

THE VASCULAR FLORA AND VEGETATIONAL COMMUNITIES OF MUNSEE WOODS NATURE PRESERVE, DELAWARE COUNTY, INDIANA

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ABSTRACT. Owned by the Red-tail Land Conservancy, Munsee Woods Nature Preserve (MWNP) is an 18.4 ha (~ 45.5 acres) woodland located 9.5 km southeast of downtown Muncie, Indiana, and just west of the northern end of Prairie Creek Reservoir in Delaware County. The inventory of the vascular flora indicates that the site harbors significant plant diversity with 399 taxa representing 252 genera and 85 families. The 10 families containing ~55% of the documented species are Asteraceae (51 spp.), Poaceae (43), Cyperaceae (35), Rosaceae (18), Brassicaceae (15), Lamiaceae (14), Fabaceae (12), Scrophulariaceae (11), Polygonaceae (10), and Liliaceae (10). Of the 399 taxa, 300 [75.3%] are native and 99 [25.8%] are exotics, and 41 represent Delaware County Records. Three species are on the Indiana Watch List, i.e., *Hydrastis canadensis*, *Spiranthes ovalis* var. *erostellata*, and *Viola pubescens*. A physiognomic analysis revealed that the native species consisted of 55 woody species, 182 herbaceous vines or forbs, 56 graminoids, and seven ferns or fern allies. Of the 99 exotics, 14 were woody, 63 were herbaceous vines or forbs, and 22 were grasses. The flora at MWNP is predominately low fidelity (low C-value), i.e., ~ 67% of the taxa have C-values ≤ 3 , and only ~5% have C-values ≥ 7 . For native species only, the FQI = 55.0 and the mean Coefficient of Conservatism (mean C) is 3.2. For all species FQI = 47.7 and the mean C = 2.4. These numbers indicate that MWNP is a site with high natural quality that is being compromised by exotics. The exotic woody species with the highest visual abundances are *Lonicera maackii*, *Rosa multiflora*, *Euonymus alatus*, *Ligustrum obtusifolium*, and *Ailanthus altissima*. Permanent plot analysis revealed that the five most important species in the overstory [based on relative importance] are *Acer saccharum*, *Quercus alba*, *Celtis occidentalis*, *Prunus serotina*, and *Ulmus americana*. Except for *Q. alba*, the same species dominate the regeneration layers. Tree species composition and diversity at MWNP is similar to other disturbed forests in the region, with an overstory dominated by species with low or intermediate shade tolerance and understory advanced regeneration with greater abundance of shade tolerant species. All these disturbed woods had lower importance of shade tolerant species and higher tree species diversity than an old-growth forest in the region. These observations indicate that Munsee Woods is in an intermediate stage of forest succession after a long history of human disturbance.

Keywords: Delaware County Indiana, Floristic Quality Index (FQI), county records – vascular plants, flora – Indiana, permanent plots, relative importance values

INTRODUCTION

Unlike the majority of nature preserves we have inventoried to date, Munsee Woods Nature Preserve (MWNP) has experienced considerable anthropogenic impact over the past century. In the early 1900s much of the site, especially the northern half, was agricultural, in the 1930s it served as a Civilian Conservation Corp camp, and in 1939 it

became a residential Girl Scout camp (Camp Munsee). In the later decades of the 1900s, the camp experienced a steady decline of use and was sold to the Red-tail Land Conservancy in April 2011. The continued intrusion of the site by human activity raises several very interesting questions. For example, during the Camp Munsee period the woodland structure as well as a stream corridor in the southern half of the preserve remained structurally intact. How has camp activity altered the vascular flora of these habitats? How does the overall flora at MWNP compare to analogous sites that have not

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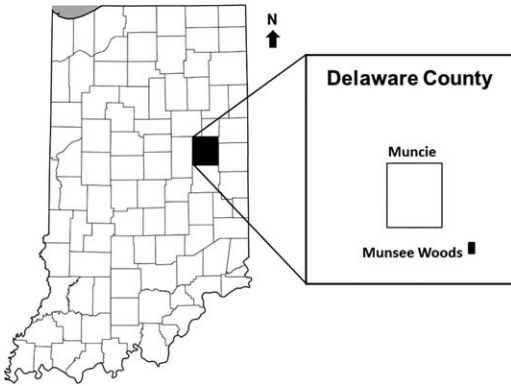


Figure 1.—Maps indicating the location of Munsee Woods Nature Preserve within Delaware County (right) and the location of Delaware County within the state of Indiana (left). The Preserve lies approximately 9.5 km southeast of downtown Muncie.

experienced similar disturbance? Has the native flora been measurably compromised by a differential loss of sensitive species? Have the number of exotics, both in species number and in number of plants, increased? In part, it was because of questions like these, that this site was included in our larger study pertaining to the flora and floral communities of east-central Indiana. Also, Barry Bank, Executive Director of the Red-tail Land Conservancy, inquired if we could help him realize the scope of plant species on the property, since an inventory of resources is the necessary first step in developing a long-term resource management plan. Additionally, measures of diversity are frequently seen as indicators of the well-being of ecological systems (Magurran 1988). There have been no published studies or informal lists concerning the flora of Camp Munsee or MWNP. 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 determine the floristic quality of the site and to compare MWNP to other sites previously studied in Indiana; (3) to establish permanent plots and analyze the structure and composition of the upland mesic woodland on the southern half of the property; (4) to compare tree species composition and diversity at MWNP to other forests in the region; (5) to identify areas of special concern (e.g., areas with rare or threatened plants, if any, and communities sensitive to disturbance); and (6) to produce a

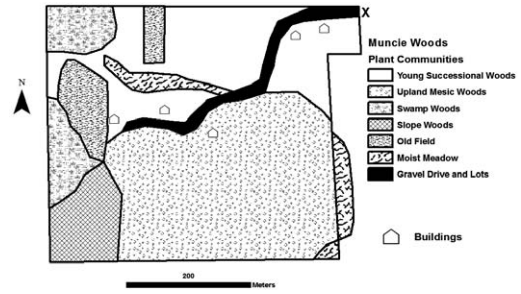


Figure 2.—Diagram illustrating the distribution of the major habitats at Munsee Woods Nature Preserve, Delaware County, Indiana.

vegetation map illustrating various habitats at the site.

SITE DESCRIPTION

Formerly known as Camp Munsee, Munsee Woods Nature Preserve is a 18.4 ha (~ 45.5 acres) woodland located 9.5 km southeast of downtown Muncie, Indiana, and just west of the northern end of Prairie Creek Reservoir in Delaware County (Fig. 1). The latitude and longitude at the entrance to the lodge are 40°08'24"N 85°18'13"W, with an elevation of 307 m (1007 ft). MWNP was approved as a state nature preserve by the Indiana Natural Resources Commission on January 21, 2014. The property is bordered on the north and west by farm fields, and on the south and east by privately owned woodlands and meadows. Medford Drain, a tributary of the White River, runs north from the southeast corner along the eastern border, then cuts west to the northwest corner of the study site.

Except for a few smaller habitats, the majority of Munsee Woods is covered by woodlands (Fig. 2). The southern half of the property is primarily a relatively flat, upland mesic forest. Most of the former campsites are located in this woodland, as are many of the largest diameter trees. These trees have low, thick branches below the current cover of the overstory and photographs from the 1930s confirm that the woods were more open in the past (Graham, Wapehani Girl Scouts Camp Munsee, Pers. Comm.). Most of the northern half of the property is covered by a young successional woodland dominated by exotic shrubs. Other habitat types include a seasonal pool and open manicured field to the west, a previously farmed old-field to the north that

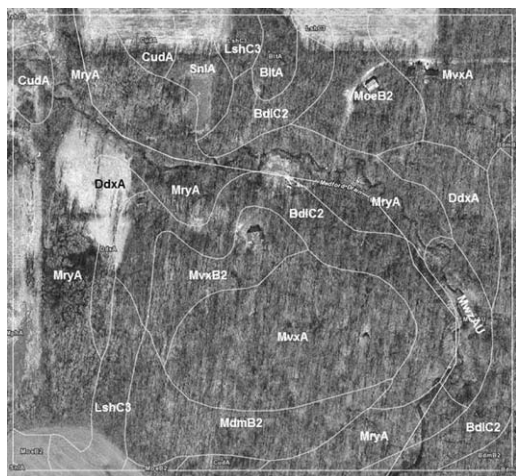


Figure 3.—Soil types and location in Munsee Woods Nature Preserve, Delaware County, Indiana. BdlC2 = Belmore loam, BdmB2 = Belmore silt loam, BltA = Belmore silt loam, Cuda = Crosby silt loam, DdxA = Digby Haney silt loam, LshC3 = Losantville clay loam, MoeB2 = Miamian loam, MryA = Millgrove silty clay loam, MvxA = Mountpleasant silt loam, MvxB2 = Mountpleasant silt loam, MwzAU = Muskego muck, and SnIA = Southwest silt loam. (From WSS, 2013).

has been fallow for many years, a small old-field, approximately 10 m across, with a flagpole, and a low moist meadow to the east and southeast, as well as a creek and creek bed, along the Medford Drain. Additionally, there are many woodland edges along roads and paths, and lastly, there are three gravel parking areas.

Munsee Woods lies near the southern border of the Tipton Till Plain Section and the northern border of the New Castle Till Plains and Drainageways Section of the Central Till Plain Region of Indiana (Homoya et al. 1985; Hedge 1997; Clark & Sanders 2005; IUPUI 2007). It occurs in the Upper White River Watershed (USGS Cataloging Unit 05120201, EPA 2009). Medford Drain flows north into the West Fork of the White River. The White River flows southwest into the Wabash River, which in turn, flows south into the Ohio River.

The soil at Munsee Woods is primarily silt and clay loam (Fig. 3). The central upland forest of Munsee Woods consists of both Mountpleasant silt loam, which is characterized as moderately sloping (0–6%), well-drained soil usually associated with kames and till plains, and Belmore silt loam, which is characterized

as moderately sloping (1–6%) and well-drained soil usually associated with outwash plains and glacial drainage channels on till plains (WSS 2013). The soils associated with the ephemeral pool and open field along the western border and along most of the Medford Drain are comprised of Milgrove silty clay loam and Digby-Haney silt loams. Both of these soil types are characterized as shallow sloping (0–1%), very to somewhat poorly drained soils usually associated with glacial drainage channels on till plains and outwash plains (WSS 2013). The moist meadow running along the eastern and southeast corner of the site is comprised of Muskego muck soils characterized as shallow sloping (0–1%), very poorly drained soils usually associated with depressions on till plains (WSS 2013). The section of Munsee Woods lying north of Medford Drain comprises several soil types, including the moderately sloping (0–12%) and well to moderately well drained loam soils [i.e., Belmore and Miamian] and the shallow sloping (0–2%) and somewhat poorly to poorly drained silt loam soils [i.e., Blount, Crosby, Mountpleasant, and Southwest] (WSS 2013). Except for the two fields, moist meadows, and gravel parking lots, all the soils at Munsee Woods are covered by woodlands.

BRIEF HISTORY AND LAND USE

The name of the nature preserve, Munsee, came from the Munsee clan of the Delaware Indians. “Munsee” means a place where stones are gathered together (Katherine King, unpublished manuscript entitled “History of Camp Munsee”). The small creek, which runs through the property was named Wolf Run Creek [today know as Medford Drain], and was named after another Delaware clan. These Native Americans inhabited the area in which the preserve is located. A series of fourteen villages was located along the White River ranging from approximately two miles outside of the Muncie city limits to Noblesville (Kemper 1908).

Little is known about the early history of Munsee Woods, other than that its ownership has changed multiple times and its boundaries are unchanged. The information provided below was provided by Bette Graham (Wapehani Girl Scouts Camp Munsee, Pers. Commun.) and Barry Banks (Executive Director Red-tail Land Conservancy, Pers. Commun.).

The land that Munsee Woods currently occupies was originally part of the Whitney Farm. E. Arthur Ball purchased the land and renamed it Green Hills Farm. In 1936 the land was rented to the Girl Scouts and nine Civilian Conservation Corp (CCC) buildings were moved onto the site. In 1939, the Ball family deeded the hilly woodland site, named Camp Munsee, to the Muncie Girl Scouts [Girl Scout Wapehani Council Camp Munsee]. The buildings located on the site were loaned to the Muncie Girl Scouts by the federal government. Camp Munsee operated as a residence camp from 1937 to 1964. In 1965 the residence camp was moved to Camp Windigo in southeastern Grant County, and Camp Munsee was used only as a day camp. In the late 1960s, many of the original buildings were removed including the unit cabins. On December 2, 1970, the Great Lodge burned and was replaced by the current building, Lycoming Lodge. The camp experienced a steady decline of use and was sold to the Red-tail Land Conservancy in April 2011, and the name was changed to Munsee Woods.

Over the years, there has been considerable human impact to the site. There is a large loop-trail through the upland woodlands with numerous campsites. Many of the largest trees at Munsee Woods occur in the campsites. In addition, there are several woodland trails through the upland woodland and the young successional woodland north of Medford Drain. A large gravel parking lot was established south of Medford Drain, just north of the new lodge. Along the west-central section of the property, a large, manicured field was maintained through the years. Off the north-west corner of this field is a deep drainage ditch. Lastly, along the north-central section of the property are two old-fields. One is a small circular field, approximately 10 m across, known as flagpole field because the flagpole was/is located here. To the west of flagpole field is the other old-field. Approximately 0.5 ha, this field was used by the girl scouts to grow garden crops, including pumpkins, and was known as pumpkin patch field.

METHODS

Floristic inventory and analysis.—During the 2011 growing season, one or two forays were made into the study site each week. Forays were random but all areas of the study site were

inventoried. 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 Appendix 1). Seasonal changes in the dominant vegetation (based on time of flowering) were noted for the various habitats. Also, the location of potentially sensitive plant communities and rare and endangered species was noted. Nomenclature follows the USDA NRCS Plants Database (USDA 2013).

