

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

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**ABSTRACT.** Owned by the Red-tail Land Conservancy, Dutro Woods Nature Preserve (DWNP) is a 6.8 ha (16.7 acres) site located on State Road 32 in west-central Muncie, Indiana, Delaware County. An inventory of the vascular flora indicates that the urban site harbors considerable plant diversity with 240 taxa representing 164 genera and 63 families. Of the 240 taxa, 136 (57%) are native and 104 (43%) are non-native (exotic). The percent of non-native taxa is high when compared to other studies in east-central Indiana (typically between 18–25%). Thirty species represent Delaware County Records. In addition, seven species documented at DWNP are reported for the first time in Delaware County; however, they are not considered county records since they have not naturalized at the site. *Tilia cordata* represents a state record. No species occur on the IDNR list of endangered, threatened, or rare plants. The 12 families containing approximately 62% of the documented species are Asteraceae (31 spp.), Poaceae (27 spp.), Cyperaceae (16 spp.), Rosaceae (16 spp.), Fagaceae (eight spp.), Liliaceae (eight spp.), Polygonaceae (eight spp.), Brassicaceae (seven spp.), Fabaceae (seven spp.), Lamiaceae (seven spp.), Caprifoliaceae (five spp.), and Caryophyllaceae (five spp.). No species of the Ranunculaceae were observed. A physiognomic analysis reveals that the native species consist of 42 woody species, 65 herbaceous vines or forbs, 27 graminoids, and two ferns. Of the 104 exotics, 26 are woody, 61 are herbaceous vines or forbs, and 17 are grasses. The flora at DWNP is predominately low fidelity (low C-value), i.e., 87.9% (211 spp.) of the taxa have C-values  $\leq 3$ , and only 4.6% (11 taxa) have C-values  $\geq 5$ . For native species only, the FQI = 25.0 and the mean Coefficient of Conservatism (mean C) is 2.2. For all species FQI = 18.6 and the mean C = 1.2. These numbers suggest that DWNP lacks or has not returned to remnant natural quality. The high percentage of non-native species is discussed from the standpoint of secondary succession at the site since the early 1980s.

**Keywords:** Floristic quality index (FQI), county records, vascular plants, flora – Indiana, old-field flora

### INTRODUCTION

Unlike other sites previously inventoried in east-central Indiana, Dutro Woods Nature Preserve (DWNP) has experienced extensive human exploitation, being the site of Ernst Nursery until the early 1980s. Two previous study sites, which have experienced considerable, but much less, human impact, are Munsee Woods Nature Preserve (FQI = 55.0; mean C = 3.2) formerly known as Camp Munsee, a girl scout camp (Prast et al. 2014), and Mississinewa Woods (FQI = 46.2; mean C = 3.0), a floodplain woodland with a former hay field and trails (Ruch et al. 2012). Despite the negative impact of human activity at these sites

on the floral communities, the FQIs of both sites suggest that they are of nature preserve quality possessing some noteworthy remnants of natural heritage of the region.

After conducting a visual examination of DWNP in the fall of 2012 and late winter of 2013, it was evident that human activities of the former nursery had severely impacted the floral communities to the extent that remnant natural quality was likely lacking. Nonetheless, the research team decided to study DWNP with the overall goal of documenting the floristic recovery of an urban site in the intermediate term (ca. 30 years). It was a further goal to validate the performance of Floristic Quality Assessment within a diverse, but compromised community. As with previous studies, the analysis included (1) an inventory of the vascular flora; (2)

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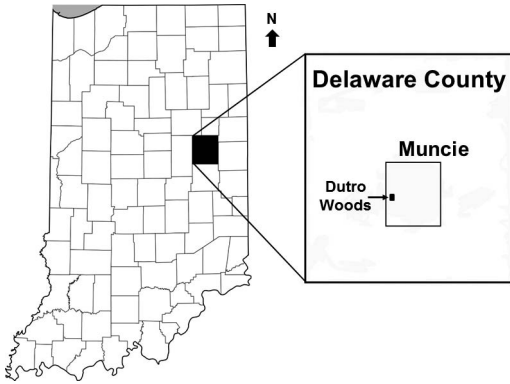


Figure 1.—Map indicating the location of Duto Woods Nature Preserve in west-central Muncie, Delaware County (right), and the location of Delaware County within the state of Indiana (left). The site is on the south side of State Road 32.

determination of floristic quality metrics; (3) description of the various habitats and floral dominance for each; and (4) identification of areas of special concern (e.g., areas with rare or threatened plants, if any). Based on the finding of this study, information for long term resource management of the site has already been discussed with Barry Banks, Executive Director of the Red-tail Land Conservancy.

#### SITE DESCRIPTION AND HISTORY

Formerly the site of Ernst Nursery until the early 1980s, Duto Woods Nature Preserve (DWNP) is a 6.8 ha (16.7 acres) site located in west-central Muncie, Indiana, on State Road 32 (Fig. 1). The latitude and longitude at the corner of SR 32 and Proctor Road is  $40^{\circ}10'51''$  N and  $85^{\circ}26'33''$  W with an elevation of 287 m (942 ft). The property is bordered on the north and west by roads, on the south by tracks of the Norfolk Southern Railroad (RR), and on the east by land formerly belonging to the nursery. No creeks run across the property.

DWNP was purchased by the Red-tail Land Conservancy (RTL) in January 2012 using funds provided by Goeff and Josephine Fox. The current site represents the western half of the old nursery. The RTL purchased the eastern 15.3 acres from the DaSilva family in early 2015, following the completion of this project. A study conducted by Creek Run LLC, Montpelier, Indiana, determined the ground water was contaminated and recommended that the RTL

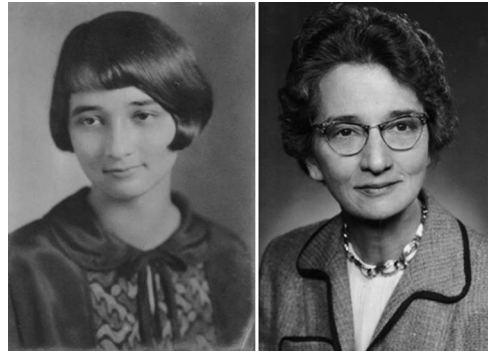


Figure 2.—Photographs of Ms. Ruth Duto: high school senior photograph (left) and 1964 (right).

dig no deeper than 1 m (Barry Banks, Executive Director RTL, pers. comm.). Lastly, when the nursery closed, apparently all shrubs and small trees were removed/bulldozed from the northern half of the property. The remains of this vegetation are seen as a long woody debris pile running the length of the site along the border of the woodland. Today, the site primarily consists of a successional shrubby old-field and a honeysuckle-Siberian elm dominated woodland.

The site is named in honor of Ms. Ruth Duto (Fig. 2). Ms. Duto was a naturalist and a former biology teacher at Burriss Laboratory School at Ball State University from 1942–1972. Josephine Fox and the Ernst family daughters were good friends and former students of Ms. Duto.

The major habitat types of DWNP are shown in Fig. 3. There are two roadside fields each having distinctly different vegetation. The old-field along State Road 32 is mowed by the City of Muncie. Although regularly mowed in the past, the old-field along Proctor Road is now in succession and is dominated by shrubs, especially the southern two-thirds. A narrow old-field runs the length of the property along the RR tracks. This field frequently experiences disturbance by humans. First, a power line runs parallel to the RR tracks, and the power company periodically removes or cuts back any woody vegetation. Second, Norfolk Southern sprays herbicide along the RR tracks each year. The northern half of the property, which was apparently bulldozed to remove woody vegetation when the nursery closed, is now a shrubby old-field (IHAPI 2011). The southern half of the property, which was open woodland previously, is currently thick honeysuckle woodland with some trees, especially

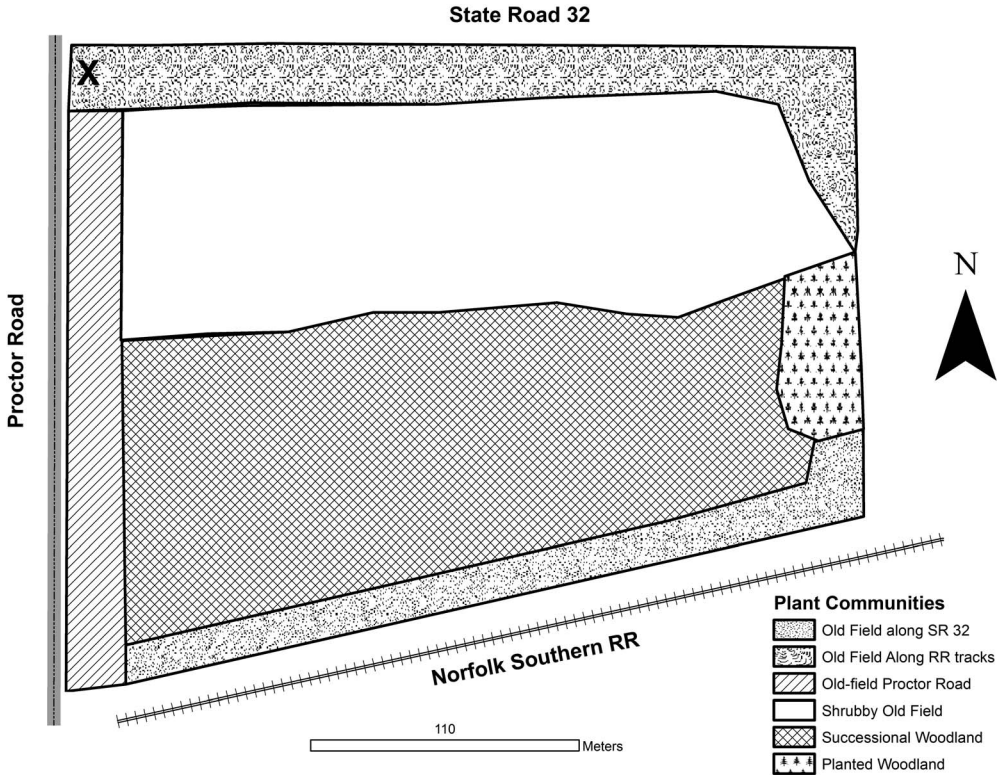


Figure 3.—Diagram illustrating the distribution of the major habitat types in Dutro Woods Nature Preserve, Delaware County, Indiana. The X marks the latitude and longitude coordinates given in the Site Description and History section.

