394.

Agrimonia parviflora Aiton; Southern, Swamp, or Small-Flowered Agrimony, Harvest-Lice; Moist roadside meadow; Rare; C = 4; BSUH 17489.

(#) *Crataegus crus-galli* L.; Cockspur Hawthorn; Floodplain woods and woodland edge along River Road; Common; C = 4; BSUH 17706, 17727.

(#) *Crataegus mollis* (T. & G.) Scheele; Downy Hawthorn; Floodplain woods; Infrequent; C = 2; BSUH 17669.

(#) *Crataegus punctata* Jacq.; Dotted Hawthorn; Floodplain woods; Common; C = 2; BSUH 17699.

(#) *Fragaria virginiana* Duchesne; Thick-leaved Wild Strawberry; Roadside fields; Infrequent; C = 2; BSUH 17685.

Geum canadense Jacq. var. *canadense*; White Avens; Floodplain woods; Abundant; C = 1; BSUH 17603, 17618.

Geum vernum (Raf.) Torr. & Gray; Spring Avens; Floodplain woods; Abundant; C = 1; BSUH 17684, 17722.

(*#) *Potentilla recta* L.; Sulphur Five-fingers, Sulphur Cinquefoil; Roadside field near entrance road to central field; Rare; C = 0; BSUH 17613.

Prunus serotina Ehrh. var. *serotina*; Wild Black Cherry; Woodland edge; Infrequent; C = 1; BSUH 17709.

(*#) *Rosa multiflora* Thunb.; Multiflora or Japanese Rose; Floodplain woods; Infrequent; C = 0; BSUH 17407.

(#) *Rubus occidentalis* L.; Black Raspberry; Floodplain woods; Infrequent; C = 1; BSUH 17697.

Rubiaceae (Madder Family)

Cephalanthus occidentalis L.; Common Button-bush; Floodplain woods, especially around vernal pools; Infrequent, but locally common; C = 5; BSUH 17466, 17506.

Galium aparine L.; Cleavers, Annual Bedstraw, Sticky Willy; Floodplain woods and roadside fields; Abundant; C = 1; BSUH 17694.

Galium triflorum Michx.; Sweet-Scented or Fragrant Bedstraw; Floodplain woods; Infrequent; C = 5; BSUH 17502.

Rutaceae (Rue Family)

Ptelea trifoliata L. ssp. *trifoliata*; Common or Smooth Hop Tree; Woodland edge; Rare; C = 4; BSUH 17523, 17711.

Salicaceae (Willow Family)

(#) *Populus deltoides* Bartram ex Marsh. var. *deltoides*; Eastern Cottonwood; Floodplain woods; Infrequent; C = 1; BSUH 17382, 17518, 17596.

(#) *Salix interior* Rowlee; SYN: *Salix exigua* Nutt. ssp. *interior* (Rowlee) Cronquist; Sandbar Willow; Wet meadow along the Mississinewa River; Rare; C = 1; BSUH 17342.

Salix nigra Marsh.; Black Willow; Riverbank; Rare, two sites; C = 3; BSUH 17510.

Saururaceae (Lizard's-Tail Family)

Saururus cernuus L.; Lizard's Tail, Water Dragon; Floodplain woods, vernal pools, and along the Mississinewa River; Abundant; C = 4; BSUH 17463, 17521, 17595.

Scrophulariaceae (Figwort Family)

Mimulus alatus Aiton; Winged or Sharpwing Monkey-Flower; Wet meadow along the Mississinewa River; Rare, but locally common; C = 4; BSUH 17634.

Mimulus ringens L. var. *ringens*; Allegheny Monkey Flower; Wet meadow along the Mississinewa River; Rare, but locally common; C = 4; BSUH 17487.

Penstemon calycosus Small; SYN: *Penstemon laevigatus* Ait. ssp. *calycosus* (Small) Benn.; (Eastern) Smooth Beard Tongue, Long-Sepal Beard Tongue; Roadside fields; Infrequent; C = 4; BSUH 17426.

Scrophularia marilandica L.; Eastern or Late Figwort; NW corner of central field and floodplain woods; Infrequent, but locally abundant; C = 5; BSUH 17505.

(*#) *Verbascum blattaria* L.; Moth Mullein; Fields; Infrequent; C = 0; BSUH 17589.

(*#) *Verbascum thapsus* L.; Common or Woolly Mullein; Roadside fields; Rare; C = 0; BSUH 17423, 17495.

(*) *Veronica serpyllifolia* L. ssp. *serpyllifolia*; Thyme-Leaved Speedwell; Roadside fields; Common; C = 0; BSUH 17721.