The floristic quality index (FQI) for Munsee Woods was determined using the program developed by the Conservation Research Institute in conjunction with Rothrock (2004). The program also calculates the mean 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. For a detailed description of how the FQI is determined and an explanation of C-values, see Swink & Wilhelm (1994); Rothrock (2004); Rothrock & Homoya (2005); Ruch et al. (2010). 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 conservative the species is to an undisturbed habitat. All exotics are given a C-value of 0. [Exotic species in Indiana was determined by the team of plant taxonomists who determined the C-values for all species (Rothrock 2004). We followed their recommendations.] 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).

Permanent plot analysis.—Permanent-monitoring plots were established in the mesic upland forest community located in the southern half of Munsee Woods, within which data for woody species were collected. Fourteen 15 m radius circle plots were established, corresponding to an area 0.0706 ha per plot and a total area sampled of 1 ha. The center of each plot was permanently marked with an orange-tipped metal rebar.

Trees in each plot were identified to species and classified into one of three size classes based on diameter at breast height (dbh): 1–4.9 cm dbh, 5–9.9 cm dbh, and ≥ 10 cm dbh. Woody stems with a dbh < 10 cm were simply counted. Trees with dbh ≥ 10.0 cm were measured for their exact dbh. These data were used to characterize current stand structure and composition and as a basis to predict future successional trends for the site.

Stem density, frequency, and basal area (dominance) were used to characterize woodland structure and composition of the study site. For each woody species a relative importance value was calculated for each of the three size classes. For size classes with dbh < 10 cm, importance values were based on relative density (percentage of all stems in the size class for each species) and relative frequency (percentage of 14 plots where a species was observed). For the dbh ≥ 10 cm size class, the importance value was based on relative density, relative frequency, and relative dominance (percentage of total basal area ($\text{m}^2 \text{ha}^{-1}$)) accounted for by summed basal area of stems for each species. Relative importance values (RIV) were computed as the average of relative density, relative frequency, and relative dominance (for stems with dbh ≥ 10 cm). For more detailed description of these calculations see Elzinga et al. (1998) and Ruch et al. (2008a). Chi-squared tests were used to compare species composition among size classes and also to compare the relative abundance of trees in three shade tolerance classes (tolerant, intermediate, intolerant), as defined by Daniel et al. (1979). The results of these comparisons among shade tolerance classes were interpreted with regards to the disturbance history of the site, age of the stand, and the stage of succession.

Relative importance values for tree species in the dbh ≥ 10 cm size class were used to compare species composition and species diversity between Munsee Woods and three other forest areas in the vicinity that span a range of disturbance history. Christy Woods in Delaware County and Yuhus Woods in Randolph County were chosen for this comparison because they have a disturbance history similar to that of Munsee Woods. Ginn Woods, in Delaware County, is an undisturbed, late successional forest that represents pre-settlement forests in this region, and represents what second growth forests such as Munsee Woods

might approach as they recover from past disturbance. Data for Christy Woods and Ginn Woods were obtained by sampling in permanent plots using methods similar to those used in the analysis of trees with dbh ≥ 10 cm at Munsee Woods. Data for Yuhus Woods were obtained using the point-centered-quarter method at 100 systematically located points. Although the sampling methods differed, the data sets for all four woods had similar numbers of stems, with $n = 363, 456, 472,$ and 400 for Munsee, Christy, Ginn, and Yuhus Woods, respectively. Chi-squared analysis was used to compare species composition among the sites, based on relative importance values. Another chi-squared analysis was used to compare the four forests with regards to relative abundance of trees in the three shade tolerance classes. Pairwise two sample t-tests were used to compare Shannon Diversity among the four woods (Zar 1996). A simple Bonferoni adjustment was used to control cumulative Type 1 error rate for these multiple t-tests.

RESULTS

Floristic inventory and analysis.—The vascular flora documented at Munsee Woods Nature Preserve is listed in Appendix 1. The flora consists of 399 taxa representing 252 genera and 85 families. Twenty-nine families ($\sim 34\%$) are represented by only one species and 18 families ($\sim 21\%$) are represented by only two species. The 10 families containing $\sim 55\%$ of the documented species are Asteraceae (51 species), Poaceae (43 species), Cyperaceae (35 species, including 30 *Carex* spp.), Rosaceae (18 species), Brassicaceae (15 species), Lamiaceae (14 species), Fabaceae (12 species), Scrophulariaceae (11 species), Polygonaceae (10 species), and Liliaceae (10 species). The plant community at MWNP is dominated by herbaceous species (Table 1, Appendix 1), especially forbs (241 taxa or $\sim 60.4\%$). Although grasses and sedges represent fewer total species (78 taxa or $\sim 26\%$), they are more visually abundant within moist meadows, old fields, and roadside at MWNP.

The MWNP flora is predominately low fidelity (low C-value) native and exotic species (Appendix 1). Only one plant species is classified as having the highest index of fidelity to undisturbed plant communities ($C = 10$), *Ranunculus hispidus* var. *caricetorum*. Six species, *Aristolochia serpentaria*, *Carex amphibola*,

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

	Native species summary		Exotic species summary	
	Number	% of Total	Number	% of Total
# of species	300	75.2%	99	24.8%
Tree	33	8.3%	3	0.8%
Shrub	13	3.3%	10	2.5%
W-Vine	9	2.3%	1	0.3%
H-Vine	4	1.0%	0	0.0%
P-Forbs	131	32.8%	23	5.8%
B-Forbs	11	2.8%	12	3.0%
A-Forbs	36	9.0%	28	7.0%
P-Grass	18	4.5%	13	3.3%
A-Grass	3	0.8%	9	2.3%
P-Sedge	35	8.8%	0	0.0%
A-Sedge	0	0.0%	0	0.0%
Fern	7	1.8%	0	0.0%

Deparia acrostichoides, *Hepatica nobilis* var. *acuta*, *Sedum ternatum*, and *Symplocarpus foetidus*, have a C = 8, and only 12 species have a C = 7. In contrast, 132 species have a C = 0, i.e., 99 exotics and 33 native species, 29 species have a C = 1, 46 species have a C = 2, and 61 species have a C = 3. Thus, 67% of the documented flora at Munsee Woods is categorized with C-values ≤ 3 , although only ~5% have C-values ≥ 7 . The remaining 28% of the taxa have C-values = 4–6, i.e., 59 species with C = 4, 47 species with C = 5, and six species with C = 6.

Based upon several sources, including the Indiana Natural Heritage Data Center's records for Delaware County, 41 species documented at MWNP are reported for the first time in Delaware County (Appendix 1). In addition, based on the list of endangered, threatened, rare, and extirpated plants of Indiana compiled by the Indiana Department of Natural Resources (IDNR Nature Preserves 2013), the vascular flora of MWNP includes three species on the state watch list, i.e., *Hydrastis canadensis*, *Spiranthes ovalis* var. *erostellata*, and *Viola pubescens*.

Accounting for ~25% of the taxa, exotic species have considerably higher visual abundances than the native species (Table 1, Appendix 1). Most of the native taxa with high visual abundances or widespread distributions are representatives of the low fidelity species categories (C < 4) indicating a notable history of disturbance. Some exotic shrubs, such as *Lonicera maackii* and *Rosa multiflora*, grow so

densely that large areas of the site, such as the young successional woodlands north of Medford Drain and the younger slope woodlands in the southwest quadrant, have little or no other shrubs or herbaceous ground cover. Herbaceous exotic species are found in abundance in all disturbed habitats on the property, especially old-fields, manicured fields, lawns around buildings, and the gravel driveways and parking lots (Fig. 2, Appendix 1). Even the less disturbed upland mesic woodland has an excess of exotic shrubs and herbaceous plants. For example, *Alliaria petiolata* lines the many trails cutting through this woodland. For the native species only, the FQI = 55.0 and the mean Coefficient of Conservatism (mean C) is 3.2 (Table 2). When the exotics are included, the FQI drops more than 7 units and the mean C is lowered by 0.8 units (Table 2). Such considerable change in both these matrices suggests that the exotics are having a significant negative impact on the native flora. Although exotics shrubs made up only a small percentage (2.5%,

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

	Species count	Mean C	FQI
Native species	300	3.2	55.0
Total species	399	2.4	47.7

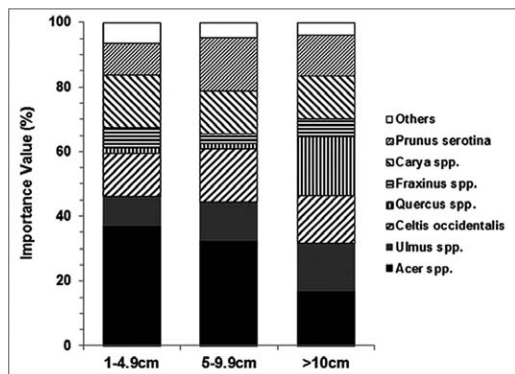


Figure 4.—Relative importance values for tree taxa recorded at Munsee Woods for three size classes defined by diameter at breast height (dbh). Dark solid bars are for tree species classified as shade tolerant. Heavy cross-hatch bars are for species with intermediate shade tolerance. Fine cross-hatch bars are for species classified as shade intolerant.

10 species) of the total number of species (Table 1), they have the highest visual abundances and largest negative impact at the site. The exotic shrub species with the highest visual abundances are *Lonicera maackii*, *Rosa multiflora*, *Euonymus alatus*, and *Ligustrum obtusifolium* (Appendix 1). Lastly, though only infrequent at present, *Ailanthus altissima* is well established in the woodland just north of the manicured field to the west and the woodland just northwest of the eastern meadow.

Permanent plot analysis.—A total of 15 tree species with dbh ≥ 10 cm was recorded in the upland mesic woods on the southern half of the property (Prast 2012). The five most important species were *Acer saccharum* (RIV = 16.7), *Quercus alba* (16.0), *Celtis occidentalis* (14.7), *Prunus serotina* (12.9), and *Ulmus americana* (10.2). The high RIV of *Q. alba* is due to a small number of large diameter stems (high relative dominance), whereas the high RIVs of *A. saccharum*, *C. occidentalis*, and *P. serotina* are due to a higher frequency and density of smaller diameter stems.

A total of 20 woody species was recorded in the advanced regeneration layers at Munsee Woods (Prast 2012). Based on RIV, the six most important species in both regeneration layers are *A. saccharum*, *C. occidentalis*, *P. serotina*, *U. americana*, *Carya cordiformis*, and *Lonicera maackii*. Four of these species were also among the five most important in the overstory. *Lonicera maackii* is an invasive

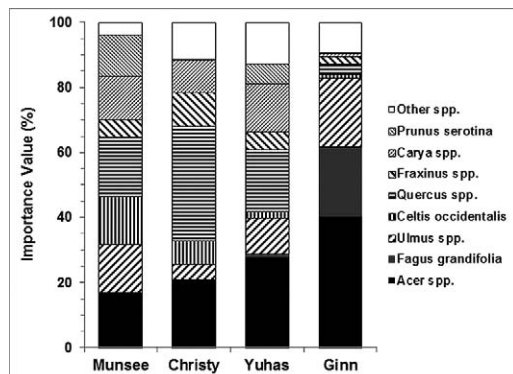


Figure 5.—Relative importance values for tree taxa recorded at three disturbed woods (Munsee, Christy, and Yuhus Woods) and one undisturbed, old-growth forest (Ginn Woods). Description relating bar fill pattern to species shade tolerance same as in Fig. 4.

shrub that will never attain canopy tree status, but can develop dense populations that shade the understory and interfere with tree regeneration. (Additional raw data for the plots are available in Prast (2012).)

Tree species composition at MWNP differed between the largest size class and the two smaller size classes ($p < 0.001$), but did not differ between the two smaller size classes (Fig. 4). Oaks had the second highest RIV in the overstory but were not found in either of the advanced regeneration layers. The relative abundance of shade tolerant sugar maple in the dbh > 10 cm size class was only half that in the advanced regeneration size classes.

Comparisons of overstory species composition and diversity between MWNP and other mature woods in the region show that MWNP is similar to other disturbed forests, but quite different from an undisturbed old-growth forest (Fig. 5). All three disturbed woods (Munsee, Yuhus, and Christy Woods) are dominated by species that are shade intolerant or have intermediate tolerance, but the old-growth Ginn Woods was over 60% sugar maple and American beech, both highly shade tolerant species. The three disturbed woods had similar Shannon diversity of overstory trees, but all had higher tree species diversity than Ginn Woods ($p < 0.001$, Fig. 6).