*Ulmus pumila* (IHAPI 2011). Lastly, the eastern fifth of the woodland is “planted” woodland, a site where the nursery planted trees for sale. The planted woodland is devoid of honeysuckle.

DWNP lies near the northern border of the Tipton Till Plain Section or the New Castle Till Plains and Drainageways, of the Central Till Plain Region of Indiana (Homoya et al. 1985; Hedge 1997; IUPUI 2013). DWNP occurs in the Upper White River Watershed (USGS Cataloging Unit 05120201, EPA 2009). The west fork of the White River, which runs parallel to the northern border, lies approximately 480 m north of the site.

DWNP is comprised primarily of silt loam. The majority of the site consists of Wawaka Silt Loam, which is characterized as 0–2% slope and well drained. The southeastern quarter of the site consists of Crosley Silt Loam, which is characterized as 0–2% slope and somewhat poorly drained with no flooding or ponding (WWS 2013).

METHODS

During the 2013 growing season [April through September], a foray every seven to ten days was made into the study area, a total of 21 trips. Forays were made into every major habitat type and efforts were made to cover all areas within these habitats. Voucher specimens for each species were collected and deposited in the Ball State Herbarium (BSUH). Notes on vegetation consisted of a species list with visual estimates of distribution and relative abundance (see catalog of vascular plants, Appendix 1). Additionally, seasonal changes in the dominant vegetation (based on time of flowering) were noted for the various habitats. Nomenclature follows the USDA Plants Database (USDA 2013). The Floristic Quality Index (FQI) for DWNP was determined using the program developed by the Conservation Design Forum in conjunction with Rothrock (2004). For this study, all exotic species, whether naturalized or

not, were included in FQI calculations. This 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), and Rothrock & Homoya (2005). Briefly, C-values, which range from zero to ten, are an index of the fidelity of an individual species to undisturbed plant communities characteristic of the region prior to European settlement. The higher the C-value the more conserved the species is to an undisturbed habitat. All exotics are given a C-value of 0. The FQI is determined by multiplying the mean C for all species present by the square root of the total number of species. [For native FQI and mean C, only the native species are used.] An 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). Potential Delaware County plant species records were determined from the following sources: the Indiana Natural Heritage Data Center's records for Delaware County [this is the same plant list in the computer database of Keller et al. (1984)], the USDA Plant database (2013), Overlease & Overlease (2007), the species listed at Munsee Woods Nature Preserve (Prast et al. 2014), and Ginn Woods (Ruch et al. 1998, 2004),

## RESULTS

The vascular flora documented at DWNP is listed in Appendix 1. The flora consists of 240 taxa representing 164 genera and 63 families. Of the 240 documented taxa, 136 taxa (57%) are native and 104 taxa (43%) are non-native. The 12 families containing 62% of the documented species are Asteraceae (31 species), Poaceae (27 species), Cyperaceae (16 species), Rosaceae (16 species), Fagaceae (eight species), Liliaceae (eight species), Polygonaceae (eight species), Brassicaceae (seven species), Fabaceae (seven species), Lamiaceae (seven species), Caprifoliaceae (five species), and Caryophyllaceae (five species). One interesting observation, no species of the Ranunculaceae were found at the site. A physiognomic summary of the flora discloses that 28.3% taxa are trees (38), shrubs (22), and woody vines (8), 52.5% of the taxa are herbaceous forbs (126), and vines (1), 18.3%

are graminoids (27 grasses and 17 sedges), and > 1% are ferns (2) (Table 1, Appendix 1).

The Floristic Quality Indices (FQI) and the mean Coefficients of Conservatism (mean C) clearly specify the quality of the preserve (Table 2). The mean C of all taxa reveals the flora at DWNP consists predominately of low fidelity (low C-value) species (Appendix 1). The highest rated natives are *Quercus shumardii* and *Carex planispicata* (C = 7) and *Carex conjuncta* and *Dryopteris carthusiana* (C = 6). Only eleven species, 4.6% of all taxa, have a C-value  $\geq 5$ . In contrast, 134 species have a C = 0 (104 exotics and 29 native species), 26 species have a C = 1, 20 species have a C = 2, 32 species have a C = 3, and 18 species have a C = 4. Thus, 95.4% of the documented flora at DWNP is categorized with C-values  $\leq 4$ .

Accounting for 43% of the taxa, exotic species have considerably higher visual abundances than the native species. All of the native taxa with high visual abundances or widespread distributions are representatives of the low fidelity species categories (C  $\leq 4$ ), thus indicting a notable history of disturbance. Some exotic shrubs, especially *Lonicera* spp., grow so densely that large areas of the site, such as woodland on the southern half of the property and many locations in the shrubby old-field, have little or no other shrubs or herbaceous ground cover. Herbaceous exotic species are found in abundance in all habitats on the property, especially in all old-fields (Fig. 2, Appendix 1). For native species only, the FQI = 25.0 and the mean C is 2.2 (Table 2). If exotic species are included, the FQI drops nearly seven units (or 26% of its value) and the mean C falls by 1.0 unit (nearly 50% of its value) (Table 2). Such substantial change in both metrics clearly suggests that the exotics are having a significant negative impact on the native flora. While exotic shrubs made up only a small percentage (5.4%, 13 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 and small tree species with the highest visual abundances are *Ailanthus altissima*, *Lonicera*  $\times$  *bella*, *L. maackii*, *L. morrowii*, *Malus* spp. (flowering crabapples), *Morus alba*, *Pyrus calleryana*, *Rosa multiflora*, and *Ulmus pumila* (Appendix 1).

Thirty species documented at DWNP are reported for the first time in the county and represent new Delaware County records (Table 3, Appendix 1). If any of these species

Table 1.—Physiognomic analysis of the vascular flora documented at Dutro 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	136	56.5%	104	43.5%
Tree	26	10.8%	12	5.0%
Shrub	9	3.7%	13	5.4%
W-Vine	7	2.9%	1	0.4%
H-Vine	1	0.4%	0	0.0%
P-Forb	44	18.3%	26	10.9%
B-Forb	6	2.5%	16	6.7%
A-Forb	14	5.9%	19	7.9%
P-Grass	8	3.4%	10	4.3%
A-Grass	2	0.8%	7	2.9%
P-Sedge	16	6.6%	0	0.0%
A-Sedge	1	0.4%	0	0.0%
Fern	2	0.8%	0	0.0%

were originally planted, they have naturalized and are spreading. Additionally, there are seven other species at DWNP that have not been previously reported from Delaware County. These are not being reported as county records because these have not naturalized nor are they spreading. Six of the seven are non-native species and include *Acer platanoides*, *Ginkgo biloba*, *Picea pungens*, *Pinus sylvestris*, *Quercus phellos*, and *Viburnum recognitum*. The native species is *Crataegus phaenopyrum* (Yatskievych, pers. comm.). *Tilia cordata* represents a state record (Yatskievych, pers. comm.). Lastly, none of the species documented at DWNP occur on the Indiana Department of Natural Resources list of endangered, threatened, or rare plants (IDNR 2013).

DESCRIPTONS OF THE MAJOR HABITATS

This preserve encompasses several habitats, each with rather distinct plant communities (Fig. 3). Since there is no current management of the site, the different communities have resulted from past and, to some extent current, human use and intervention. The major habitats occurring at DWNP include the roadside old-fields, the old-field along the RR tracks, the successional shrubby old-field in the northern half of the site, the woodland in the southern

Table 2.—Floristic Quality summary for the vascular flora documented at Dutro Woods Nature Preserve, Delaware County, Indiana. Mean C = mean Coefficient of Conservation, FQI = Floristic Quality Index, Total species = native plus non-native species.

	Species count	Mean C	FQI
Native species	135	2.2	25.0
Total species	239	1.2	18.6

half of the site, a “planted” woodland, i.e., a site used by the former nursery to grow woody species for sale, and a woody debris pile along the entire length between the shrubby old-field and woodland.

**Roadside old-fields.**—There are two roadside fields, each having a distinctive flora. The field along State Road 32 (SR 32), mowed by the City of Muncie once or twice a year, is dominated by grasses and herbs. The field along Proctor Road was manicured in the past, but it is now a successional old-field, most of which is dominated by shrubs. *Old-field along SR 32:* This field is dominated by graminoids. The common to abundant species of grasses include *Agrostis gigantea*, *Poa pratensis*, and

Table 3.—List of Delaware County records documented at Dutro Woods Nature Preserve. Non-native species are in capital letters.