Smilacaceae (Catbrier Family)

Smilax lasioneura Hook.; SYN: *Smilax herbacea* L. var. *lasioneura* (Hook.) A. DC.; Common or Blue Ridge Carrion-Flower, Herbaceous Greenbrier; Floodplain woods; Infrequent; C = 4; BSUH 17599, 17705.

Smilax tamnoides L.; SYN: *Smilax hispida* Muhl. ex. Torr., *Smilax tamnoides* L. var. *hispida* (Muhl. ex Torr.) Fernald; Bristly or Hispid Greenbrier; Floodplain woods; Common; C = 3; BSUH 17439, 17560.

Solanaceae (Nightshade Family)

Physalis longifolia Nutt. var. *subglabrata* (Mack. & Bush) Cronquist; Long-Leaved Ground Cherry,

Smooth Ground Cherry; Central field; Common; C = 0; BSUH 17355, 17368.

(#) *Solanum carolinense* L. var. *carolinense*; Carolina Horse Nettle, Carolina Poppy; Central field; Common; C = 0; BSUH 17358.

(#) *Solanum ptycanthum* Dunal; SYN: *Solanum nigrum* auct. non L., *Solanum americanum* auct. non Mill.; Eastern Black Nightshade, West Indiana Nightshade; Floodplain woods south of central field; Rare; C = 0; BSUH 17602.

Staphyleaceae (Bladdernut Family)

Staphylea trifolia L.; American Bladdernut; Floodplain woods especially around the central field; Infrequent, but locally common; C = 5; BSUH 17445, 17682.

Tiliaceae (Linden Family)

Tilia americana L. var. *americana*; American Basswood, American Linden; Floodplain woods; Infrequent, but locally common; C = 5; BSUH 17418.

Ulmaceae (Elm Family)

Celtis occidentalis L.; Northern or Common Hackberry; Floodplain woods; Common; C = 3; BSUH 17416.

Ulmus americana L.; White or American Elm; Floodplain woods; Abundant; C = 3; BSUH 17717.

(#) *Ulmus rubra* Muhl.; Slippery or Red Elm; Woodland edge along River Road; Infrequent; C = 3; BSUH 17393.

Urticaceae (Nettle Family)

Boehmeria cylindrica (L.) Sw.; Small-Spike False Nettle; Floodplain woods; Infrequent; C = 3; BSUH 17383, 17500.

Laportea canadensis (L.) Weddell; SYN: *Urtica canadensis* L.; Canadian Wood Nettle; Floodplain woods; Abundant; C = 2; BSUH 17512, 17593.

Parietaria pensylvanica Muhl. ex Willd.; Pennsylvania Pellitory; Floodplain woods; Infrequent; C = 1; BSUH 17637.

Pilea pumila (L.) A. Gray; Canadian Clearweed; Floodplain woods; Abundant; C = 2; BSUH 17354.

Urtica dioica L. ssp. *gracilis* (Aiton) Seland.; SYN: *Urtica dioica* L. var. *procera* (Muhl. ex Willd.) Weddell, *Urtica procera* Muhl. ex Willd.; Tall Nettle, California Nettle; Floodplain woods; Infrequent, but locally common; C = 1; BSUH 17390, 17524.

Valerianaceae (Valerian Family)

(#) *Valeriana pauciflora* Michx.; Long-tube Valerian, Large-Flowered Valerian; Floodplain woods, especially north of the central field; Infrequent; C = 7; BSUH 17414.

Valerianella umblicata (Sull.) Alph. Wood; (Naval) Corn Salad; Central field; Rare, but locally common; C = 5; BSUH 17690, 17716.

Verbenaceae (Vervain Family)

Verbena urticifolia L. var. *urticifolia*; White Vervain; Floodplain woods, especially along the Mississippine River; Infrequent; C = 3; BSUH 17507.

Violaceae (Violet Family)

Viola pubescens Aiton; Yellow Forest Violet, Downy Yellow Violet; Floodplain woods; Infrequent; C = 5; BSUH 17578.

Viola sororia Willd.; Common Blue Violet, Door-yard Violet; Floodplain woods; Abundant; C = 1; BSUH 17582.

Viola striata Aiton; Striped Creamy Violet, Common White Violet; Floodplain woods, especially south of central field; Abundant; C = 4; BSUH 17438, 17585.

Vitaceae (Grape Family)

Parthenocissus quinquefolia (L.) Planch.; Virginia Creeper, Woodbine; Floodplain woods; Abundant; C = 2; BSUH 17551.

Vitis riparia Michx.; Riverbank Grape; Floodplain woods, woodland edge; Abundant; C = 1; BSUH 17411, 17686.

(#) *Vitis vulpina* L.; Frost Grape; Border of central field; Rare; C = 3; BSUH 17607.

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