DISCUSSION

Floristic inventory and analysis.—The FQI = 55.0 for native species suggests that the site

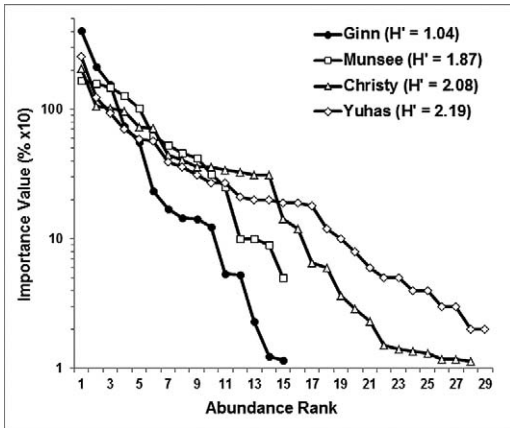


Figure 6.—Rank – abundance curve displaying species richness and species evenness for overstory trees at three disturbed woods (Munsee, Christy, and Yuhas Woods) and one undisturbed, old-growth forest (Ginn Woods). The absolute value of Shannon diversity index for each site is listed in the legend.

contains remnants of the region’s natural flora (Swink & Wilhelm 1994). A comparison of the native FQI and mean C-values for various sites in East-Central Indiana is seen in Table 3. Although FQI value for MWNP suggests it is of nature preserve quality (Swink & Wilhelm 1994), it is clearly of lower quality than most other natural areas that have been studied. Rothrock & Homoya (2005) indicated that the

best quality central Indiana sites have mean C values ranging from 3.8–4.1. The mean C = 3.2 for MWNP falls shy of this range and is likely due to the excessive, prolonged anthropogenic impact. For example, the majority of the northern half of the site (north of Medford Drain) was agricultural field until about 25–30 years ago, and has since been covered by the young successional woodland (Graham, Wapehani Girl Scouts Camp Munsee, Pers. Commun.). In addition to containing 99 exotic species, the site also includes 169 species of native plants with low C-values ($C \leq 3$). Rothrock & Homoya (2005) noted that central Indiana natural areas have limited number of species in the highest fidelity categories of C-values, but they gave no specific reason for this observation. Ruch et al. (2008a) suggested the large number of low-fidelity species was due to the anthropogenic impact associated with large amounts of agriculture and construction. As noted above, one of the most noticeable disturbances was the clearing of the northern half of the site for agricultural use when it was still farm property. Additionally, in the upland mesic woodland trees were cleared later for buildings, drive-ways, trails, and campsites associated with the old girl scout camp. The presence of large lower branches among the larger, older stems and the absence of species common in

Table 3.—Comparison of the native Floristic Quality Index and mean Coefficient of Conservatism for various sites in East-Central Indiana. Sites are arranged by descending FQI values. Mean C = native mean Coefficient of Conservatism, FQI = native Floristic Quality Index, * = unpublished data (Ruch), NP = Nature Preserve, FWA = Fish and Wildlife Area, WC = Wetland Complex. (Rothrock & Homoya 2005; Ruch et al. 1998, 2002, 2004, 2007, 2008a, 2008b, 2009, 2012, 2013; Stonehouse et al. 2003; Tungsveck 2011)

Site	# Native spp./ # Total spp.	Native FQI	Mean C	Hectares	County
Mounds State Park	478/584	96.2	4.4	117	Madison
Cabin Creek Raised Bog	400/478	85.6	4.3	7	Randolph
Wilbur Wright FWA	388/536	77.3	3.9	416	Henry
Ginn Woods	364/441	74.1	3.9	61	Delaware
Hayes Arboretum	375/525	72.0	3.7	203	Wayne
Duning Woods NP*	308/380	71.9	4.1	49	Wayne
Lick Creek Summit NP	304/387	68.9	4.0	16	Wayne
Botany Glen	295/357	68.5	4.0	18	Grant
IMI WC	246/287	61.9	3.9	3	Henry
McVey Memorial Woods*	295/378	60.0	3.5	115	Randolph
Munsee Woods NP	300/399	55.0	3.2	18.4	Delaware
Bennett WC	210/264	54.6	3.8	3	Henry
Mississinewa Woods NP	233/311	46.2	3.0	15	Randolph
Dutro Woods NP*	132/239	25.0	2.2	6.6	Delaware

the area, such as *Asarum canadense*, in the southern half of Munsee Woods suggest that the site was once more open and may have been used for grazing when it was part of Whitney Farm or Green Hills Farm.

The FQI for all species is 7.3 units lower and the mean C is 0.8 units lower than the FQI and mean C for native species alone. Rothrock & Homoya (2005) suggested that the quality of a plant community is degraded when including exotic species and lowers the mean C by more than 0.7 units. From these numbers and from visual examination of MWNP, it is obvious that the exotic flora is having a significant negative impact on the native plant community. Sites, such as Fall Creek Gorge in Warren County (Tonkovich & Sargent 1993; Rothrock & Homoya 2005) and Lick Creek Summit Nature Preserve (LCSNP) in Wayne County (Ruch et al. 2008a), have shown a difference in mean C \geq 0.7 units with limited negative impact on the native community. This is due in large part to the highest diversity and concentration of exotic species being located on the margins and only minimally penetrating the interior of these sites. At MWNP, however, many of the exotic species, especially invasive shrubs, were found in the southwestern successional woods and the northern half of the site, and were spreading into the south mesic woods along the Medford Drain and along the many paths. *Lonicera maackii* dominated the northern half of the site, and was growing so thickly in some areas that virtually no other plants could grow. Furthermore, around the gravel drive and parking lot and field adjacent to Medford Drain, herbaceous exotic species dominated. A similar degree of negative impact by exotic species was reported for many areas, especially old-fields and young successional woodlands, at Wilbur Wright Fish and Wildlife Area, where the mean differences between all species and the native species was 1.1 units (Ruch et al. 2002). A study that uses plot analysis to quantify frequency, density, and percent cover of exotic species, especially the shrubs, is recommended to better quantify the abundance and impact of exotic species on the plant community at MWNP.

Permanent plot analysis.—Comparisons among size classes in MWNP and comparisons with other mature forests in the region indicate that Munsee Woods is in early to middle stages

of succession from past disturbances. As the large trees in the current overstory die and are replaced by saplings from the understory, the relative importance of sugar maple in the overstory will likely increase. Undisturbed forests in this region, such as Ginn Woods, are dominated by shade tolerant species such as *A. saccharum* and *Fagus grandifolia*. No stems of American beech were recorded in the permanent plots, but sugar maple was abundant in the advanced regeneration of MWNP. Oak species may well disappear from Munsee Woods in the future as the few large trees currently in the overstory die with no oaks in the understory to replace them. However, other tree species with intermediate shade tolerance, such as *P. serotina* and *C. cordiformis*, are relatively abundant in the advanced regeneration size classes and may succeed into the overstory in the future.

Historical disturbance in Munsee, Christy, and Yuhus Woods appears to have resulted in higher tree species diversity compared to the old-growth forest at Ginn Woods. This is consistent with the literature on forest succession, which shows that late successional forests tend to be dominated by a small number of highly competitive, shade tolerant tree species (Christensen 1977). The spatially and temporally complex disturbance history of Indiana woodlots managed by individual landowners created a patchy distribution of niches that could be exploited by tree species with differing life history characteristics, including differences in dispersal mechanism, micro-site requirements, and shade tolerance. If the relative importance of sugar maple in MWNP increases in the future it is likely that tree species diversity will decrease toward a level similar to that documented for the old-growth Ginn Woods. Some research has shown that regular small-scale natural disturbances can maintain overstory tree species diversity (Glitzenstein et al. 1986). In Indiana such disturbances might include strong winds and ice storms that damage or knock down overstory trees, creating large gaps in the canopy. However, there is evidence of regular small-scale blow-down in Ginn Woods, yet the overstory is dominated by beech and maple and has low species diversity. If Munsee Woods is allowed to develop without further human disturbance, it is likely to follow a trajectory toward species composition and diversity similar to Ginn Woods.

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APPENDIX 1

CATALOG OF VACULAR FLORA AT MUNSEE WOODS, DELAWARE COUNTY, INDIANA

(Arranged alphabetically by family)

Listed are voucher specimens for all species documented at Munsee Woods. Nomenclature follows the USDA Plants Database (USDA 2013). 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); (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 = frequent throughout its potential habitats and may be locally abundant at one or more sites; and abundant = common and numerous throughout its potential habitats.

All non-native (exotic) species are in capital letters. [Exotics that were planted and have not naturalized are also listed in capital letters.] Potential Delaware County records are indicated by a pound-symbol (#) in parentheses immediately preceding a species. Species were deemed unreported for Delaware County, and hence considered a county record, if they did not appear in Deam (1940), the computer database of Keller et al. (1984); Keller (1986); Overlease & Overlease (2007); Ruch et al. (1998, 2004); or the UDSA Plant Database (USDA 2013). (The database of plants developed by Keller et al. (1984) contains the same plant list for Delaware County as does the Indiana Natural Heritage Data Center, IDNR.). There are 41 Delaware County records. Lastly, the status of certain species in brackets (e.g. [Watch List]) is from the list compiled by the Indiana Department of Natural Resources (IDNR 2013).

PHYLUM EQUISETOPHYTA

Horsetails and Scouring Rushes

Equisetaceae (Horsetail Family)

Equisetum arvense L.; Common or field horsetail; Eastern meadow and creek bank; Infrequent; C = 1; BSUH 17822.

PHYLUM POLYPODIOPHYTA

Ferns

Aspleniaceae (Spleenwort Family)

Asplenium platyneuron (L.) Britton, Sterns & Poggenb. var. *platyneuron*; Ebony spleenwort; Successional woods north of western old-field; Rare, but locally common; C = 3; BSUH 17798.

Dryopteridaceae (Wood Fern Family)

Cystopteris protrusa (Weath.) Blasdel; Lowland bladder fern; Successional woods along northern creek; Common; C = 4; BSUH 17805.

Deparia acrostichoides (Sw.) M. Kato; SYN: *Athyrium thelypteroides* (Michx.) Desv., *Diplazium acrostichoides* (Sw.) Butters; Silver false spleenwort, silvery glade fern, silvery spleenwort; Upland woods; Rare, one plant; C = 8; Observed but not collected.

Onoclea sensibilis L.; Sensitive fern; Creek bank and meadow in the SE corner of property; Rare, but locally frequent; C = 4; BSUH 17783.

Ophioglossaceae (Adder's Tongue Family)

Botrychium dissectum Spreng.; SYN: *Botrychium dissectum* Spreng. var. *obliquum* (Muhl. ex Willd.)

Clute; Lace-frond or cutleaf grapefern; Upland woods; Rare; C = 3; BSUH 17826.

Botrychium virginianum (L.) Sw.; Rattlesnake fern, Virginia grapefern; Upland woods; Abundant and widespread; C = 4; BSUH 17757.

PHYLUM CONIFEROPHYTA

Gymnosperms or Conifers

Cupressaceae (Cypress Family)

(#) *Juniperus virginiana* L. var. *virginiana*; Eastern red cedar; Young successional woods east of entrance road [Happy Hollow Campsite]; Rare; C = 2; BSUH 17964.

Pinaceae (Pine Family)

PICEA ABIES (L.) Karst.; Norway spruce; West side of gravel lot; One tree, planted not naturalized; C = 0; BSUH 17988.

Pinus strobus L.; Eastern white pine; Entrance road near maintenance building; Rare, one tree, planted not naturalized; C = 5; BSUH 17947.

PHYLUM MAGNOLIOPHYTA

Angiosperms

Acanthaceae (Acanthus Family)

Ruellia strepens L.; Smooth ruellia, Limestone wild petunia; Entrance road, gravel lot and adjacent field; Infrequent; C = 4; BSUH 18059.

Aceraceae (Maple Family)

Acer negundo L. var. *negundo*; Boxelder; Woodlands; Abundant and widespread; C = 1; BSUH 17311.

Acer saccharinum L.; Silver maple; Seasonal pool, woodlands; Common, and locally abundant; C = 1; BSUH 17846.

Acer saccharum Marsh. var. *saccharum*; Sugar maple; Woodlands; Abundant and widespread; C = 4; BSUH 17758.

Alismataceae (Water Plantain Family)

Alisma subcordatum Raf.; SYN: *Alisma plantago-aquatica* L. ssp. *subcordatum* (Raf.) Hultén; Small-flowered or American water-plantain; Northern meadow; Rare; C = 2; BSUH 18022.

(#) *Sagittaria latifolia* Willd.; Common or broadleaf arrowhead; Moist meadow and creek bank in SE corner of property; Rare; C = 3; BSUH 18039.

Amaranthaceae (Amaranth Family)

(#) *AMARANTHUS RETROFLEXUS* L.; Rough green amaranth, redroot; Edge of seasonal pool; Infrequent; C = 0; BSUH 17290.

Anacardiaceae (Cashew Family)

Rhus glabra L.; Smooth sumac; Woodland edge along south end of pumpkin patch old-field; Rare, but locally common; C = 1; BSUH 17940.

Toxicodendron radicans (L.) Kuntze ssp. *negundo* (Greene) Gillis; Common or eastern poison ivy; Woodlands, old-fields; Abundant and widespread; C = 1; BSUH 17738.

Apiaceae (Carrot Family)

Chaerophyllum procumbens (L.) Crantz var. *procumbens*; Wild or spreading chervil; Young successional woods; Abundant and widespread; C = 2; BSUH 17867.

Cicuta maculata L. var. *maculata*; Spotted water hemlock; Northern meadow; Infrequent; C = 6; BSUH 18036.

CONIUM MACULATUM L.; Poison hemlock; Entrance road near maintenance building; Rare; C = 0; BSUH 17745.

Cryptotaenia canadensis (L.) DC.; Canada honewort; Woodlands; Abundant and widespread; C = 3; BSUH 17955.

DAUCUS CAROTA L.; Queen Anne's-lace, wild carrot; Gravel lot and adjacent field; Common; C = 0; BSUH 17972.

Osmorhiza longistylis (Torr.) DC.; Aniseroot, long-style sweetroot; Young successional woods; Abundant and widespread; C = 3; BSUH 17812.

PASTINACA SATIVA L.; Wild parsnip; Edge of gravel lot; Rare; C = 0; BSUH 17742.

Sanicula canadensis L. var. *canadensis*; Canada sanicle, Canada black-snakeroot; Flagpole old-field; Infrequent; C = 2; BSUH 17975.

Sanicula odorata (Raf.) K.M. Pryer & L.R. Philippe; SYN: *Sanicula gregaria* E.P. Bicknell; Clustered black-snakeroot, clustered sanicle; Woodlands; Abundant and widespread; C = 2; BSUH 17794.

Apocynaceae (Dogbane Family)

Apocynum cannabinum L.; Dogbane, American Indian-hemp; Old-fields; Infrequent; C = 2; BSUH 18020.