Species	
AGROSTIS GIGANTEA	HEMEROCALLIS
AMARANTHUS	FULVA
RETROFLEXUS	<i>Hypericum prolificum</i>
<i>Andropogon virginicus</i>	<i>Juniperus virginiana</i>
ARTEMISIA VULGARIS	<i>Liquidambar styraciflua</i>
ASPARAGUS	<i>Panicum capillare</i>
OFFICINALIS	<i>Paspalum setaceum</i>
BROMUS	<i>Phalaris arundinacea</i>
COMMUTATUS	PLANTAGO MAJOR
BROMUS ARVENSIS	PYRUS
<i>Carex aggregata</i>	CALLERYANA
CHLORIS	<i>Rudbeckia triloba</i>
VERTICILLATA	var. <i>triloba</i>
<i>Cyperus esculentus</i>	SILENE
var. <i>leptostachyus</i>	NOCTIFLORA
DRABA VERNA	<i>Solidago altissima</i>
<i>Eupatorium altissimum</i>	TILIA CORDATA
<i>Eupatorium serotinum</i>	TORILIS ARVENSIS
FALLOPIA	<i>Viola palmata</i>
CONVOLVULUS	
GERANIUM	
DISSECTUM	

*Schedonorus arundinaceus*. Other less frequent grasses include *Elymus repens*, *Phalaris arundinacea* (in the ditch), and *Phleum pratense*. Abundant sedges include *Carex leavenworthii*, and in the ditch both *Cyperus esculentus* var. *leptostachyus* and *Eleocharis obtusa*. Also, *Juncus tenuis* is abundant and widespread. The most common herbs are *Apocynum cannabinum*, *Daucus carota*, *Erigeron annuus*, *Securigera varia*, *Sisyrinchium angustifolium*, *Solidago altissima*, *Symphotrichum pilosum*, *Toxicodendron radicans* ssp. *negundo*, *Vernonia gigantea*, and *Veronica serpyllifolia*. In the ditch along the road, *Acalypha rhomboidea* and *Bidens frondosa* were common. **Old-field along Proctor Road:** Visually, this field is dominated by shrubs. The most abundant species is *Lonicera maackii*; other common shrubs include *Acer negundo*, *Morus alba*, *Populus deltoides*, and *Rosa multiflora*. Between the shrubs are many graminoid species which are common to abundant including *Carex blanda*, *C. davisii*, *C. grisea*, *Chloris verticillata*, *Digitaria sanguinalis*, *Paspalum setaceum*, *Poa pratensis*, *Schedonorus arundinaceus*, and *Tridens flavus*. The most common herbaceous plants in this field include *Barbarea vulgaris*, *Cichorium intybus*, all *Cirsium* spp., *Daucus carota*, *Erigeron annuus*, *Medicago lupulina*, *Plantago lanceolata*, *Polygonatum biflorum* var. *biflorum*, and *Veronica arvensis*. This field is the only location for *Euonymus atropurpureus* and *Gaura biennis*, both rare at the site.

**Old-field along the RR tracks.**—This old-field lies between the woodland and the RR tracks along the extreme southern edge of the property. The field is impacted by humans in two ways. First, the RR sprays herbicide along the tracks annually. Second, a power line runs through the field parallel to the RR tracks, and the power company periodically trims/removes wood vegetation. As a result of these human interventions, this old-field is an “exotic species paradise.” Woody species occurring at this site that are common to abundant include *Ailanthus altissima*, *Gleditsia triacanthos*, *Lonicera maackii*, *Morus alba*, *Toxicodendron radicans* ssp. *negundo*, and *Vinca minor* (a very large colony at the eastern end). *Carex grisea* is the only sedge common along the tracks. Although several grasses occur here, none are widespread or especially common. Grasses with the highest frequency are *Bromus inermis*, *Muhlenbergia schreberi*, *Panicum capillare*, *Poa pratensis*,

and *Setaria faberi*. Exotic herbaceous plants common to abundant in this field include *Alliaria petiolata*, *Allium vineale*, *Artemisia vulgaris*, *Barbarea vulgaris*, *Brassica nigra*, *Cirsium arvense*, *C. vulgare*, *Conium maculatum*, *Geranium dissectum*, *Glechoma hederacea*, *Lamium purpureum*, *Leonurus cardiaca*, *Lepidium campestre*, *Nepeta cataria*, *Saponaria officinalis*, *Taraxacum officinale*, *Thlaspi arvense*, *Verbascum thapsus*, and *Veronica arvensis*. Native herbaceous species in this field include *Ambrosia artemisiifolia* var. *elator*, *Cirsium discolor*, *Conyza canadensis*, *Fallopia scandens*, *Oxalis dillenii*, *Phytolacca americana*, *Solidago altissima*, and *S. canadensis* var. *canadensis*. Except for *C. discolor*, all the native herbaceous species common to abundant in this old-field have a C-value = 0. The woodland edge of the field is lined with large *Ulmus pumila*, the largest having a dbh (diameter at breast height) = 146.6 cm. At the base of this tree is a large colony of *Fallopia japonica*.

**Successional shrubby old-field.**—When the nursery closed, the northern half of the property was cleared by bulldozing all shrubs and small trees to the border of the open woodlands. Currently, there is a woody debris pile along the entire length between this field and woodland. Following the removal of the woody vegetation, the field was left fallow and today is a shrubby old-field undergoing secondary succession. The single most abundant plant in this large field is *Toxicodendron radicans* ssp. *negundo* forming a “carpet” over the site. The most visual and abundant woody vegetation includes *Cornus drummondii*, *Fraxinus americana*, *F. pennsylvanica* seedlings, *Hypericum prolificum*, *Lonicera* spp., *Malus* spp. (crabapples), *Morus alba*, *Pyrus calleryana*, *Quercus* spp., *Rosa setigera*, *Ulmus americana*, *U. pumila*, *Vitis riparia*, and *V. vulpina*. Between the shrubs, the two most abundant grasses are *Poa pratensis* and *Schedonorus arundinaceus*. Several sedges are common to abundant, including *Carex aggregata*, *C. leavenworthii*, and *C. granularis*. Also, the rush *Juncus tenuis* is extremely abundant and widespread. Although many species of herbs occur in the field, most are infrequent and found only in localized areas. The few herbs that are common to abundant and widespread include *Dipsacus fullonum*, *Geum laciniatum* var. *trichocarpum*, *G. vernum*, *Prunella vulgaris*, *Solidago altissima*, *Veronica serpyllifolia*, and *Viola sororia*.

*Woody debris pile:* Plant species occurring within the pile include those typical of both the successional woodland and the shrubby old-field. Nevertheless, growing in the soil between the logs is one robust plant of *Dryopteris carthusiana*. This plant is approximately 45–50 m from Proctor Road and the fronds bore sori.

**Successional woodland.**—This community occurs along the southern half of the property. When the nursery closed, this was an open woodland with few shrubs. However, over the years, *Lonicera maackii* has invaded and now grows so thickly that most of the woodland has no herbaceous cover. Tree species in this woodland include *Acer saccharinum*, *Celtis occidentalis*, *Fraxinus americana*, *F. pennsylvanica*, *Juglans nigra*, *Morus alba*, *Populus deltoides* (western end), *Prunus serotina*, *Ulmus americana*, and *U. pumila*. Vines include *Menispermum canadense* and *Toxicodendron radicans* ssp. *negundo*. Herbaceous plants grow where breaks in the honeysuckle occur and include *Allium canadense*, *Fallopia japonica*, *Geum canadense*, *G. vernum*, *Poa trivialis*, *Symphotrichum lateriflorum* var. *lateriflorum*, *Tovara virginiana*, and *Viola sororia*. The majority of the herbaceous plants occur in the eastern half of this woodland.

**“Planted” woods.**—The small woodland area occurs at the eastern end of the larger woodland and was used by the former nursery to grow woody species for sale. Woody species occurring in this site include *Acer platanoides*, *Ginkgo biloba*, *Liquidambar styraciflua*, *Philadelphus inodorus*, *Quercus shumardii*, and *Tilia cordata*. The most notable ground cover under the rows of trees is *Allium canadense* and *Vinca minor*. In the southwest corner of these this woodland is a large colony of *Carex jamesii*. This is the only site that this sedge occurs on the property.

## DISCUSSION

Swink & Wilhelm (1994) state, “Plant species, through millennia, have become adapted to the specific combinations of biotic and abiotic factors, processes, and floral and faunal interactions uniquely characterizing the site they inhabit. An area with a long history of biome-level stability, such as characterized most of the presettlement landscape in the Midwest, will almost always support a diverse assemblage of conservative species in self-replicating, interactive arrays.” With rapid changes to a site/habitat, the established specific combinations of biotic and abiotic factor and processes no longer exist. The

result is a significant reduction in conservative plants and an increase in the number of both less conservative native plants and non-native invasive plants suitable to the new habitat. This shift in flora is often proportional to the severity of change to the habitat (Swink & Wilhelm 1994). Although the native FQI is 25.0 at DWNP, when all species are included the FQI drops to 18.6. Similarly, the native mean C is 2.2, but when all species are included the mean C drops to 1.2. These metrics clearly illustrate the high percentage of exotic and low-fidelity native species ( $C \leq 4$ , 95.4%) at the site. If a site has an FQI less than 20, then that site essentially has no significance from a natural area perspective (Rothrock & Homoya 2005; Swink & Wilhelm 1994). Clearly, the anthropogenic impact for over half a century significantly devalued the floristic quality of this property. Because no studies of the flora prior to the nursery are available, the full extent of the decline is unknown.

Since the close of the nursery in the early 1980s, the site has undergone continued succession. The southern half of the property adjacent to the railroad tracks, which was open woodland with some manicured fields and was not bulldozed, has developed into woodland heavily dominated by *Lonicera maackii* and *Ulmus pumila*, both exotic species. The northern half of the property along SR 32, which was bulldozed, has essentially undergone secondary old-field succession (that is, succession due to a catastrophic event that reduced an already established ecosystem (Kimmins 2004; IHAPI 2011). With this type of succession, the first plants to appear are annuals and biennials which have long-lived seeds and the ability to use available resources quickly to grow and reproduce. Within a few years perennial grasses and herbs begin to replace the initial species (Monk 1983). After approximately ten years, shrubs start to become dominant. Eventually shade-tolerant tree seedlings appear, and with time the site will become woodland (Quarterman 1957; Root & Wilson 1973; Kimmins 2004). The northern half of DWNP is currently in the dominant shrub stage of succession with *Cornus drummondii* and *Fraxinus pennsylvanica* seedlings, both low C-value natives, and *Lonicera* spp. and *Morus alba* abundant.

The results of old-field succession today, particularly in urban areas such as Muncie, differ from 50 or 100 years ago due to the high number of non-native species introduced to the United States over the past half century

(Barger et al. 2008; USDA 2014). Many of these non-native species are invasive and inhibit the establishment of native species (e.g., Collier et al. 2002; Davis et al. 2005). Typically, the percent of exotic species documented in inventories conducted in east-central Indiana, regardless of the size of the site, is between 18 to 26% (Rothrock et al. 1993; Rothrock 1997; Ruch et al. 1998, 2002, 2004, 2007, 2008a, b, 2009, 2010, 2012; Stonehouse et al. 2003; Tungesvik 2011). Exotics might be expected to comprise 1/3 of post-agricultural communities (Stover & Marks 1998). At DWNP exotic species compose 43% of the documented species. The most plausible explanation for the remarkable number of exotics is the reservoir of available propagules in combination with intense anthropogenic impact. The combination provided open habitat for invasive species while reducing competition from the native species.

The Indiana Invasive Species Council (IISC) has been creating a list of invasive plant species for the state using a science-based assessment program. Currently, the list contains 120 species including their invasive rank, i.e., high, medium, or caution, for most species (IISC 2013). Of the 104 exotic taxa occurring at DWNP, twenty-one have a high invasive rank, such as *Ailanthus altissima*, *Alliaria petiolata*, *Artemisia vulgaris*, *Conium maculatum*, *Dipsacus fullonum*, *Fallopia japonica*, *Lonicera* spp., *Rosa multiflora*, and *Securigera varia*. Additionally, nine species have a medium invasive rank, such as *Glechoma hederacea*, *Melilotus* spp., *Pastinaca sativa*, *Schedonorus arundinaceus*, *Ulmus pumila*, and *Vinca minor*. Many of the exotic species at DWNP are remnants of the nursery, such as *Ginkgo biloba*, *Hypericum prolificum*, *Malus* spp., *Philadelphus inodorus*, *Picea* spp., *Quercus phellos*, *Tilia cordata*, and *Viburnum* spp.

In summary, DWNP is a site which lacks remnant natural quality due to intense human activity associated with the former nursery. When the nursery closed, conditions were apparently ideal for the invasion of exotic species and for the exotics left on the site by the nursery to expand. As a result, nearly half of the plant taxa documented are non-native species. However, with considerable effort and resources, DWNP could be transformed into a high quality site. Barry Banks and Josie Fox are both committed to achieving this. We have recommended, at least for the shrubby fields, that they develop some quality prairies.

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#### APPENDIX 1

##### CATALOG OF VASCULAR FLORA AT DUTRO WOODS, DELAWARE COUNTY, INDIANA

(Arranged alphabetically by family)

Listed are voucher specimens for all species documented at Dutro Woods. Nomenclature follows the USDA Plants Database (USDA 2014). 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), and Yatskiyevch (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 =  $\leq 5$  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) and Keller (1986), Overlease & Overlease (2007), Prast et al. 2014, Ruch et al. (1998, 2004), or the USDA Plant Database (USDA 2014). (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 30 Delaware County records. Lastly, no species documented at Dutro Woods occur on the Indiana Department of Natural Resources list of endangered, threatened or rare plants (IDNR 2013).

## DIVISION POLYPODIOPHYTA

### Ferns

#### Dryopteridaceae (Wood Fern Family)

*Dryopteris carthusiana* (Vill.) H.P. Fuchs; SYN: *Dryopteris spinulosa* (O.F. Müll.) Watt; Toothed or Spinulose Wood-Fern, Spinulose Shield-Fern; Border between woodland and shrubby field; Rare; C = 6; BSUH 18843.

*Onoclea sensibilis* L.; Sensitive Fern; Shrubby old-field, east end; Rare; C = 4; BSUH 18762.

## DIVISION GINKGOOPHYTA

### Ginkgo

#### Ginkgoaceae (Ginkgo Family)

*GINKGO BILOBA* L.; Ginkgo, Maidenhair Tree; Planted woodland; Rare, one tree; C = 0; BSUH 18718.

## DIVISION CONIFEROPHYTA

### Conifers

#### Cupressaceae (Redwood or Cypress Family)

*Juniperus virginiana* L. var. *virginiana*; Eastern Red Cedar; Shrubby old-field; Rare; C = 2; BSUH 18813.

#### Pinaceae (Pine Family)

*PICEA ABIES* (L.) Karst.; Norway Spruce; Shrubby old-field; Several trees, planted not naturalized; C = 0; BSUH 18706, 18746.

*PICEA PUNGENS* Engelm.; (Colorado) Blue Spruce; Shrubby old-field; Two trees, planted not naturalized; C = 0; BSUH 18717.

*PINUS SYLVESTRIS* L.; Scotch or Scots Pine; Shrubby old-field; Several trees, planted not naturalized; C = 0; BSUH 18792.

## DIVISION MAGNOLIOPHYTA

### Angiosperms

#### Aceraceae (Maple Family)

*Acer negundo* L. var. *negundo*; Boxelder, Ash-Leaved Maple; Shrubby old-field and woodland; Infrequent; C = 1; BSUH 18660.

*ACER PLATANOIDES* L.; Norway Maple; Rare; Planted woodland; C = 0; BSUH 18719.

*Acer rubrum* L. var. *rubrum*; Red Maple; Rare, one tree, planted; Shrubby old-field, west end; C = 5; BSUH 18659.

*Acer saccharinum* L.; Silver Maple; Woodland; Infrequent; C = 1; BSUH 18664, 18793.

*Acer saccharum* Marshall var. *saccharum*; Sugar Maple; Woodland; Infrequent; C = 4; BSUH 18663.

#### Amaranthaceae (Amaranth Family)

*AMARANTHUS RETROFLEXUS* L.; Redroot, Rough Green Amaranth; Old-field along RR track; Infrequent; C = 0; BSUH 18782.

#### Anacardiaceae (Cashew Family)

*Toxicodendron radicans* (L.) Kuntze ssp. *negundo* (Greene) Gillis; Common or Eastern Poison Ivy; All habitats; Extremely abundant; C = 1; BSUH 18808, 18811.

#### Apiaceae (Carrot Family)

*CONIUM MACULATUM* L.; Poison Hemlock; Old-field along RR track; Abundant; C = 0; BSUH 18819.

*DAUCUS CAROTA* L.; Wild Carrot, Queen Anne's-Lace; Old-field and roadside along S. Proctor Road; Common; C = 0; BSUH 18642.

*PASTINACA SATIVA* L.; Wild Parsnip; Old-field along RR track; Infrequent but locally abundant; C = 0; BSUH 18803.

*Sanicula canadensis* L. var. *canadensis*; Canadian Black-Snakeroot, Canada Sanicle; Woodland; Rare; C = 2; BSUH 18645.

*TORILIS ARVENSIS* (Huds.) Link ssp. *ARVENSIS*; Field or Spreading Hedge-Parsley; Old-field along RR track; Infrequent; C = 0; BSUH 18638.

#### Apocynaceae (Dogbane Family)

*Apocynum cannabinum* L.; (American) Indian Hemp, Dogbane; Old-field along SR 32; Infrequent; C = 2; BSUH 18814.

*VINCA MINOR* L.; Common Periwinkle, Myrtle; Edge of planted woods and old-field along RR track; Rare but locally abundant; C = 0; BSUH 18711, 18712, 18713.

Asclepiadaceae (Milkweed Family)

*Asclepias incarnata* L. ssp. *incarnata*; Swamp Milkweed; Old-field along SR 32; Rare, one clump; C = 4; BSUH 18626.

*Asclepias syriaca* L.; Common Milkweed; Old-field along RR track; Infrequent; C = 1; BSUH 18688.

Asteraceae (Aster Family)

*Achillea millefolium* L. var. *occidentalis* DC.; Common or Western Yarrow; Old-field along SR 32, western-end; Rare; C = 0; BSUH 18806.

*Ambrosia artemisiifolia* L. var. *elatior* Descourt.; SYN: *Ambrosia elatior* L.; Common or Annual Ragweed; Old-field along RR track; Abundant; C = 0; BSUH 18751.