Araceae (Arum Family)

Arisaema dracontium (L.) Schott; Green dragon; Meadow; Rare, but locally common; C = 5; BSUH 18010.

Arisaema triphyllum (L.) Schott var. *triphyllum*; Jack-in-the-pulpit; Woodlands; Abundant and widespread; C = 4; BSUH 17814.

Symplocarpus foetidus (L.) Salib. ex W.P.C. Barton; Eastern skunk cabbage; Meadows; Common and locally abundant; C = 8; BSUH 17843.

Aristolochiaceae (Birthwort Family)

Aristolochia serpentaria L.; Virginia snakeroot; Successional woods near buildings; Infrequent; C = 8; BSUH 17778.

Asclepiadaceae (Milkweed Family)

Asclepias incarnata L. ssp. *incarnata*; Swamp milkweed; Eastern meadow; Infrequent; C = 4; BSUH 18054.

Asclepias syriaca L.; Common milkweed; Gravel lot and adjacent field; Rare; C = 1; BSUH 18006.

Asteraceae (Aster Family)

Achillea millefolium L.; Common yarrow; Western old-field; Infrequent; C = 0; BSUH 17316.

Ageratina altissima (L.) King & H. Rob. var. *altissima*; SYN: *Eupatorium rugosum* Houtt.; White snakeroot; Woodlands; Abundant and widespread; C = 2; BSUH 17907.

Ambrosia artemisiifolia L. var. *elatior* Descourt.; SYN: *Ambrosia elatior* L.; Common ragweed; Western old-field; Abundant and widespread; C = 0; BSUH 17903.

Ambrosia trifida L. var. *trifida*; Great or giant ragweed; Gravel lot and adjacent field; Common; C = 0; BSUH 17895.

ARCTIUM MINUS (Hill) Bernh.; Common or lesser burdock; Border of western old-field; Infrequent; C = 0; BSUH 18021.

Bidens cernua L.; Nodding bur-marigold, nodding beggar's-ticks; Creek bank north of western old-field; Common; C = 2; BSUH 17292.

Bidens frondosa L.; Common beggar's-ticks, devil's-beggar's-ticks; Successional woods near Happy Hollow camp site; Infrequent but locally common; C = 1; BSUH 17873.

(#) *Bidens tripartita* L.; SYN: *Bidens comosa* (A. Gray) Wiegand; Three-parted or three-lobed beggar's-ticks; Northern meadow; Common; C = 2; BSUH 17922.

Bidens vulgata Greene; Tall beggar's-ticks, big devil's-beggar's-ticks; Western old-field; Infrequent but locally abundant; C = 0; BSUH 17904.

CICORIUM INTYBUS L.; Chicory; Gravel lot and adjacent field; Rare; C = 0; BSUH 17932.

CRISIUM ARVENSE (L.) Scop.; Canada thistle; Gravel lot and adjacent field; Infrequent; C = 0; BSUH 18012.

Cirsium discolor (Muhl. ex Willd.) Spreng.; Field or pasture thistle; Gravel lot and adjacent field, old-fields; Infrequent but widespread; C = 3; BSUH 17871.

CRISIUM VULGARE (Savi) Ten.; Bull thistle; Gravel lot and adjacent field; Rare; C = 0; BSUH 18023.

Conyza canadensis (L.) Cronquist var. *canadensis*; SYN: *Erigeron canadensis* L.; Canadian horse-

weed; Gravel lot and old-fields; Common and widespread; C = 0; BSUH 18034.

Erechtites hieraciifolia (L.) Raf. ex DC. var. *hieraciifolia*; White fireweed, American burnweed; Old-fields; Rare; C = 2; BSUH 17890.

Erigeron annuus (L.) Pers.; Eastern daisy or annual fleabane, whitetop; Old-fields; Abundant and widespread; C = 0; BSUH 17740.

Erigeron philadelphicus L. var. *philadelphicus*; Philadelphia daisy or fleabane; Gravel lot and adjacent field; Infrequent; C = 3; BSUH 17809.

(#) *Eupatorium altissimum* L.; Tall boneset, tall thoroughwort; Gravel lot and adjacent field; Infrequent; C = 1; BSUH 17295.

Eupatorium perfoliatum L. var. *perfoliatum*; Common boneset; Moist meadows; Common and widespread; C = 4; BSUH 18025.

Euthamia graminifolia (L.) Nutt. var. *graminifolia*; SYN: *Solidago graminifolia* (L.) Salisb.; Common flat-topped goldenrod, grass-leaved goldenrod; Old-fields; Infrequent but locally common; C = 3 BSUH 17889.

Eutrochium purpureum (L.) E.E. Lamont var. *purpureum*; SYN: *Eupatorium purpureum* L. var. *purpureum*, *Eupatoriadelphus purpureus* (L.) King & H. Rob.; Purple-node, green-stemmed, or sweet-scented Joe-Pye-weed; Old-fields; Common; C = 5; BSUH 18016.

(#) *GALINSOGA QUADRIRADIATA* Cav.; Common quickweed, Peruvian daisy, shaggy soldier; Edge of gravel lot; Rare; C = 0; BSUH 17288.

Helenum autumnale L. var. *autumnale*; Common sneezeweed; Creek bank near eastern meadow; Rare; C = 3; BSUH 17925.

(#) *Helianthus grosseserratus* M. Martens; Sawtooth sunflower; Creek bank north of western old-field; Infrequent; C = 3; BSUH 17285.

Helianthus tuberosus L.; Jerusalem-artichoke; Edge of gravel lot, western old-field; Infrequent but locally abundant; C = 2; BSUH 17878.

Helipopsis helianthoides (L.) Sweet var. *helianthoides*; False sunflower, smooth oxeye; Woodlands and creek banks; Common and widespread; C = 4; BSUH 17980.

(#) *HYPOCHAERIS RADICATA* L.; Hairy cat's-ear; Western old-field; Infrequent but locally common; C = 0; BSUH 17779.

Lactuca biennis (Moench) Fernald; Tall blue lettuce; Eastern meadow and woodland edges; Infrequent but widespread; C = 2; BSUH 17882.

Lactuca canadensis L.; Wild or Canada lettuce; Western old-field; Infrequent; C = 2; BSUH 18051.

Lactuca floridana (L.) Gaertn. var. *floridana*; Woodland or blue lettuce; Edge of gravel lot, old-fields, woodlands; Abundant and widespread; C = 5; BSUH 17870.

MATRICARIA DISCOIDEA DC.; SYN: *Matricaria matricarioides* auct. non (Less.) Porter; Pineapple-

- weed, disc mayweed; Gravel lot and adjacent field; Rare; C = 0; BSUH 17324.
- Packera glabella* (Poir.) C. Jeffrey; SYN: *Senecio glabellus* Poir.; Butterweed, yellowtop; Young successional woods, old-fields; Infrequent but widespread; C = 0; BSUH 17852.
- Packera obovata* (Muhl. ex Willd.) W.A. Weber & A. Löve; SYN: *Senecio obovatus* Muhl. ex Willd.; Round-leaved golden ragwort; Upland woods; Infrequent but locally common; C = 7; BSUH 17850.
- Prenanthes altissima* L.; Tall rattlesnake-root, tall white lettuce; Upland woods; Common; C = 5; BSUH 17879.
- Ratibida pinnata* (Vent.) Barnhart; Gray-headed or pinnate prairie coneflower; Flagpole old-field and path; Rare; C = 5; BSUH 17931.
- Rudbeckia hirta* L. var. *pulcherrima* Farw.; Black-eyed Susan; Creek bank in SE corner of property; Rare; C = 2; BSUH 17912.
- Rudbeckia laciniata* L. var. *laciniata*; Cut-leaved coneflower; Creek banks, meadows; Common and widespread; C = 3; BSUH 18035.
- (#) *Solidago altissima* L.; SYN: *Solidago canadensis* L. var. *scabra* Torr. & A. Gray; Tall or Canada goldenrod; Old-fields, roadside; Abundant and widespread; C = 0; BSUH 17920.
- Solidago caesia* L.; Blue-stemmed goldenrod, wreath goldenrod; Upland woods; Infrequent but locally common; C = 7; BSUH 17299.
- SONCHUS ASPER* (L.) Hill; Spiny sow-thistle; Gravel lot and adjacent field; Rare; C = 0; BSUH 17951.
- Symphotrichum cordifolium* (L.) G.L. Nesom; SYN: *Aster cordifolius* L., *Aster sagittifolius* Wedem. ex Willd., *Symphotrichum sagittifolium* (Wedem. ex Willd.) G.L. Nesom; Common blue wood aster, blue heart-leaved aster; Field adjacent to gravel lot, woodlands; Common and widespread; C = 5; BSUH 17302.
- Symphotrichum lanceolatum* (Willd.) G.L. Nesom ssp. *lanceolatum* var. *lanceolatum*; SYN: *Aster simplex* Willd.; *Aster lanceolatus* Willd. ssp. *simplex* (Willd.) A.G. Jones; White panicle aster; Meadows, creek bank; Common and widespread; C = 3; BSUH 17301.
- Symphotrichum lateriflorum* (L.) Á. Löve & D. Löve var. *lateriflorum*; SYN: *Aster lateriflorus* (L.) Britton; Calico, goblet, or side-flowering aster; Gravel lot and adjacent field, woodlands; Abundant and widespread; C = 3; BSUH 17294.
- Symphotrichum novae-angliae* (L.) G.L. Nesom; SYN: *Aster novae-angliae* L.; New England aster; Gravel lot and adjacent field; Rare; C = 3; BSUH 17289.
- Symphotrichum pilosum* (Willd.) G.L. Nesom var. *pilosum*; SYN: *Aster pilosus* Willd.; Hairy white old-field aster, goodbye meadow; Old-fields, roadside; Common and widespread; C = 0; BSUH 17303.
- (#) *Symphotrichum puniceum* (L.) Á. Löve & D. Löve var. *puniceum*; SYN: *Aster firmus* Nees.; *Symphotrichum firmum* (Nees) G.L. Nesom; Purple-stem aster; Meadow in SE corner of property; Rare but locally common; C = 4; BSUH 17300.
- TARAXACUM OFFICINALE* F.H. Wigg. ssp. *OFFICINALE*; Common dandelion; Old-fields, roadside; Common and widespread; C = 0; BSUH 17840.
- TRAGOPOGON LAMOTTEI* Rouy; SYN: *Tragopogon pratensis* L.; Common goat's-beard, jack-go-to-bed-at-noon; Western old-field; Rare; C = 0; BSUH 18056.
- Verbesina alternifolia* (L.) Britton ex Kearney; SYN: *Actinomeris alternifolia* (L.) DC.; Wingstem; Creek bank and moist woodlands; Common; C = 3; BSUH 17908.
- Vernonia gigantea* (Walter) Trel. ssp. *gigantea*; SYN: *Vernonia altissima* Nutt.; Tall or giant ironweed; Western old-field; Common; C = 2; BSUH 17905.
- Xanthium strumarium* L. var. *glabratum* (DC.) Cronquist; Rough cocklebur; Seasonal pool; Rare but locally abundant; C = 0; BSUH 17917.
- Balsaminaceae (Touch-Me-Not Family)
- Impatiens capensis* Meerb.; SYN: *Impatiens biflora* Walter; Orange jewelweed, spotted touch-me-not; Old-fields, meadows, open woodlands; Abundant and widespread; C = 2; BSUH 17978.
- Impatiens pallida* Nutt.; Yellow jewelweed, pale touch-me-not; Gravel lot and adjacent field; Rare; C = 4; BSUH 18027.
- Berberidaceae (Barberry Family)
- (#) *BERBERIS THUNBERGII* DC.; Japanese barberry; Upland woods; Rare; C = 0; BSUH 17785.
- Podophyllum peltatum* L.; May-apple; Woodlands; Abundant and widespread; C = 3; BSUH 17835.
- Bignoniaceae (Trumpet-Creeper Family)
- Campsis radicans* (L.) Seem. ex Bureau; Trumpet creeper; Woodland along the edge of the western old-field; Locally abundant; C = 1; BSUH 17983.
- Catalpa speciosa* (Warder) Warder ex Engelm.; Northern catalpa; Gravel lot and successional woods along northern creek; Infrequent but locally common; C = 0; BSUH 17753.
- Boraginaceae (Borage Family)
- Hackelia virginiana* (L.) I.M. Johnst.; Stickseed, beggars-lice; Upland woods; Abundant and widespread; C = 0; BSUH 18042.

Mertensia virginica (L.) Pers. ex Link; Virginia bluebells; Upland woods near RTC Office; Rare but locally abundant; C = 6; BSUH 17839.

Brassicaceae (Mustard Family)

ALLIARIA PETIOLATA (M. Bieb.) Cavara & Grande; SYN: *Alliaria officinalis* Andr. ex M. Bieb.; Garlic mustard; Woodlands, old-fields; Abundant and widespread; C = 0; BSUH 17823.

Arabis hirsuta (L.) Scop. var. *pyncocarpa* (M. Hopkins) Rollins; SYN: *Arabis hirsuta* (L.) Scop. var. *adpressipilis* (M. Hopkins) Rollins; Hairy rockcress, cream-flower rockcress; Upland woods; Rare but locally common; C = 5; BSUH 17804.

BARBAREA VULGARIS W.T. Aiton; Garden yellow-rocket, bitter winter cress; Edge of gravel lot, old-fields, roadside; Common; C = 0; BSUH 17863.

BRASSICA NIGRA (L.) W.D.J. Koch; Black mustard; Gravel lot and adjacent field; Rare but locally common; C = 0; BSUH 18014.

CAPSELLA BURSA-PASTORIS (L.) Medik.; Shepherd's-purse; Gravel lot and adjacent field, roadside; Infrequent; C = 0; BSUH 17807.