*Ambrosia trifida* L. var. *trifida*; Great or Giant Ragweed; Old-field along SR 32; C = 0; BSUH 18756.

*ARCTIUM MINUS* (Hill) Bernh.; Common or Lesser Burdock; Old-field along RR track; Infrequent; C = 0; BSUH 18734.

*ARTEMISIA VULGARIS* L.; SYN: *Artemisia vulgaris* L. var. *vulgaris*; Mugwort, Common Wormwood; Old-field between planted woods and RR track and old-field along RR track; Abundant; C = 0; BSUH 18727, 18770, 18772.

*Bidens frondosa* L.; Common or Devil's Beggar's-Ticks; Ditch in old-field along SR 32; Common; C = 1; BSUH 18779.

*CICHORIUM INTYBUS* L.; Chicory; Old-field and roadside along S. Proctor Road; Common; C = 0; BSUH 18651.

*CIRSIIUM ARVENSE* (L.) Scop.; Canada Thistle; Old fields along S. Proctor Road and the RR track; Abundant; C = 0; BSUH 18735, 18810.

*Cirsium discolor* (Muhl. ex Willd.) Spreng.; Field or Pasture Thistle; Old-fields along the RR tract and S. Proctor Road; Abundant; C = 3; BSUH 18750.

*CIRSIIUM VULGARE* (Savi) Ten.; Bull Thistle; Old-field along the RR tract and S. Proctor Road; Common; C = 0; BSUH 18755.

*Conyza canadensis* (L.) Cronquist var. *canadensis*; SYN: *Erigeron canadensis* L.; Horseweed, Muleweed; Old-field along RR track; Abundant; C = 0; BSUH 18628.

*Erigeron annuus* (L.) Pers.; Eastern Daisy, Annual Fleabane, Whitetop; Old-field along S. Proctor Road; Common; C = 0; BSUH 18802.

*Erigeron philadelphicus* L. var. *philadelphicus*; Common, Marsh, or Philadelphia Fleabane; Old-field along SR 32 and northern side of shrubby old-field; Infrequent; C = 3; BSUH 18590.

*Eupatorium altissimum* L.; Tall Boneset, Tall Thoroughwort; Old-field along S. Proctor Road; Infrequent; C = 1; BSUH 18764.

*Eupatorium serotinum* Michx.; Late Boneset, Late-Flowering Thoroughwort; Old-field along SR 32; Infrequent; C = 0; BSUH 18765.

*Heliopsis helianthoides* (L.) Sweet var. *helianthoides*; False Sunflower, Smooth Oxeye; Shrubby old-field; Infrequent; C = 4; BSUH 18682.

*Lactuca canadensis* L.; Wild or Canada Lettuce; Old-field along RR track; Infrequent; C = 2; BSUH 18752.

*LACTUCA SERRIOLA* L.; SYN: *Lactuca scariola* L.; Prickly Lettuce; Old-field along RR track; Rare; C = 0; BSUH 18733.

*LEUCANTHEMUM VULGARE* Lam.; SYN: *Chrysanthemum leucanthemum* L. var. *pinnatifidum* Lecoq & Lamotte, *Leucanthemum vulgare* Lam. var. *pinnatifidum* (Lecoq & Lamotte) Moldenke; Ox-Eye Daisy; Old-field along S. Proctor Road; Rare; C = 0; BSUH 18650.

*MATRICARIA DISCOIDEA* DC.; SYN: *Matricaria matricarioides* auct. non (Less.) Porter; Pineapple-Weed, Disc Mayweed; Roadside along S. Proctor Road; Rare; C = 0; BSUH 18624.

*Rudbeckia triloba* L. var. *triloba*; Three-Lobed Coneflower, Brown-Eyed Susan; Old-field along RR track; Rare; C = 3; BSUH 18776.

*Solidago altissima* L.; SYN: *Solidago canadensis* L. var. *scabra* Torr. & A. Gray; Tall or Canada Goldenrod; Old-fields; Abundant; C = 0; BSUH 18722, 18763, 18768.

*Solidago canadensis* L. var. *canadensis*; Canada Goldenrod; Old-field along SR 32; Common; C = 0; BSUH 18775.

*SONCHUS ASPER* (L.) Hill; Spiny Sow-Thistle; Old-field along RR track; Infrequent; C = 0; BSUH 18565, 18637.

*Symphyotrichum 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; Woodland, especially eastern-end; Infrequent; C = 3; BSUH 18777.

*Symphyotrichum lateriflorum* Á. Löve & D. Löve var. *lateriflorum*; SYN: *Aster lateriflorus* (L.) Britton; Goblet, Calico, or Side-Flowering Aster; Woodlands, especially eastern-end; Common; C = 3; BSUH 18778, 18780.

*Symphyotrichum novae-angliae* (L.) G.L. Nesom; SYN: *Aster novae-angliae* L.; New England Aster; Old-field along SR 32; Infrequent; C = 3; BSUH 18767.

*Symphyotrichum pilosum* (Willd.) G.L. Nesom var. *pilosum*; SYN: *Aster pilosus* Willd.; Heath or Hairy White Old-Field Aster, Goodbye-Meadow; Old-field along SR 32; Abundant; C = 0; BSUH 18766.

*TARAXACUM OFFICINALE* Weber ssp. *OFFICINALE*; Common Dandelion; Old-field; Common; C = 0; BSUH 18693.

*TRAGOPOGON LAMOTTEI* Rouy; SYN: *Tragopogon pratensis* L.; Showy or Common

Goat's-Beard, Jack-go-to-Bed-at-Noon; Roadside and field along S. Proctor Road; Infrequent; C = 0; BSUH 18714.

*Vernonia gigantea* (Walter) Trel. ssp. *gigantea*; SYN: *Vernonia altissima* Nutt.; Tall or Giant Ironweed; Old-field along SR 32 and shrubby old-field; Infrequent; C = 2; BSUH 18631.

Bignoniaceae (Trumpet-Creeper Family)

*Catalpa speciosa* (Warder) Warder ex Engelm.; Northern Catalpa; Shrubby old-field; Rare; C = 0; BSUH 18583.

Boraginaceae (Borage Family)

*Hackelia virginiana* (L.) I.M. Johnst.; Stickseed, Beggars-Lice; Woodland and old-field along RR track; Infrequent but locally common; C = 0; BSUH 18630.

Brassicaceae (Mustard Family)

*ALLIARIA PETIOLATA* (M. Bieb.) Cavara & Grande; SYN: *Alliaria officinalis* Andr. ex M. Bieb.; Garlic Mustard; Woodland and old-field in southeast corner; Abundant; C = 0; BSUH 18701.

*BARBAREA VULGARIS* W.T. Aiton; (Garden) Yellow Rocket, Bitter Winter Cress; Old-fields along S. Proctor Road and the RR track; Abundant; C = 0; BSUH 18694.

*BRASSICA NIGRA* (L.) W.D.J. Koch; Black Mustard; Old-field along RR track; abundant; C = 0; BSUH 18685.

*DRABA VERNA* L.; SYN: *Erophila verna* (L.) Besser; Early Whitlow-Grass, Spring Draba; Roadside along S. Proctor Road; Infrequent; C = 0; BSUH 18702.

*HESPERIS MATRONALIS* L.; Dame's-Rocket; Old-fields along S. Proctor Road and RR track; Common; C = 0; BSUH 18602.

*LEPIDIUM CAMPESTRE* (L.) W.T. Aiton; Field Peppergrass or Pepperweed, Cow Cress; Old-field along RR track and roadside on S. Proctor Road; Common, locally abundant; C = 0; BSUH 18848.

*THLASPI ARVENSE* L.; Field Pennycress; Old-field along RR track; Common; C = 0; BSUH 18707.

Campanulaceae (Bellflower Family)

*Lobelia siphilitica* L. var. *siphilitica*; Great Blue Lobelia; Edge of planted woods; Rare; C = 3; BSUH 18771.

Caprifoliaceae (Honeysuckle Family)

*LONICERA* × *BELLA* Zabel; Showy Fly Honeysuckle; Shrubby old-field; Common; C = 0; BSUH 18678.

*LONICERA MAACKII* (Rupr.) Herder; Amur Bush Honeysuckle; All habitats; Abundant; C = 0; BSUH 18574.

*LONICERA MORROWII* A. Gray; Morrow's Honeysuckle; Shrubby old-field; Common; C = 0; BSUH 18679, 18680.

*Sambucus nigra* L. ssp. *canadensis* (L.) R. Bolli; SYN: *Sambucus canadensis* L.; American Black Elderberry, Common Elderberry; Old-field along RR track, eastern-end; Infrequent but locally common; C = 2; BSUH 18801.

*VIBURNUM OPULUS* L. var. *OPULUS*; Guelder-Rose, European Highbush Cranberry; Shrubby old-field and woodland; Infrequent; C = 0; BSUH 18598.

*VIBURNUM RECOGNITUM* Fernald; SYN: *Viburnum dentatum* L. var. *lucidum* Aiton; Smooth or Southern Arrow-Wood; Shrubby old-fields and borders; Infrequent; C = 0; BSUH 18581, 18816.

Caryophyllaceae (Pink Family)

*ARENARIA SERPYLLIFOLIA* L.; Thyme-Leaved Sandwort; Roadside and old-field along S. Proctor Road; Infrequent; C = 0; BSUH 18805.

*CERASTIUM FONTANUM* Baumg. ssp. *VULGARE* (Hartm.) Greuter & Burdet; SYN: *Cerastium vulgatum* L.; Mouse-Ear Chickweed, Big Chickweed; Old-fields along RR track and S. Proctor Road; Rare; C = 0; BSUH 18580.

*SAPONARIA OFFICINALIS* L.; Soapwort, Bouncing-Bet; Old-field along RR track; Infrequent but locally common; C = 0; BSUH 18686.

*Silene antirrhina* L.; Sleepy Catchfly, Sleepy Silene; Old-field along S. Proctor Road; Infrequent; C = 0; BSUH 18834.

*SILENE LATIFOLIA* Poir. ssp. *ALBA* (Mill.) Greuter & Burdet; SYN: *Silene pratensis* (Raf.) Gren. & Godr., *Lychnis alba* Mill.; Evening, White, or Bladder Campion; Old-field along RR track; Rare; C = 0; BSUH 18566, 18567.

*SILENE NOCTIFLORA* L.; Night-Flowering Catchfly or Silene; Old-field along RR track; Rare; C = 0; BSUH 18568.

Celastraceae (Staff-Tree Family)

*Euonymus atropurpureus* Jacq. var. *atropurpureus*; (Eastern) Wahoo; Old-field along S. Proctor Road; Rare; C = 5; BSUH 18720.

*EUONYMUS FORTUNEI* (Turcz.) Hand.-Maz. var. *RADICANS* (Siebold ex Miq.) Rehder; Winter-Creeper; Old-field along S. Proctor Road; Rare; C = 0; BSUH 18669.

Chenopodiaceae (Goosefoot Family)

*CHENOPODIUM ALBUM* L. var. *ALBUM*; Lamb's-Quarters, Pigweed; Old-field along RR track; Infrequent; C = 0; BSUH 18783.

Clusiaceae (Mangosteen Family)

*Hypericum prolificum* L.; SYN: *Hypericum spathulatum* (Spach) Steud.; Shrubby St.-John's-Wort;

Shrubby old-field; Infrequent, planted and naturalized; C = 4; BSUH 18625, 18641.

*Hypericum punctatum* Lam.; Spotted St. John's-Wort; Shrubby old-field, eastern-end; Infrequent; C = 3; BSUH 18740.

#### Convolvulaceae (Morning-Glory Family)

*Calystegia sepium* (L.) R. Br.; Common Hedge-Bindweed, Hedge False Bindweed; Old-fields; Infrequent; C = 1; BSUH 18668.

*CONVOLVULUS ARVENSIS* L.; Field Bindweed; Old-field along SR 32; Rare but locally common; C = 0; BSUH 18836.

*Ipomoea pandurata* (L.) G. Mey.; Wild Potato, Man-of-the-Earth; Old-field along S. Proctor Road; Rare, one colony; C = 3; BSUH 18744.

#### Cornaceae (Dogwood Family)

*Cornus drummondii* C.A. Mey.; Rough-Leaved Dogwood; Shrubby old-field; Abundant; C = 2; BSUH 18761, 18789, 18830.

#### Cyperaceae (Sedge Family)

*Carex aggregata* Mack.; Smooth Clustered Sedge, Glomerate Sedge; Shrubby old-field; Common; C = 2; BSUH 18623.

*Carex blanda* Dewey; Common Wood Sedge, Eastern Woodland Sedge; Old-fields along S. Proctor Road and RR track; Abundant; C = 1; BSUH 18621.

*Carex cephalophora* Muhl. ex Willd.; Short-Headed Bracted Sedge, Oval-Leaf Sedge; Shrubby old-field; Common; C = 3; BSUH 18559.

*Carex conjuncta* Boott; Green-Headed Fox Sedge, Soft Fox Sedge; Shrubby old-field; Infrequent; C = 6; BSUH 18558.

*Carex davisii* Schwein. & Torr.; Awned Graceful Sedge, Davis' Sedge; Old-field along S. Proctor Road and shrubby old-field; Abundant; C = 3; BSUH 18620.

*Carex granularis* Muhl. ex Willd.; Pale Sedge, Limestone Meadow Sedge; Shrubby old-field; Common; C = 2; BSUH 18618.

*Carex grisea* Wahlenb.; Wood Gray Sedge, Inflated Narrow-Leaf Sedge; Old-fields along S. Proctor Road and RR track; Abundant; C = 3; BSUH 18619.

*Carex jamesii* Schwein. Grass Sedge, James' Sedge; Woodlands; Rare but locally abundant; C = 4; BSUH 18824.

*Carex leavenworthii* Dewey; Dwarf bracted sedge; Shrubby old-field; Abundant; C = 1; BSUH 18560, 18561, 18562.

*Carex molesta* Mack. ex Bright; Field Oval Sedge, Troublesome Sedge; Shrubby old-field; Infrequent; C = 2; BSUH 18615, 18616, 18617.

*Carex planispicata* Naczi; Flat-spiked sedge; Old-field along RR track; rare but locally common; C = 7; BSUH 18563.

*Carex radiata* (Wahlenb.) Small; Straight-Styled Wood Sedge, Eastern Star Sedge; Old-field along SR 32; Infrequent but locally common under oaks; C = 4; BSUH 18614.

*Carex shortiana* Dewey; Short's Sedge; Shrubby old-field; Rare; C = 3; BSUH 18613.

*Carex tribuloides* Wahlenb. var. *tribuloides*; Awl-Fruited Oval Sedge, Blunt Broom Sedge; Shrubby old-field; Infrequent; C = 5; BSUH 18847.

*Carex vulpinoidea* Michx. var. *vulpinoidea*; Brown Fox Sedge; Shrubby old-field; Infrequent; C = 2; BSUH 18611.

*Cyperus esculentus* L. var. *leptostachyus* Boeckeler; Yellow Nutsedge; Ditch of old-field along SR 32; Common; C = 0; BSUH 18639, 18742.

*Eleocharis obtusa* (Willd.) Schult.; Blunt Spike Rush; Ditch of old-field along SR 32; Common and locally abundant; C = 1; BSUH 18622.

#### Dipsacaceae (Teasel Family)

*DIPSACUS FULLONUM* L.: SYN: *Dipsacus sylvestris* Huds., *Dipsacus fullonum* L. ssp. *sylvestris* (Huds.) Clapham; Fuller's or Common Teasel; Shrubby old-field; Common; C = 0; BSUH 18683.

#### Elaeagnaceae (Oleaster Family)

*ELAEAGNUS UMBELLATA* Thunb. var. *PARVIFOLIA* (Wall. ex Royle) C.K. Schneid.; Autumn Olive; Shrubby old-field; Rare; C = 0; BSUH 18573.

#### Euphorbiaceae (Spurge Family)

*Acalypha rhomboidea* Raf.: SYN: *Acalypha virginica* L. var. *rhomboidea* (Raf.) Cooperr.; Common Three-Seeded Mercury; Ditch in old-field along SR 32; Rare but locally abundant; C = 0; BSUH 18758.

*Chamaesyce maculata* (L.) Small; SYN: *Euphorbia maculata* L., *Euphorbia suprina* Raf.; Milk Purslane, Spotted or Creeping Spurge, Spotted Sandmat; Old-fields along S. Proctor Road and RR track; Common; C = 0; BSUH 18732.

*Chamaesyce nutans* (Lag.) Small; *Euphorbia nutans* Lag.; Nodding Spurge, Eyebane; Old-field along SR 32; Infrequent; C = 0; BSUH 18769.

#### Fabaceae (Pea or Bean Family)

*Cercis canadensis* L. var. *canadensis*; Eastern Redbud; Woodland edge along RR track; rare; C = 3; BSUH 18700.

*Gleditsia triacanthos* L.; Honey Locust; Old-field along RR track and woodlands, locally abundant; C = 1; BSUH 18593.

*MEDICAGO LUPULINA* L.; Black Medic; Old-fields along S. Proctor Road and SR 32; Common; C = 0; BSUH 18823.

*MELILOTUS ALBUS* Medik.; SYN: *Melilotus officinalis* auct. non (L.) Lam.; White Sweet Clover; Old-fields along S. Proctor Road and RR track; Rare; C = 0; BSUH 18648.

*MELILOTUS OFFICINALIS* (L.) Lam.; Yellow Sweet Clover; Old-fields along S. Proctor Road and RR track; Infrequent; C = 0; BSUH 18822.

*SECURIGERA VARIA* (L.) Lassen; SYN: *Coronilla varia* L.; (Purple) Crown Vetch; Old-field along SR 32, eastern-end; Rare but locally abundant; C = 0; BSUH 18815.

*TRIFOLIUM PRATENSE* L.; Red Clover; Old-field along SR 32; Infrequent; C = 0; BSUH 18817.

#### Fagaceae (Beech Family)

*Quercus alba* L.; White Oak; Shrubby old-field; Rare; C = 5; BSUH 18729.

*Quercus macrocarpa* Michx. var. *macrocarpa*; Bur Oak; Shrubby old-field; Rare; C = 5; BSUH 18570, 18656.

*Quercus muehlenbergii* Engelm.; Chinquapin (Chinkapin) or Yellow Oak; Shrubby old-field; Rare; C = 4; BSUH 18690.

*Quercus palustris* Münchh.; Pin Oak; Shrubby old-field and woodlands; Infrequent; C = 3; BSUH 18591.

*QUERCUS PHELLOS* L.; Willow Oak; Shrubby old-field in southwest corner, two trees, planted, not naturalized; C = 0; BSUH 18640, 18658.