Cardamine bulbosa (Schreb. ex Muhl.) Britton, Sterns & Poggenb.; SYN: *Cardamine rhomboidea* (Pers.) DC.; White spring cress, bulbous bittercress; Northern creek bank and meadow; Infrequent but locally abundant; C = 4; BSUH 17824.

Cardamine concatenata (Michx.) Sw.; SYN: *Dentaria laciniata* Muhl. ex Willd.; Cut-leaved toothwort; Woodlands; Abundant and widespread; C = 4; BSUH 17836.

Cardamine douglassii Britton; Purple spring cress, limestone bittercress; Edge of western old-field, woodlands; Common and widespread; C = 5; BSUH 17845.

(#) *CARDAMINE HIRSUTA* L.; Hairy bittercress; Building lawns; Infrequent but locally abundant; C = 0; BSUH 17837.

Cardamine pensylvanica Muhl. ex Willd.; Pennsylvania bittercress; Young successional woods and meadows; Infrequent; C = 2; BSUH 17851.

(#) *DRABA VERNA* L.; Early whitlow-grass, spring draba; Gravel drive and lawns; Infrequent but locally abundant; C = 0; BSUH 17830.

Lepidium virginicum L. var. *virginicum*; Common peppergrass, poor man's-pepper, Virginia pepperweed; Gravel lot and adjacent field; Infrequent; C = 0; BSUH 17962.

NASTURTIUM OFFICINALE W.T. Aiton; SYN: *Rorippa nasturtium-aquaticum* (L.) Hayek; Watercress; Creek at bridge of entrance road; Rare but locally abundant; C = 0; BSUH 18040.

Rorippa palustris (L.) Besser ssp. *fernaldiana* (Butters & Abbe) Jonsell; SYN: *Rorippa islandica* (Oeder) Borbás var. *fernaldiana* Butters & Abbe; Common or Fernald's yellow cress; Seasonal pool; Rare; C = 2; BSUH 17915.

THLASPI ARVENSE L.; Field pennycress; Gravel lot and adjacent field; Rare but locally frequent; C = 0; BSUH 17767.

Campanulaceae (Bellflower Family)

Campanulastrum americanum (L.) Small; SYN: *Campanula americana* L.; Tall or American bellflower; Edge of woodlands and open woodlands; Abundant and widespread; C = 4; BSUH 18044.

Lobelia inflata L.; Indian-tobacco; Gravel lot and adjacent field, successional woods north of creek; Infrequent; C = 3; BSUH 17874.

Lobelia siphilitica L. var. *siphilitica*; Great blue lobelia; Moist meadows; Infrequent; C = 3; BSUH 17897.

Cannabaceae (Hemp Family)

(#) *Humulus lupulus* L. var. *lupuloides* E. Small; Common or American hops; Edge of western old-field; Rare but locally common; C = 5; BSUH 17775.

Caprifoliaceae (Honeysuckle Family)

LONICERA MAACKII (Rupr.) Herder; Amur bush honeysuckle; Woodlands; Abundant and widespread; C = 0; BSUH 17789.

LONICERA MORROWII A. Gray; Morrow's honeysuckle; Successional woods; Infrequent; C = 0; BSUH 17857.

LONICERA X BELLA Zabel; Showy fly honeysuckle; Successional woods; Infrequent; C = 0; BSUH 17859.

Sambucus nigra L. ssp. *canadensis* (L.) R. Bolli; SYN: *Sambucus canadensis* L.; American black elderberry; Moist woodlands, border of eastern meadow; Common; C = 2; BSUH 18005.

Triosteum perfoliatum L.; Common horse-gentian, feverwort; Flagpole old-field; Rare; C = 5; BSUH 17953.

Viburnum lentago L.; Nannyberry, sheepberry; Creek bank in SE corner of property; Rare; C = 5; BSUH 17885.

Viburnum prunifolium L.; Black haw; Upland woods; Common and widespread; C = 4; BSUH 17861.

Caryophyllaceae (Pink Family)

ARENARIA SERPYLLIFOLIA L.; Thyme-leaved sandwort; Building lawns; Rare, one large colony; C = 0; BSUH 17981.

CERASTIUM FONTANUM Baumg. ssp. *VULGARE* (Hartm.) Greuter & Burdet; SYN: *Cerastium vulgatum* L.; Mouse-ear chickweed, big chickweed; Western old-field; Common and widespread in field; C = 0; BSUH 18047.

SILENE LATIFOLIA Poir. ssp. *ALBA* (Mill.) Greuter & Burdet; SYN: *Lychnis alba* Mill.; Evening, white, or bladder campion; Gravel lot and adjacent field; Rare; C = 0; BSUH 17322.

Silene stellata (L.) W.T. Aiton; Starry catchfly, widowsfrill; Young successional slope woods in SW corner; Rare; C = 5; BSUH 17984.

Silene virginica L. var. *virginica*; Fire pink; Upland woods; Rare but locally common; C = 7; BSUH 17319.

STELLARIA MEDIA (L.) Vill.; Common chickweed; Lawns, woodlands; Abundant and widespread; C = 0; BSUH 17827.

Celastraceae (Staff-tree Family)

(#) *CELASTRUS ORBICULATUS* Thunb.; Oriental bitter-sweet; Shrub thicket between gravel lot and creek; Infrequent but locally common; C = 0; BSUH 17770.

Celastrus scandens L.; American bitter-sweet; Woodland edge of western old-field; Rare; C = 2; BSUH 17780.

EUONYMUS ALATUS (Thunb.) Siebold var. *ALATUS*; Winged euonymus, winged burning bush; Upland and successional woods; Abundant and widespread; C = 0; BSUH 17808.

EUONYMUS FORTUNEI (Turcz.) Hand.-Maz. var. *RADICANS* (Siebold ex Miq.) Rehder; Winter creeper; Gravel lot and adjacent field; Rare; C = 0; BSUH 17296.

Chenopodiaceae (Goosefoot Family)

CHENOPODIUM ALBUM L. var. *ALBUM*; Lamb's-quarters, pigweed; Gravel lot and adjacent field; Rare; C = 0; BSUH 17921.

Clusiaceae (Mangosteen Family)

Hypericum punctatum Lam.; Spotted St.-John's-wort; Western old-field; Common and widespread in this field; C = 3; BSUH 17987.

Commelinaceae (Spiderwort Family)

COMMELINA COMMUNIS L.; Asiatic or common day-flower; Gravel lot and adjacent field; Rare; C = 0; BSUH 17868.

Tradescantia subaspera Ker Gawl. var. *subaspera*; Zigzag or broad-leaved spiderwort; Edge of western old-field; Infrequent; C = 4; BSUH 17906.

Tradescantia virginiana L.; Virginia spiderwort; Upland woods; Common and widespread; C = 7; BSUH 17801.

Convolvulaceae (Morning-glory Family)

Calystegia sepium (L.) R. Br.; Common hedge bindweed, hedge false bindweed; Gravel lot and adjacent field, edge of old-fields; Abundant; C = 1; BSUH 17743.

IPOMOEA HEDERACEA Jacq.; Ivy-leaved morning-glory; Gravel lot and adjacent field; Rare; C = 0; BSUH 17894.

Ipomoea pandurata (L.) G. Mey.; Wild potato, man-of-the-earth; Western old-field; Infrequent but locally abundant; C = 3; BSUH 18019.

IPOMOEA PURPUREA (L.) Roth; Common or tall morning-glory; Gravel lot and adjacent field; Rare; C = 0; BSUH 18043.

Cornaceae (Dogwood Family)

Cornus drummondii C.A. Mey.; Rough-leaved dogwood; Gravel drive, woodland edges; Common and widespread; C = 2; BSUH 18049.

Cornus florida L.; Flowering dogwood; Woodlands; Abundant and widespread; C = 4; BSUH 17862.

Cornus obliqua Raf.; SYN: *Cornus anomum* Mill. var. *schuetzeana* (C.A. Mey.) Rickett; Silky dogwood, knob-styled dogwood; Northern meadow; Rare; C = 5; BSUH 17332.

Crassulaceae (Stonecrop Family)

Sedum ternatum Michx.; Wild or woodland stonecrop; Campsites in upland woods; Infrequent but locally abundant; C = 8; BSUH 17820.

Cuscutaceae (Dodder Family)

Cuscuta gronovii Willd. ex Schult. var. *gronovii*; Common dodder, scaldweed; Northern meadow; Rare, parasitic on *Lactuca floridana*; C = 2; BSUH 17898.

Cyperaceae (Sedge Family)

(#) *Carex aggregata* Mack.; Smooth clustered sedge, Glomerate Sedge; Fields, especially the western old-field; Abundant and widespread; C = 2; BSUH 17268.

Carex amphibola Steud.; Gray sedge, eastern narrowleaf sedge; Upland woods; Infrequent; C = 8; BSUH 17934.

(#) *Carex annectens* E.P. Bicknell; Large yellow fox sedge, yellow-fruit sedge; Western old-field; Rare but locally common; C = 3; BSUH 17936.

Carex blanda Dewey; Common wood sedge, eastern woodland sedge; Old-fields and woodlands; Abundant and widespread; C = 1; BSUH 17269.

Carex cephalophora Muhl. ex Willd.; Short-headed bracted sedge, oval-leaf sedge; Western old-field; Common; C = 3; BSUH 17271.

Carex conjuncta Boott; Green-headed or soft fox sedge; Small seasonal pool in NW corner of property; Rare but locally abundant; C = 6; BSUH 17270.

Carex cristatella Britton; Crested oval sedge; Eastern meadow; Infrequent but common at this site; C = 3; BSUH 17272.

Carex davisii Schwein. & Torr.; Awned graceful sedge, Davis' sedge; Old-fields and woodlands; Abundant and widespread; C = 3; BSUH 17273.

- Carex frankii* Kunth; Bristly cattail sedge, Frank's sedge; Gravel lot and adjacent field; Infrequent; C = 2; BSUH 17310.
- Carex granularis* Muhl. ex Willd.; Pale sedge, limestone meadow sedge; Old-fields; Common; C = 2; BSUH 17274.
- Carex grisea* Wahlenb.; Wood gray sedge, inflated narrow-leaf sedge; Woodlands; Abundant and widespread; C = 3; BSUH 17275.
- Carex hirsutella* Mack.; Hairy green sedge, fuzzy-wuzzy sedge; Upland woods; Common and widespread; C = 3; BSUH 17276.
- Carex hirtifolia* Mack.; Hairy wood sedge, pubescent sedge; Creek bank and field near western old-field; Infrequent; C = 5; BSUH 17277.
- (#) *Carex hystericina* Muhl. ex Willd.; Porcupine or bottlebrush sedge; Eastern meadow; Infrequent but locally common; C = 5; BSUH 17278.
- Carex jamesii* Schwein.; Grass sedge, James' sedge; Young successional woods north of creek; Abundant and widespread; C = 4; BSUH 17813.
- Carex laevivaginata* (Kük.) Mack.; Smooth-sheathed fox sedge; Northern meadow; Infrequent but locally common; C = 7; BSUH 17279.
- Carex laxiculmis* Schwein.; Weak-stemmed wood sedge, spreading sedge; Upland woods; Abundant and widespread; C = 7; BSUH 17935.
- (#) *Carex lupulina* Muhl. ex Willd.; Common hop sedge; Western old-field near seasonal pool; Rare; C = 4; BSUH 18061.
- Carex molesta* Mack. ex Bright; Field oval sedge, troublesome sedge; Western old-field; Common; C = 2; BSUH 17966.
- Carex normalis* Mack.; Spreading oval sedge, greater straw sedge; Old-fields and northern meadow; Common and widespread; C = 3; BSUH 17280.
- Carex radiata* (Wahlenb.) Small; Straight-styled wood sedge, eastern star sedge; Gravel lot, lawns, woodlands; Abundant and widespread; C = 4; BSUH 17765.
- Carex rosea* Schkuhr ex Willd.; Curly-styled wood sedge, rosy sedge; Upland woods; Infrequent but locally common; C = 5; BSUH 17933.
- Carex shortiana* Dewey; Short's sedge; Gravel lot and adjacent field; Infrequent; C = 3; BSUH 17796.
- Carex sparganioides* Muhl. ex Willd.; Loose-headed bracted sedge, bur-reed sedge; Fields and creek east of the entrance drive; Infrequent; C = 4; BSUH 17281.
- Carex stipata* Muhl. ex Willd. var. *stipata*; Common fox sedge, awlfruit sedge; Fields and creek east of entrance drive; Common; C = 2; BSUH 17282.
- Carex stricta* Lam.; Tussock sedge, upright sedge; Northern creek bank and meadow; Common; C = 5; BSUH 18063.
- (#) *Carex texensis* (Torr.) L.H. Bailey; Texas bracted sedge; Western old-field; Rare but locally common; C = 0; BSUH 17264. NOTE: a disjunct species north of its normal range.
- Carex tribuloides* Wahlenb. var. *tribuloides*; Awl-fruited oval sedge, blunt broom sedge; Western old-field, successional woods; Abundant; C = 5; BSUH 17971.
- (#) *Carex trichocarpa* Muhl. ex Willd.; Hairy-fruited lake sedge; Northern meadow; Rare but locally common; C = 4; BSUH 17283.
- Carex vulpinoidea* Michx. var. *vulpinoidea*; Brown fox sedge; Gravel lot and adjacent field; Rare but locally abundant; C = 2; BSUH 17749.
- Cyperus strigosus* L.; Long-scaled or false nut sedge, straw-colored flatsedge; Western old-field; Abundant and widespread in this field; C = 0; BSUH 17884.
- Eleocharis erythropoda* Steud.; Red-rooted or bald spike rush; Western old-field along seasonal pool; Rare but locally abundant; C = 2; BSUH 17318.
- Schoenoplectus tabernaemontani* (C.C. Gmel.) Palla; SYN: *Scirpus validus* Vahl; Great or soft-stemmed (softstem) bulrush; Northern meadow; Infrequent but locally common; C = 4; BSUH 17941.
- Scirpus atrovirens* Willd.; Dark green bulrush; Gravel lot and adjacent field; Infrequent; C = 4; BSUH 18001.
- Scirpus pendulus* Muhl.; Red or rufous bulrush; Edge of western old-field; Rare but locally common; C = 2; BSUH 17943.

Elaeagnaceae (Oleaster Family)

ELAEAGNUS UMBELLATA Thunb. var. *PARVIFOLIA* (Wall. ex Royle) C.K. Schneid.; Autumn olive; Near creek on entrance road; Rare; C = 0; BSUH 17810.

Euphorbiaceae (Spurge Family)

Acalypha rhomboidea Raf.; SYN: *Acalypha virginica* L. var. *rhomboidea* (Raf.) Cooperr.; Common three-seeded mercury; Woodlands, old-fields; Common and widespread C = 0; BSUH 17896.

Chamaesyce maculata (L.) Small; SYN: *Euphorbia maculata* L.; Milk purslane, spotted or creeping spurge, spotted sandmat; Lawn of the RTC Office, roadside; Infrequent but locally common; C = 0; BSUH 17910.

Chamaesyce nutans (Lag.) Small; SYN: *Euphorbia nutans* Lag.; (Small) Eyebane, nodding spurge; Gravel lot and adjacent field; Infrequent; C = 0; BSUH 17872.

Fabaceae (Pea or Bean Family)

Amphicarpaea bracteata (L.) Fernald; American hog-peanut; Northern meadow and moist path along the creek; Abundant; C = 5; BSUH 17876.

(#) *Apios americana* Medik.; Common groundnut, wild bean; Northern meadow and moist path along creek; Infrequent but locally common; C = 3; BSUH 17877.

Cercis canadensis L. var. *canadensis*; Eastern redbud; Woodlands; Infrequent; C = 3; BSUH 17847.

Desmodium canadense (L.) DC.; Canadian tick-trefoil, showy tick-trefoil; Pumpkin patch old-field; Common in this field; C = 3; BSUH 17297.

Gleditsia triacanthos L.; Honey locust; Western old-field; Infrequent; C = 1; BSUH 17982.

Gymnocladus dioica (L.) K. Koch; Kentucky coffeetree; Entrance Road near caretaker's house; Rare; C = 4; BSUH 18013.

MEDICAGO LUPULINA L.; Black medic; Large gravel lot and field along the entrance road; Infrequent; C = 0; BSUH 17790.

MELILOTUS ALBA Medik.; SYN: *Melilotus officinalis* (L.) Pall.; White sweet clover; Entrance Road, gravel lot and adjacent field; Common; C = 0; BSUH 17959.

MELILOTUS OFFICINALIS (L.) Lam.; Yellow sweet clover; Flagpole old-field; Infrequent; C = 0; BSUH 17741.

TRIFOLIUM HYBRIDUM L.; Alsike clover; Large gravel lot and adjacent field; Rare but locally common; C = 0; BSUH 17952.

TRIFOLIUM PRATENSE L.; Red clover; Large gravel lot and adjacent field, roadside; Infrequent; C = 0; BSUH 17787.

TRIFOLIUM REPENS L.; White clover; Large gravel lot and adjacent field, roadside; Infrequent but locally common; C = 0; BSUH 17791.

Fagaceae (Beech Family)

Quercus alba L.; White oak; Parking lot and lawn around the RTC Office, upland woods; Infrequent; C = 5; BSUH 17760.

Quercus imbricaria Michx.; Shingle-oak; Happy Hollow Camp Sites – successional woods; Rare; C = 3; BSUH 18045.

Quercus rubra L.; Northern red oak; Parking lot and lawn around the RTC Office, upland woods; Infrequent; C = 4; BSUH 17747.

Geraniaceae (Geranium Family)

Geranium maculatum L.; Wild geranium, spotted geranium; Upland woods; Common and widespread; C = 4; BSUH 17853.

Grossulariaceae (Currant Family)

Ribes cynosbati L.; Dogberry, eastern prickly gooseberry; Upland woods in the south half of property; Infrequent; C = 4; BSUH 17858.

Hippocastanaceae (Horse-chestnut Family)

Aesculus glabra Willd.; Ohio buckeye; Entrance Road near the caretaker's house; Rare; C = 5; BSUH 18002.

Hydrangeaceae (Hydrangea Family)

PHILADELPHUS INODORUS L.; Scentsless mock-orange; RTC Office lawn [planted]; Rare; C = 0; BSUH 17325. NOTE: This plant was removed following this study.

Hydrophyllaceae (Waterleaf Family)

Hydrophyllum macrophyllum Nutt.; Hairy or large-leaf waterleaf; Fields/lawns around buildings, woodlands; Abundant and widespread; C = 7; BSUH 17948.

Phacelia purshii Buckley; Miami mist; Fields and meadows along creek east of entrance road; Infrequent but locally common; C = 3; BSUH 17793.

Iridaceae (Iris Family)

Iris virginica L. var. *shrevei* (Small) E.S. Anderson; SYN: *Iris shrevei* Small; Southern blue flag, Shreve's iris; Northern meadow; Rare; C = 5; BSUH 17957.

Sisyrinchium angustifolium Mill.; Stout or narrowleaf blue-eyed grass; Old-fields; Infrequent but locally common; C = 3; BSUH 17954.

Juglandaceae (Walnut Family)

Carya cordiformis (Wangenh.) K. Koch; Bitternut hickory; Woodlands in the northern half of property; Common and widespread; C = 5; BSUH 17330.

Carya glabra (Mill.) Sweet; Pignut hickory; Upland woods; Common; C = 4; BSUH 17772.

Carya ovata (Mill.) K. Koch; Shagbark hickory; Upland woods; Common; C = 4; BSUH 17773.

Juglans nigra L.; Black walnut; Upland woods; Common; C = 2; BSUH 17774.

Juncaceae (Rush Family)

Juncus dudleyi Wiegand; SYN: *Juncus tenuis* Willd. var. *dudleyi* (Wiegand) F.J. Herm.; Dudley's rush; Large gravel lot and adjacent field; Infrequent; C = 2; BSUH 17939.

Juncus tenuis Willd.; Path or poverty rush; Successional woods in the northern half of the property; Common and widespread; C = 0; BSUH 17938.

(#) *Juncus torreyi* Cov.; Torrey's rush; Pumpkin patch old-field; Rare; C = 3; BSUH 17891.

(#) *Luzula multiflora* (Ehrh.) Lej.; Common wood rush; Upland woods; Infrequent; C = 6; BSUH 17854.

Lamiaceae (Mint Family)

Agastache nepetoides (L.) Kuntze; Catnip or yellow giant hyssop; Path from gravel lot to eastern meadow [open woods]; Rare; C = 4; BSUH 17880.

GLECHOMA HEDERACEA L.; Ground ivy, gill-over-the-ground, creeping Charlie; Old-fields,

successional woods, meadows; Abundant and widespread; C = 0; BSUH 17860.

LAMIUM AMPLEXICAULE L.; Henbit, dead nettle; Lawns, upland woods; Infrequent; C = 0; BSUH 17829.

LAMIUM PURPUREUM L. var. *PURPUREUM*; Purple dead nettle; Lawns and upland woods; Infrequent; C = 0; BSUH 17834.

Lycopus americanus Muhl. ex W.P.C. Barton; Common or American water horehound, American bugleweed; Northern meadow; Infrequent; C = 3; BSUH 17900.

Lycopus uniflorus Michx. var. *uniflorus*; Northern water horehound or bugleweed; Seasonal pool, creek banks, meadows; Infrequent; C = 5; BSUH 17919.

Mentha arvensis L.; SYN: *Mentha arvensis* L. var. *villosa* (Benth.) S.R. Stewart, *Mentha arvensis* L. var. *canadensis* (L.) Kuntze; Field or wild mint; Eastern meadow; Rare; C = 4; BSUH 17924.

Monarda fistulosa L. ssp. *fistulosa* var. *mollis* (L.) Benth.; Wild bergamot; Northern meadow and moist field along creek; Common; C = 3; BSUH 18055.

NEPETA CATARIA L.; Catnip; Entrance road, gravel lot and adjacent field; Rare but locally common; C = 0; BSUH 17991.

PRUNELLA VULGARIS L. ssp. *VULGARIS*; Common self heal, lawn prunella, heal-all; Western old-field, lawns; Infrequent; C = 0; BSUH 18000.

Scutellaria incana Biehler var. *incana*; Downy or hoary skullcap; Open woodlands north of eastern meadow, i.e., path between entrance road at the bridge and eastern meadow; Rare but locally common; C = 4; BSUH 17994.

Scutellaria lateriflora L. var. *lateriflora*; Mad-dog skullcap, blue skullcap; Seasonal pool, successional woods north of western old-field; Infrequent; C = 4; BSUH 17883.

Stachys tenuifolia Willd.; SYN: *Stachys tenuifolia* Willd. var. *hispida* (Pursh) Fernald, *Stachys hispida* Pursh; Smooth hedge-nettle; Eastern meadow; Infrequent; C = 4; BSUH 17996.

Teucrium canadense L. var. *canadense*; SYN: *Teucrium canadense* L. var. *virginicum* (L.) Eaton; Canadian (American) germander; Entrance road, gravel lot and adjacent field; Open successional woods; Infrequent but locally common; C = 3; BSUH 17989.

Lauraceae (Laurel Family)

Lindera benzoin (L.) Blume var. *benzoin*; Northern or hairy spice bush; Woodlands; Infrequent but locally common; C = 5; BSUH 17848.

Sassafras albidum (Nutt.) Nees; Sassafras; Woodlands east of entrance road, between Happy Hollow Camp Site and caretaker's house; Rare; C = 1; BSUH 17754.

Lemnaceae (Duckweed Family)

Lemna minor L.; Lesser, small, or common duckweed; Northern meadow; Locally abundant in a small pool; C = 3; BSUH 17803.

Liliaceae (Lily Family)

Allium burdickii (Hanes) A.G. Jones; SYN: *Allium tricoccum* Aiton var. *burdickii* Hanes; Narrow-leaf wild leek; Upland woods; Abundant and widespread; C = 6; BSUH 17782.

Allium canadense L. var. *canadense*; Wild or meadow garlic; Woodland near RTC Office; Infrequent; C = 1; BSUH 17323.

(#) *ASPARAGUS OFFICINALIS* L.; Garden asparagus; Gravel lot and adjacent field; Rare; C = 0; BSUH 17992.

Camassia scilloides (Raf.) Cory; Early-blooming wild hyacinth, Atlantic camas; Upland woods; Rare; C = 5; BSUH 17817.

(#) *HEMEROCALLIS FULVA* (L.) L.; Orange day lily; Entrance Road, gravel lot and adjacent field; Infrequent; C = 0; BSUH 17960.

Maianthemum racemosum (L.) Link ssp. *racemosum*; SYN: *Smilacina racemosa* (L.) Desf.; Feathery false Solomon's seal, feathery Solomon's plume, feathery false lily of the valley; Fields and meadows near creek east of entrance road; Infrequent; C = 4; BSUH 17755.

NARCISSUS PSEUDONARCISSUS L.; Daffodil; Lawn and woodlands around the RTC Office; Rare; C = 0; BSUH 17833.

Polygonatum biflorum (Walter) Elliott var. *biflorum*; Small or smooth Solomon's seal; Slope woods between RTC Office and northern meadow, woodlands; Abundant; C = 4; BSUH 17320.

Polygonatum biflorum (Walter) Elliott var. *commutatum* (Schult. & Schult. f.) Morong; Giant or smooth Solomon's seal; Fields and meadows near creek east of entrance road; Infrequent; C = 4; BSUH 17795.

Trillium sessile L.; Toadshade, sessile trillium, sessile-flowered wake-robin; Lawn around the RTC Office, upland woods; Abundant; C = 4; BSUH 17832.

Limnanthaceae (Meadow-foam Family)

Floerkea proserpinacoides Willd.; False mermaid-weed; Upland woods; Infrequent but locally abundant; C = 5; BSUH 17825.

Lythraceae (Loosestrife Family)

Lythrum alatum Pursh var. *alatum*; Winged loosestrife, winged lythrum; Pumpkin patch old-field; Rare; C = 5; BSUH 17977.

Magnoliaceae (Magnolia Family)

Liriodendron tulipifera L.; Tulip poplar, tulip tree, yellow poplar; Parking lot and lawn around the RTC Office; Rare; C = 4; BSUH 17762.

Malvaceae (Mallow Family)

ABUTILON THEOPHRASTI Medik.; Velvetleaf; Gravel lot and adjacent field; Rare; C = 0; BSUH 17287.

HIBISCUS TRIONUM L.; Flower-of-an-hour; Northern border of western old-field; Rare; C = 0; BSUH 17291.

SIDA SPINOSA L.; Prickly sida, prickly mallow, prickly fan-petals; Northern border of western old-field; Infrequent; C = 0; BSUH 17928.

Menispermaceae (Moonseed Family)

Menispermum canadense L.; Common moonseed; Woodlands; Common; C = 3; BSUH 17806.

Moraceae (Mulberry Family)

MORUS ALBA L.; SYN: *Morus tatarica* L.; White mulberry; Woodlands; Infrequent but widespread; C = 0; BSUH 17761.

Morus rubra L. var. *rubra*; Red mulberry; Upland woods; Infrequent; C = 4; BSUH 17771.

Oleaceae (Olive Family)

Fraxinus americana L.; White ash; Woodlands; Common and widespread; C = 4; BSUH 17756.

Fraxinus pennsylvanica Marsh.; SYN: *Fraxinus pennsylvanica* Marsh. var. *subintegerrima* (Vahl) Fernald, *F. pennsylvanica* Marsh. var. *lanceolata* (Borkh.) Sarg.; Green ash; Woodlands; Common and widespread; C = 1; BSUH 17786.