*Quercus rubra* L.; Northern Red Oak; Shrubby old-field and woodlands; Infrequent; C = 4; BSUH 18671, 18696.

*Quercus shumardii* Buckley var. *shumardii*; Shumard Oak; Edge of planted woods; Rare, one tree; C = 7; BSUH 18759, 18760.

*Quercus velutina* Lam.; Black Oak; Shrubby old-field; Rare; C = 4; BSUH 18842.

#### Geraniaceae (Geranium Family)

*GERANIUM DISSECTUM* L.; Wrinkle-Seeded Cranesbill, Cutleaf Geranium; Old-field along RR track, western-end; Infrequent but locally abundant; C = 0; BSUH 18579, 18606.

#### Hamamelidaceae (Witch Hazel Family)

*Liquidambar styraciflua* L. Sweetgum, Red Gum; Planted woods; Rare but locally abundant, planted and naturalized; C = 4; BSUH 18569.

#### Hydrangeaceae (Hydrangea Family)

*PHILADELPHUS INODORUS* L.; Scentless Mock-Orange, Edge of planted woods; Rare, one plant; C = 0; BSUH 18826.

#### Iridaceae (Iris Family)

*Sisyrinchium angustifolium* Mill.; Stout or Narrowleaf Blue-Eyed-Grass; Shrubby old-field and old-field along SR 32; Infrequent; C = 3; BSUH 18809.

#### Juglandaceae (Walnut Family)

*Juglans nigra* L.; Black Walnut; Shrubby old-field and woodland; Infrequent; C = 2; BSUH 18584.

#### Juncaceae (Rush Family)

*Juncus tenuis* Willd.; Path Rush, Poverty Rush; Shrubby old-field; Abundant; C = 0; BSUH 18585, 18799.

#### Lamiaceae (Mint Family)

*Agastache nepetoides* (L.) Kuntze; Catnip or Yellow Giant-Hyssop; Edge of planted woods; Rare; C = 4; BSUH 18754.

*GLECHOMA HEDERACEA* L.; Gill-Over-the-Ground, Ground Ivy, Creeping Charlie; Old-fields along RR track and in southeast corner; Abundant; C = 0; BSUH 18698.

*LAMIUM PURPUREUM* L. var. *PURPUREUM*; Purple Dead Nettle; Old-fields along S. Proctor Road and RR track; Abundant; C = 0; BSUH 18695.

*LEONURUS CARDIACA* L. ssp. *CARDIACA*; Common Motherwort; Old-field along RR track; Abundant; C = 0; BSUH 18818.

*Monarda fistulosa* L. ssp. *fistulosa* var. *mollis* (L.) Benth.; Wild Bergamot; Old-field along RR track; Rare; C = 3; BSUH 18737.

*NEPETA CATARIA* L.; Catnip; Old-field along RR track; Abundant; C = 0; BSUH 18643.

*PRUNELLA VULGARIS* L. ssp. *VULGARIS*; (Common) Selfheal, Heal-All; Old-fields; Infrequent; C = 0; BSUH 18743.

#### Liliaceae (Lily Family)

*Allium canadense* L. var. *canadense*; Wild or Meadow Garlic; Planted woods and woodland; Abundant; C = 1; BSUH 18692.

*ALLIUM VINEALE* L. ssp. *VINEALE*; Field or Wild Garlic; Old-field along RR track; Abundant; C = 0; BSUH 18838.

*ASPARAGUS OFFICINALIS* L.; (Garden) Asparagus; Shrubby old-field; Rare; C = 0; BSUH 18652.

*HEMEROCALLIS FULVA* (L.) L.; Orange Day Lily; Old-field between planted woods and old-field along RR track; Rare, two colonies; C = 0; BSUH 18653, 18739.

*NARCISSUS PSEUDONARCISSUS* L.; Daffodil; Old-field between planted woods and old-field along RR track; Rare; C = 0; BSUH 18794.

*ORNITHOGALUM UMBELLATUM* L.; Common Star-of-Bethlehem, Sleepydick; Old-field between planted woods and old-field along RR track; Rare, one colony; C = 0; BSUH 18662.

*Polygonatum biflorum* (Walter) Elliott var. *biflorum*; Small or Smooth Solomon's Seal; Old-field along S. Proctor Road; Common; C = 4; BSUH 18667.

*Polygonatum biflorum* (Walter) Elliott var. *commutatum* (Schult. & Schult. f.) Morong; SYN: *Polygonatum canaliculatum* auct. non (Muhl. ex Willd.) Pursh, *Polygonatum commutatum* (Schult. &

Schult. f.) A. Dietr.; (Giant) Smooth Solomon's-Seal; Old-field along S. Proctor Road; Infrequent; C = 4; BSUH 18600.

Malvaceae (Mallow Family)

*MALVA NEGLECTA* Wallr.; Common Mallow, Cheeses; Old-field along RR track; Rare; C = 0; BSUH 18784.

Menispermaceae (Moonseed Family)

*Menispermum canadense* L.; [Common] Moonseed; Old-field along S. Proctor Road and woodlands; Common; C = 3; BSUH 18601.

Moraceae (Mulberry Family)

*MORUS ALBA* L.; SYN: *Morus tatarica* L.; White Mulberry; Shrubby old-field and woodlands; Common; C = 0; BSUH 18674, 18738.

Nyctaginaceae (Four-O'clock Family)

*Mirabilis nyctaginea* (Michx.) MacMill.; Heart-Leaved Umbrella-Wort, Heartleaf Four-O'clock; Old-field along RR track; Rare; C = 0; BSUH 18821.

Oleaceae (Olive Family)

*Fraxinus americana* L.; White or American Ash; Shrubby old-field and woodland; Infrequent; C = 4; BSUH 18582, 18800.

*Fraxinus pennsylvanica* Marsh.; SYN: *Fraxinus pennsylvanica* Marsh. var. *subintegerrima* (Vahl) Fernald, *F. pennsylvanica* Marsh. var. *lanceolata* (Borkh.) Sarg.; Green Ash; Shrubby old-field and woodland; Infrequent; C = 1; BSUH 18672.

*LIGUSTRUM OBTUSIFOLIUM* Siebold & Zucc.; Border Privet; Shrubby old-field; Infrequent; C = 0; BSUH 18833.

Onagraceae (Evening Primrose Family)

*Circaea lutetiana* L. ssp. *canadensis* (L.) Asch. & Magnus; SYN: *Circaea latifolia* Hill; Common or Broadleaf Enchanter's-Nightshade; Shrubby old-field, planted woods, and woodland at eastern-end; Infrequent but locally common; C = 2; BSUH 18644, 18646.

*Epilobium coloratum* Biehler; Eastern, Cinnamon, or Purple-Leaf Willow-Herb; Shrubby old-field, eastern-end; Infrequent; C = 3; BSUH 18724.

*Gaura biennis* L.; Biennial Gaura, Biennial Bee-blossom; Old-field along S. Proctor Road, southern-end; Rare; C = 3; BSUH 18791.

*Oenothera biennis* L.; SYN: *Oenothera pycnocarpa* Atk. & Bartlett; Common Evening-Primrose; Old-field along RR track; Infrequent; C = 0; BSUH 18749.

Oxalidaceae (Wood Sorrel Family)

*Oxalis dillenii* Jacq.; SYN: *Oxalis stricta* auct. non L.; Slender Yellow Wood Sorrel, Common Yellow

Oxalis; Old-field along RR track; Abundant; C = 0; BSUH 18605, 18827.

Phytolaccaceae (Pokeweed Family)

*Phytolacca americana* L. var. *americana*; American Pokeweed or Pokeberry; Old-field along RR track; Abundant; C = 0; BSUH 18835.

Plantaginaceae (Plantain Family)

*PLANTAGO LANCEOLATA* L.; English or Narrow-Leaf Plantain, Buckhorn; Old-fields especially the one along S. Proctor Road; Common; C = 0; BSUH 18576.

*PLANTAGO MAJOR* L.; Common Plantain; Roadside along S. Proctor Road; Rare; C = 0; BSUH 18655.

*Plantago rugelii* Decne. var. *rugelii*; American, Red-Stemmed, or Blackseed Plantain; Old-fields especially the one along S. Proctor Road; Infrequent but locally common; C = 0; BSUH 18681.

Platanaceae (Plane-Tree Family)

*Platanus occidentalis* L.; American Sycamore, Buttonwood; Shrubby old-field; Rare (planted); C = 3; BSUH 18798.

Poaceae (Grass Family)

*AGROSTIS GIGANTEA* Roth; SYN: *Agrostis alba* auct. non L.; Redtop; Old-field along SR 32; Abundant; C = 0; BSUH 18691.

*Andropogon gerardii* Vitman; Big Bluestem; Roadside along S. Proctor Road; Rare, one large clump; C = 5; BSUH 18634.

*Andropogon virginicus* L. var. *virginicus*; Broom-Sedge, Virginia Bluestem; Old-field along S. Proctor Road; Rare; C = 1; BSUH 18774.

*BROMUS ARVENSIS* L.; SYN: *Bromus japonicus* Thunb. nom. illeg.; Japanese Chess, Field Brome; Old-field along S. Proctor Road; Rare; C = 0; BSUH 18849.

*BROMUS COMMUTATUS* Schrad.; SYN: *Bromus racemosus* auct. non L.; Hairy Chess, Hairy, Meadow, or Bald Brome; Old-field along RR track; Infrequent but locally common; C = 0; BSUH 18610.