LIGUSTRUM OBTUSIFOLIUM Siebold & Zucc.; Border privet; Woodlands, especially in the northern half of the property; Abundant and widespread; C = 0; BSUH 17735.

Onagraceae (Evening Primrose Family)

Circaea lutetiana L. ssp. *canadensis* (L.) Asch. & Magnus; Common or broadleaf enchanter's nightshade; Woodlands; Abundant and widespread; C = 2; BSUH 18009.

Epilobium coloratum Biehler; Eastern, cinnamon, or purple-leaf willow-herb; Eastern meadow; Infrequent; C = 3; BSUH 17913.

Gaura biennis L.; Biennial gaura, biennial bee-blossom; Pumpkin patch old-field; Rare; C = 3; BSUH 17888.

Ludwigia palustris (L.) Elliott; Common water purslane, marsh purslane, marsh seedbox; Creek at bridge on entrance road, east side of road; Rare but locally abundant; C = 3; BSUH 17926.

Oenothera biennis L.; Common evening primrose; Gravel lot and adjacent fields; Rare; C = 0; BSUH 18015.

Orchidaceae (Orchid Family)

Aplectrum hyemale (Muhl. ex Willd.) Torr.; Putty-root orchid, Adam and Eve; Successional woods

north of the RTC Office; Infrequent; C = 7; BSUH 17818.

(#) *Spiranthes ovalis* Lindl. var. *erostellata* Catling; Lesser ladies tresses, October lady's tresses; Lawn of RTC Office; Rare; C = 3; BSUH 17286. [Watch List]

Oxalidaceae (Wood Sorrel Family)

Oxalis stricta L. Upright yellow wood sorrel, common yellow oxalis; Gravel lot and adjacent field; Common; C = 0; BSUH 17788.

Papaveraceae (Poppy Family)

Sanguinaria canadensis L.; Bloodroot; Lawn and woodlands around the RTC Office; Infrequent; C = 5; BSUH 17838.

Phytolaccaceae (Pokeweed Family)

Phytolacca americana L. var. *americana*; American pokeweed or pokeberry; Entrance Road, gravel lot and adjacent fields, open woodlands; Common and widespread; C = 0; BSUH 17958.

Plantaginaceae (Plantain Family)

PLANTAGO LANCEOLATA L.; English or narrow-leaf plantain, buckhorn; Roadside, parking area and lawns around buildings, gravel lot and adjacent fields; Infrequent but widespread; C = 0; BSUH 17950.

Plantago rugelii Decne. var. *rugelii*; American, purple-stemmed or blackseed plantain; Entrance Road, gravel lot and adjacent fields, open woodlands; Abundant and widespread; C = 0; BSUH 17887.

Platanaceae (Plane-tree Family)

Platanus occidentalis L.; American sycamore, buttonwood; Creek banks near northern meadow and SE corner of property; Infrequent; C = 3; BSUH 18060.

Poaceae (Grass Family)

(#) *AGROSTIS GIGANTEA* Roth; SYN: *Agrostis alba* auct. non L.; Redtop; Pumpkin patch old-field; Common; C = 0; BSUH 17970.

Agrostis perennans (Walter) Tuck.; Autumn or upland bent-grass, thin-grass; Lawn around buildings; Common; C = 2; BSUH 17929.

(#) *Andropogon virginicus* L. var. *virginicus*; Broom-sedge, Virginia bluestem; Western old-field; Infrequent; C = 1; BSUH 17284.

BROMUS COMMUTATUS Schrad.; SYN: *Bromus racemosum* L.; Hairy chess, also hairy, meadow, or bald brome; Pumpkin patch old-field; Infrequent; C = 0; BSUH 17967.

BROMUS INERMIS Leyss.; Smooth or Hungarian brome; Gravel lot and adjacent field, old-fields;

- Common and locally abundant; C = 0; BSUH 17942.
- Bromus pubescens* Muhl. ex Willd.; Hairy woodland brome; Parking area and lawns around the buildings; Infrequent; C = 4; BSUH 17267.
- BROMUS TECTORUM* L.; Junegrass, cheatgrass, downy chess, or downy brome; Gravel lot and adjacent field; Infrequent; C = 0; BSUH 17750.
- Cinna arundinacea* L.; Common or sweet woodreed; Northern meadow, woodlands; Abundant and widespread; C = 4; BSUH 18041.
- DACTYLIS GLOMERATA* L.; Orchard grass; Parking lot and lawns around the RTC Office; Infrequent; C = 0; BSUH 17766.
- Danthonia spicata* (L.) P. Beauv. ex Roem. & Schult.; Poverty oatgrass; Flagpole path and old-field; Abundant here; C = 3; BSUH 17326.
- Dichanthelium acuminatum* (Sw.) Gould & C.A. Clark var. *fasciculatum* (Torr.) Freckmann; SYN: *Panicum implicatum* Scribn., *Panicum lanuginosum* Elliot var. *implicatum* (Scribn.) Fernald; Woolly, western, or old-field panic grass; Western old-field; Locally abundant; C = 2; BSUH 17331.
- (#) *DIGITARIA CILIARIS* (Retz.) Koeler; SYN: *Digitaria sanguinalis* (L.) Scop. var. *ciliaris* (Retz.) Parl.; Southern crab-grass; Lawn of RTC Office; Rare but locally common; C = 0; BSUH 17886.
- DIGITARIA SANGUINALIS* (L.) Scop.; Northern or hairy crab-grass; Roadside, gravel lot and adjacent field; Common; C = 0; BSUH 17965.
- ECHINOCHLOA CRUS-GALLI* (L.) P. Beauv.; Barnyard-grass; Entrance road, gravel lot, and adjacent field; Infrequent; C = 0; BSUH 17266.
- Echinochloa muricata* (P. Beauv.) Fernald var. *muricata*; Rough-barnyard grass; Seasonal pool adjacent to western old-field; Rare but locally abundant; C = 1; BSUH 17265.
- ELEUSINE INDICA* (L.) Gaertn.; Yard grass; Indian goose-grass; crowfoot grass; Lawn and drive at RTC Office; Infrequent; C = 0; BSUH 18030.
- Elymus hystrix* L. var. *hystrix*; SYN: *Hystrix patula* Moench; Eastern bottlebrush grass; Upland woods adjacent to eastern meadow; Rare but locally frequent; C = 5; BSUH 18029.
- (#) *Elymus macgregorii* R. Brooks & J.J.N. Campb; Early wild rye; Creek bank near entrance road, north of bridge and east side of road; Infrequent; C = 3; BSUH 17968.
- ELYMUS REPENS* (L.) Gould; SYN: *Elytrigia repens* (L.) Desv. ex Nevski.; Quack grass; Entrance road, gravel lot and adjacent field; Infrequent; C = 0; BSUH 18057.
- Elymus villosus* Muhl. ex Willd.; Downy or hairy wild rye; Woodlands; Abundant and widespread; C = 4; BSUH 17969.
- Festuca subverticillata* (Pers.) E. Alexeev; SYN: *Festuca obtusa* Biehler; Nodding fescue; Woodlands; Abundant and widespread; C = 4; BSUH 17312.
- Glyceria striata* (Lam.) Hitchc.; Fowl manna-grass; Meadows and creek banks; Abundant; C = 4; BSUH 17328.
- (#) *HOLCUS LANATUS* L.; Common velvet-grass; Western old-field; Abundant; C = 0; BSUH 17327.
- HORDEUM JUBATUM* L. ssp. *JUBATUM*; Fox-tail barley; Gravel lot and adjacent field; Rare; C = 0; BSUH 17746.
- Leersia oryzoides* (L.) Sw.; Rice cut-grass; Wet meadows, especially the eastern meadow; Infrequent but locally abundant; C = 2; BSUH 17307.
- Leersia virginica* Willd.; White-grass; Woodlands; Abundant; C = 4; BSUH 17930.
- (#) *Muhlenbergia frondosa* (Poir.) Fernald; Common satin-grass, wirestem muhly; Creek bank and meadow in SE corner; Infrequent but locally common; C = 3; BSUH 17911.
- Muhlenbergia schreberi* J.F. Gmel.; Nimblewill; Gravel lot and adjacent field; Abundant; C = 0; BSUH 18033.
- Panicum dichotomiflorum* Michx. var. *dichotomiflorum*; Knee grass, fall panic grass; Entrance road, gravel lot and adjacent field; Infrequent; C = 0; BSUH 17306.
- Panicum philadelphicum* Bernh. ex Trin.; Philadelphia panic grass; Entrance road, gravel lot and adjacent field; Infrequent; C = 4; BSUH 17305.
- (#) *PHALARIS ARUNDINACEA* L.; Reed canary grass; Large gravel lot and adjacent fields, creek bank; Common here; C = 0; BSUH 17945.
- PHLEUM PRATENSE* L.; Timothy; Pumpkin patch old-field; Common; C = 0; BSUH 18058.
- (#) *Phragmites australis* (Cav.) Trin. ex Steud.; Common reed; Eastern meadow; Rare but locally common; C = 0; BSUH 17881. NOTE: it is the native genotype.
- POA ANNUA* L.; Annual bluegrass, speargrass; Lawn and roadside near RTC Office; Common and widespread; C = 0; BSUH 17309.
- POA COMPRESSA* L.; Canada bluegrass; Flagpole path and old-field, woodlands; Abundant; C = 0; BSUH 17946.
- POA PRATENSIS* L. ssp. *PRATENSIS*; Kentucky bluegrass; Old-fields, roadside, and open woodlands; Abundant; C = 0; BSUH 17759.
- Poa sylvestris* A. Gray; Forest or woodland bluegrass; Woodlands; Abundant and widespread; C = 5; BSUH 17797.
- POA TRIVIALIS* L.; Rough bluegrass; Northern meadow and creek bank; Abundant; C = 0; BSUH 17329.
- SCHEDONORUS ARUNDINACEUS* (Schreb.) Dumort.; SYN: *Schedonorus phoenix* (Scop.) Holub, *Lolium arundinaceum* (Schreb.) S.J. Darbyshire, *Festuca arundinacea* Schreb., *Festuca elatior* L. var. *arundinacea* (Schreb.) Hook; Tall

fescue; Fields and roadsides; Abundant; C = 0; BSUH 17944.

SETARIA FABERI Herrm.; Nodding or giant foxtail-grass, Japanese bristlegrass; Entrance road, gravel lot and adjacent fields; Infrequent; C = 0; BSUH 18024.

SETARIA PUMILA (Poir.) Roem. & Schult. ssp. *PUMILA*; SYN: *Setaria glauca* (L.) P. Beauv.; Yellow foxtail-grass; Gravel lot and adjacent field; Infrequent; C = 0; BSUH 17909.

SORGHUM HALEPENSE (L.) Pers.; Johnson-grass; Gravel lot and adjacent field; Rare; C = 0; BSUH 17986.

Tridens flavus (L.) Hitchc. var. *flavus*; SYN: *Triodia flava* (L.) Smyth; Purpletop, purpletop tridens; Pumpkin patch old-field; Infrequent; C = 1; BSUH 18031.

Polemoniaceae (Phlox Family)

Phlox divaricata L. ssp. *divaricata*; Wild blue or woodland phlox; Young successional woods northern half of property; Abundant and widespread; C = 5; BSUH 17866.

Phlox paniculata L.; Garden, summer, or fall phlox; Creek bank near northern meadow; Rare; C = 3; BSUH 17979.

Polemonium reptans L. var. *reptans*; Greek valerian, spreading Jacob's-ladder; Young successional woods northern half of property; Common and widespread; C = 5; BSUH 17865.

Polygonaceae (Smartweed Family)

Fallopia scandens (L.) Holub; SYN: *Polygonum scandens* L. var. *scandens*; Climbing false buckwheat; Pumpkin patch old-field, woodland edges; Abundant and widespread; C = 0; BSUH 17293.

(#) *PERSICARIA CESPITOSA* (Blume) Nakai, var. *LONGISETA* (Bruijn) C. F. Reed; SYN: *Polygonum cespitosum* Blume var. *longisetum* (Bruijn) A.N. Steward, *Polygonum longisetum* Bruijn, *Persicaria longiseta* (Bruijn) Kitagawa; Creeping smartweed, Oriental lady's thumb; Pumpkin patch old-field, woodlands; Abundant and widespread; C = 0; BSUH 17963.

Persicaria pensylvanica (L.) Small; SYN: *Polygonum pensylvanicum* L.; Pinkweed, Pennsylvania smartweed; Large seasonal pool west side of western old-field; Infrequent but locally abundant; C = 0; BSUH 17916.

PERSICARIA MACULOSA Gray.; SYN: *Persicaria vulgaris* Webb & Moq., *Persicaria maculata* (Raf.) Gray, *Polygonum persicaria* L., *Polygonum dubium* Stein; Spotted lady's-thumb; Entrance road, gravel lot and adjacent field; Infrequent; C = 0; BSUH 18048.

Persicaria punctata (Elliott) Small var. *leptostachya* (Meisn.) Small; SYN: *Polygonum punctatum* Elliott var. *confertiflorum* (Meisn.) Fassett; SYN: Dotted or water smartweed; Creek bank and

sandy shoreline north of western old-field; Infrequent, but locally common; C = 3; BSUH 17875.

POLYGONUM AVICULARE L.; SYN: *Polygonum monspeliense* Pers.; Doorweed, common or prostrate knotweed; Lawns around the buildings, roadside; Infrequent; C = 0; BSUH 17923.

RUMEX ACETOSELLA L.; Field sorrel, common sheep sorrel; Western old-field; Rare but locally abundant; C = 0; BSUH 17800.

RUMEX CRISPUS L. ssp. *CRISPUS*; Curly dock, sour dock; Gravel lot and adjacent field; Infrequent; C = 0; BSUH 17752.

RUMEX OBTUSIFOLIUS L.; Bitter dock, blunt-leaved dock; Entrance road, gravel lot and adjacent field; Common; C = 0; BSUH 18062.

Tovara virginiana (L.) Raf.; SYN: *Polygonum virginianum* L., *Persicaria virginiana* (L.) Gaertn.; Jumpseed, Virginia knotweed; Successional woods north of creek; Abundant and widespread; C = 3; BSUH 18018.

Portulacaceae (Purslane Family)

Claytonia virginica L. var. *virginica*; Virginia spring beauty; Woodlands and fields; Abundant; C = 2; BSUH 17831.

Primulaceae (Primrose Family)

Lysimachia ciliata L.; Fringed loosestrife; Field/open woods from entrance road at the bridge to eastern meadow; Common; C = 4; BSUH 17993.

Samolus valerandi L. ssp. *parviflorus* (Raf.) Hultén; SYN: *Samolus floribundus* Kunth, *Samolus parviflorus* Raf.; Seaside brookweed, water pimpernel; Eastern meadow; Rare; C = 5; BSUH 17914.

Ranunculaceae (Buttercup Family)

Anemone virginiana L. var. *virginiana*; Tall anemone or thimbleweed; Pumpkin patch old-field; Rare; C = 4; BSUH 18052.

Caltha palustris L. var. *palustris*; Marsh marigold, cowslip; Meadow in SE corner of property; Rare but locally abundant; C = 7; BSUH 17849.

Hepatica nobilis Schreb. var. *acuta* (Pursh) Steyerl.; SYN: *Hepatica acutiloba* DC., *Anemone acutiloba* (DC.) G. Lawson; Sharp-lobed hepatica; Hillside woods between office and northern meadow; Rare; C = 8; BSUH 17815.

Hydrastis canadensis L.; Goldenseal, yellowroot; Creek bank and meadow in the SE corner of property; Rare but locally common; C = 7; BSUH 17784. [Watch List]

Ranunculus abortivus L.; Kidney-leaved or little-leaf buttercup or crowfoot, small-flowering crowfoot; Lawn and woodlands around the RTC Office, moist woodlands; Common; C = 0; BSUH 17842.

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; Creek bank and eastern meadow; Common and locally abundant; C = 10; BSUH 17821.

Thalictrum revolutum DC.; Waxy-leaved or skunk meadow rue; Northern meadow and creek bank; Common; C = 5; BSUH 17737.

Rosaceae (Rose Family)

(#) *Agrimonia gryposepala* Wallr.; Tall hairy or common agrimony; Upland woods; Common and widespread; C = 2; BSUH 17997.

Agrimonia parviflora Aiton; Southern, swamp, or small-flowered agrimony, harvestlice; Border of western old-field; Infrequent; C = 4; BSUH 18037.

Agrimonia pubescens Wallr.; Downy or soft agrimony; Creek bank and succession woods east of entrance road; Infrequent; C = 5; BSUH 18017.

Crataegus mollis Scheele; Downy hawthorn; Successional woods south of the western old-field and seasonal pool; Infrequent; C = 2; BSUH 17777.

Crataegus punctata Jacq.; Dotted hawthorn; Successional woods north of the western old-field; Infrequent; C = 2; BSUH 17776.

(#) *DUCHESNEA INDICA* (Andrews) Focke; Mock or Indian strawberry; Lawns, woodland edges, fields; Common; C = 0; BSUH 17816.

Geum canadense Jacq. var. *canadense*; White avens; Woodlands; Abundant; C = 1; BSUH 18008.

Geum laciniatum Murray; Rough avens; Eastern meadow; Rare; C = 3; BSUH 17892.

Geum vernum (Raf.) Torr. & A. Gray; Spring avens; Woodlands; Abundant; C = 1; BSUH 17864.

Potentilla norvegica L. ssp. *monspeiliensis* (L.) Asch. & Graebn. Rough or Norwegian cinquefoil; Pumpkin patch old-field; Rare but locally common; C = 0; BSUH 17976.

POTENTILLA RECTA L.; Sulfur cinquefoil, sulfur five-fingers; Western old-field; Rare; C = 0; BSUH 17739.

Potentilla simplex Michx.; Common or old-field cinquefoil, old-field five-fingers; Upland woods; Rare but locally common; C = 2; BSUH 17802.

Prunus serotina Ehrh. var. *serotina*; Wild black cherry; Woodlands; Abundant and widespread; C = 1; BSUH 17781.

ROSA MULTIFLORA Thunb.; Japanese or multiflora rose; Woodlands; Abundant and widespread; C = 0; BSUH 17949.

Rosa setigera Michx. var. *setigera*; Climbing prairie rose, Illinois rose; Eastern meadow, western old-field; Infrequent; C = 4; BSUH 18011.

Rubus allegheniensis Porter; Common or Allegheny blackberry; Gravel lot and adjacent field, old-fields; Common; C = 2; BSUH 17768.

Rubus occidentalis L.; Black raspberry; Parking lot and yards around the RTC Office, old-fields; Common; C = 1; BSUH 17764.

Rubus pensilvanicus Poir.; SYN: *Rubus abactus* L.H. Bailey; Pennsylvania or Yankee blackberry; Western old-field; Common; C = 5; BSUH 17315.

Rubiaceae (Madder Family)

Cephalanthus occidentalis L.; Common buttonbush; Eastern meadow; Rare; C = 5; BSUH 18004.

Galium aparine L.; Cleavers, annual bedstraw, sticky-willy; Upland woods; Abundant and widespread; C = 1; BSUH 17869.

Galium circaezans Michx. var. *circaezans*; Forest bedstraw, smooth wild licorice, licorice bedstraw; Upland woods around buildings; Abundant in this area; C = 7; BSUH 17313.

Galium concinnum Torr. & A. Gray; Shining bedstraw; Woodlands; Common; C = 5; BSUH 17736.

(#) *Galium tinctorium* (L.) Scop.; Stiff marsh bedstraw; Eastern meadow; Infrequent but locally common; C = 6; BSUH 18026.

Galium triflorum Michx.; Sweet-scented or fragrant bedstraw; Meadows and creek banks, moist woodlands; Abundant and widespread; C = 5; BSUH 17973.

Salicaceae (Willow Family)

Populus deltoides Bartram ex. Marsh. var. *deltoides*; Eastern cottonwood; Successional woods in the northern half of property; Abundant and widespread; C = 1; BSUH 17751.

Salix amygdaloides Andersson; Peach-leaf willow; Western old-field; Rare; C = 4; BSUH 17308.

Salix nigra Marsh.; Black willow; Eastern meadow; Rare; C = 3; BSUH 18003.

Scrophulariaceae (Figwort Family)

Mimulus alatus Aiton; Winged or sharp-wing monkey-flower; Northern meadow and moist path along creek; Common; C = 4; BSUH 18053.

Mimulus ringens L. var. *ringens*; Allegheny monkey-flower; Eastern meadow; Common; C = 4; BSUH 18038.

Penstemon calycosus Small; SYN: *Penstemon laevigatus* Ait. ssp. *calycosus* (Small) Benn.; Smooth beard-tongue, long-sepal beard-tongue; Near screen building in the western old-field; Rare but locally common; C = 4; BSUH 17314.

Scrophularia marilandica L.; Eastern or late figwort, carpenter's-square; Happy Hollow Camp Sites – successional woods; Rare; C = 5; BSUH 18046.

VERBASCUM BLATTARIA L.; Moth mullein; Gravel lot and adjacent field; Rare; C = 0; BSUH 17744.

VERBASCUM THAPSUS L.; Common or woolly mullein; Gravel lot and adjacent field; Rare but locally common; C = 0; BSUH 17961.

Veronica anagallis-aquatica L.; SYN: *Veronica catenata* Pennell; Water speedwell; Eastern meadow; Common; C = 5; BSUH 17321.

VERONICA ARVENSIS L.; Corn speedwell; Old-fields; Abundant; C = 0; BSUH 17855.

(#) *VERONICA PERSICA* Poir.; Birdseye speedwell; Gravel lot and adjacent field; Rare but locally common; C = 0; BSUH 17937.

VERONICA POLITA Fr.; Gray field or wayside speedwell; Lawn and woodlands around the RTC Office; Infrequent but locally common; C = 0; BSUH 17819.

VERONICA SERPYLLIFOLIA L. ssp. *SERPYL-LIFOLIA*; Thyme-leaved speedwell; Old-fields; Abundant; C = 0; BSUH 17856.

Simaroubaceae (Quassia Family)

AILANTHUS ALTISSIMA (Mill.) Swingle; Tree-of-heaven; Successional woods in the northern half of property; Infrequent but widespread; C = 0; BSUH 17995.

Smilacaceae (Catbrier Family)

Smilax ecirrhata (Engelm. ex Kunth) S. Watson; Upright carrion flower; Woodlands; Infrequent; C = 5; BSUH 17748.

Smilax tamnoides L.; SYN: *Smilax hispida* Muhl. ex Torr., *Smilax tamnoides* L. var. *hispida* (Muhl. ex Torr.) Fernald; Bristly greenbrier or catbrier; Eastern meadow, woodlands; Common and widespread; C = 3; BSUH 17792.

Solanaceae (Nightshade Family)

Physalis longifolia Nutt. var. *subglabrata* (Mack. & Bush) Cronquist; SYN: *Physalis subglabrata* Mack. & Bush; Long-leaved or smooth ground cherry; Western old-field; Rare; C = 0; BSUH 17927.

Solanum carolinense L. var. *carolinense*; Horse-nettle, Carolina poppy; Pumpkin patch old-field; Common; C = 0; BSUH 18050.

Solanum ptycanthum Dunal; SYN: *Solanum nigrum* auct. non L., *Solanum americanum* auct. non Mill.; Eastern black nightshade, West Indian nightshade; Seasonal pool north of the western old-field; Rare; C = 0; BSUH 17918.

Typhaceae (Cattail Family)

TYPHA ANGUSTIFOLIA L.; Narrow-leaved cattail; Meadows; Rare; C = 0; BSUH 18028.

Typha latifolia L.; Common or broad-leaved cattail; Meadows; Rare but locally common; C = 1; BSUH 17893.

Ulmaceae (Elm Family)

Celtis occidentalis L.; Northern or common hackberry; Woodlands; Abundant; C = 3; BSUH 17317.

Ulmus americana L.; White or American elm; Woodlands; Abundant; C = 3; BSUH 17799.

Ulmus rubra Muhl.; Red or slippery elm; Woodlands; Common; C = 3; BSUH 17956.

Urticaceae (Nettle Family)

Boehmeria cylindrica (L.) Sw.; Small-spike false nettle; Meadows; Infrequent but locally common; C = 3; BSUH 17899.

Laportea canadensis (L.) Weddell; SYN: *Urtica canadensis* L.; Canadian wood nettle; Moist woodlands; Abundant; C = 2; BSUH 17901.

Parietaria pensylvanica Muhl. ex Willd.; Pennsylvania pellitory; Western old-field; Infrequent but locally abundant; C = 1; BSUH 17902.

(#) *Pilea fontana* (Lunell) Rydb.; Bog or lesser clearweed; Northern meadow; Rare; C = 5; BSUH 17298.

Pilea pumila (L.) A. Gray var. *pumila*; Canadian clearweed; Creek bank, moist old-fields, woodlands; Abundant and widespread; C = 2; BSUH 17304.

Urtica dioica L. ssp. *gracilis* (Aiton) Seland.; SYN: *Urtica dioica* L. var. *procera* (Muhl. ex Willd.) Weddell, *Urtica procera* Muhl. ex Willd.; Tall, California, or stinging nettle; Creek banks and meadows; Infrequent but locally common; C = 1; BSUH 17974.

Valerianaceae (Valerian Family)

Valerianella umbilicata (Sull.) Alph. Wood; Navel or navel-fruited cornsalad; Young successional woods north of the creek; Abundant; C = 5; BSUH 17811.

Verbenaceae (Vervain Family)

Phryma leptostachya L.; American lopseed; Woodland; Common; C = 4; BSUH 18007.

Phyla lanceolata (Michx.) Greene; SYN: *Lippia lanceolata* Michx.; Lance-leaf fogfruit; West old-field bordering large seasonal pool; Rare but locally common; C = 2; BSUH 17999.

Verbena hastata L. var. *hastata*; Common or blue vervain, swamp verbena; Entrance road, gravel lot and adjacent field; Rare but locally common; C = 3; BSUH 17990.

Verbena urticifolia L. var. *urticifolia*; White vervain; Creek bank and meadow in SE corner of property; Infrequent; C = 3; BSUH 17998.

Violaceae (Violet Family)

Viola pubescens Aiton; Forest yellow violet; Lawn and woodlands; Abundant and widespread; C = 5; BSUH 17828. [Watch List]

Viola sororia Willd.; Common blue violet, dooryard violet; Lawn and woodlands; Abundant and widespread; C = 1; BSUH 17844.

Viola striata Aiton; Striped cream violet, cream violet, white violet; Lawn and woodlands; Abundant and widespread; C = 4; BSUH 17841.

Vitaceae (Grape Family)

- Parthenocissus quinquefolia* (L.) Planch.; Virginia creeper, woodbine; Woodlands; Abundant; C = 2; BSUH 17763.
- Vitis cinerea* (Engelm.) Engelm. ex Millard var. *cinerea*; Graybark or winter grape; On shrubs between the eastern meadow and creek; Rare but locally abundant; C = 4; BSUH 17985.
- Vitis riparia* Michx.; Riverbank grape; Roadside, gravel lot and adjacent field; Rare; C = 1; BSUH 18032.
- Vitis vulpina* L.; Frost or fox grape; Woodlands; Common and widespread; C = 3; BSUH 17769.

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