*BROMUS INERMIS* Leyss. ssp. *INERMIS*; Smooth or Hungarian Brome; Old-fields along RR track and S. Proctor Road; Infrequent but locally common; C = 0; BSUH 18796.

*BROMUS TECTORUM* L.; Junegrass, Cheat-grass, Downy Chess or Brome; Old-field along S. Proctor Road; Rare; C = 0; BSUH 18604.

*CHLORIS VERTICILLATA* Nutt.; Windmill Finger-Grass, Tumble Windmill Grass; Roadside along S. Proctor Road; Abundant all along this road; C = 0; BSUH 18609.

*DACTYLIS GLOMERATA* L.; Orchard-Grass; Old-field along SR 32; Infrequent; C = 0; BSUH 18586.

*DIGITARIA SANGUINALIS* (L.) Scop.; Northern or Hairy Crab-Grass; Old-fields along the RR track and S. Proctor Road; Infrequent but locally common; C = 0; BSUH 18635, 18726.

*Echinochloa muricata* (P. Beauv.) Fernald var. *muricata*; Rough Barnyard-Grass; Old-field along the RR track; Infrequent; C = 1; BSUH 18607.

*ELYMUS REPENS* (L.) Gould; SYN: *Elytrigia repens* (L.) Desv. ex Nevski.; Quack Grass; Old-field along SR 32; Infrequent but locally common; C = 0; BSUH 18608.

*HORDEUM JUBATUM* L. ssp. *JUBATUM*; Foxtail Barley; Roadside and old-field along S. Proctor Road; Rare; C = 0; BSUH 18564.

*Glyceria striata* (Lam.) Hitchc.; Fowl-Manna-Grass; Open area in woodland near shrubby field; Rare but locally common; C = 4; BSUH 18747.

*Muhlenbergia schreberi* J.F. Gmel.; Nimblewill; Old-field along RR track; Common; C = 0; BSUH 18745.

*Panicum capillare* L.; Witch Grass; Old-field along RR track; Common; C = 0; BSUH 18632.

*Paspalum setaceum* Michx.; SYN: *Paspalum setaceum* Michx. var. *muehlenbergii* (Nash) D. Banks; Thin Paspalum, Hairy Lens Grass; Roadside along S. Proctor Road; Common; C = 3; BSUH 18636, 18730, 18785.

*Phalaris arundinacea* L.; Reed Canary Grass; Old-field along SR 32, southwest corner; Rare but locally abundant; C = 0; BSUH 18588, 18589.

*PHLEUM PRATENSE* L.; Timothy; Old-field along SR 32; Infrequent; C = 0; BSUH 18748.

*POA PRATENSIS* L. ssp. *PRATENSIS*; Kentucky Bluegrass; Old-fields; Abundant; C = 0; BSUH 18845.

*POA TRIVIALIS* L.; Rough Bluegrass; Woods and fields in southeast corner; Common; C = 0; BSUH 18825.

*SCHEDONORUS ARUNDINACEUS* (Schreb.) Dumort., nom. cons.; SYN: *Schedonorus phoenix* (Scop.) Holub, *Lolium arundinaceum* (Schreb.) S.J. Darbyshire, *Festuca arundinacea* Schreb., *Festuca elatior* L. var. *arundinacea* (Schreb.) Hook.; Tall Fescue; Old-fields; Common; C = 0; BSUH 18795.

*SETARIA FABERI* Herrm.; Nodding or Giant Foxtail-Grass, Japanese Bristlegrass; Old-field along RR track; Infrequent (abundant south of RR track); C = 0; BSUH 18633.

*SETARIA PUMILA* (Poir.) Roem. & Schult. ssp. *PUMILA*; SYN: *Setaria glauca* (L.) P. Beauv.; Yellow Foxtail-Grass; Old-field along RR track; Infrequent; C = 0; BSUH 18787.

*SETARIA VIRIDIS* (L.) P. Beauv. var. *VIRIDIS*; Green Foxtail, Green Bristle-Grass; Old-field along S. Proctor Road; Infrequent; C = 0; BSUH 18728.

*Sphenopholis intermedia* (Rydb.) Rydb.; SYN: *Sphenopholis obtusata* (Michx.) Scribn. var. *major* (Torr.) K.S. Erdman; Slender Wedge Grass, Slender

Wedgescale; Shrubby old-field; Infrequent; C = 3; BSUH 18587.

*Tridens flavus* (L.) Hitchc. var. *flavus*; SYN: *Triodia flava* (L.) Smyth; Purpletop, Purpletop Tridens; Old-fields along SR 32 and S. Proctor Road; Common; C = 1; BSUH 18786.

Polygonaceae (Smartweed Family)

*FALLOPIA CONVULVULUS* (L.) Á. Löve; SYN: *Polygonum convolvulus* L.; Black Bindweed; Old-field along RR track; Rare but locally common; C = 0; BSUH 18781.

*FALLOPIA JAPONICA* (Houtt.) Ronse Decr.; SYN: *Polygonum cuspidatum* Siebold & Zucc.; Japanese Knotweed; Woodland especially the eastern half; Common and locally abundant; C = 0; BSUH 18721, 18736.

*Fallopia scandens* (L.) Holub; SYN: *Polygonum scandens* L. var. *scandens*; Climbing False Buckwheat; Old-fields especially the one along the RR track; Abundant; C = 0; BSUH 18723.

*PERSICARIA MACULOSA* Gray; SYN: *Polygonum persicaria* L., *Polygonum dubium* Stein, *Polygonum maculata* (Raf.) Gray, *Persicaria vulgaris* Webb & Moq.; Spotted Lady's-Thumb; Ditch in old-field along SR 32; Rare but locally common; C = 0; BSUH 18773.

*POLYGONUM AVICULARE* L.; SYN: *Polygonum monspeliense* Pers.; Doorweed, Common or Prostrate Knotweed; Old-fields; Common; C = 0; BSUH 18654.

*RUMEX CRISPUS* L. ssp. *CRISPUS*; Curly Dock, Sour Dock; Shrubby old-field; Infrequent; C = 0; BSUH 18571.

*RUMEX OBTUSIFOLIUS* L.; Bitter Dock, Blunt-Leaved Dock; Old-field along RR track and shrubby field; Infrequent; C = 0; BSUH 18840.

*Tovara virginiana* (L.) Raf.; SYN: *Polygonum virginianum* L., *Persicaria virginiana* (L.) Gaertn.; Jumpseed, Virginia Knotweed; Woodlands; Common and locally abundant; C = 3; BSUH 18757.

Portulacaceae (Purslane Family)

*Claytonia virginica* L. var. *virginica*; Virginia Spring Beauty; Shrubby old-field; Infrequent; C = 2; BSUH 18699.

*PORTULACA OLERACEA* L.; Common Purslane, Little Hogweed; Ditch in old-field along SR 32; Infrequent but locally abundant; C = 0; BSUH 18741.

Primulaceae (Primrose Family)

*Lysimachia ciliata* L.; Fringed Loosestrife; Shrubby old-field; Rare; C = 4; BSUH 18627.

Rosaceae (Rose Family)

*Crataegus phaenopyrum* (L. f.) Medik.; Washington-Thorn (-Hawthorn); Shrubby old-field near

planted woods; Rare, not naturalized; C = 0; BSUH 18831, 18832.

*Fragaria virginiana* Mill. ssp. *virginiana*; Thick-Leaved or Virginia Wild Strawberry; Shrubby old-field; Infrequent; C = 2; BSUH 18673.

*Geum canadense* Jacq. var. *canadense*; White Avens; Old-fields; Common; C = 1; BSUH 18647.

*Geum laciniatum* Murray var. *trichocarpum* Fernald; Rough Avens; Shrubby old-field and woods in southeast corner; Abundant; C = 3; BSUH 18828, 18829.

*Geum vernum* (Raf.) Torr. & A. Gray; Spring Avens; Woodland and shrubby old-field; Abundant; C = 1; BSUH 18844.

*MALUS PUMILA* Mill.; SYN: *Pyrus pumila* (Mill.) K. Koch, *Malus domestica* auct. non Borkh.; Domestic or Paradise Apple; Border of woodland and shrubby old-field, planted, not naturalized; Rare; C = 0; BSUH 18788.

*Potentilla norvegica* L. ssp. *monspeliensis* (L.) Asch. & Graebn.; Rough or Norwegian Cinquefoil; Shrubby old-field; Infrequent; C = 0; BSUH 18684.

*POTENTILLA RECTA* L.; Sulfur Cinquefoil; Old-field along RR track; Rare; C = 0; BSUH 18820.

*Prunus serotina* Ehrh. var. *serotina*; Wild Black Cherry; Woodland edge along RR track; Infrequent; C = 1; BSUH 18596.

*PYRUS CALLERYANA* Decne. "Bradford"; Bradford Pear; Shrubby old-field, naturalized; Common; C = 0; BSUH 18704.

*Pyrus* spp. (*Malus* spp.); Flowering Crabapple; Shrubby old-field, not naturalized; C = 0; BSUH 18705.

*ROSA MULTIFLORA* Thunb.; Multiflora or Japanese Rose; Old-field along S. Proctor Road; Common; C = 0; BSUH 18804.

*Rosa setigera* Michx. var. *setigera*; Climbing Prairie Rose, Illinois Rose; Old-field along S. Proctor Road and shrubby field; Common; C = 4; BSUH 18649.

*Rubus allegheniensis* Porter; Common or Allegheny Blackberry; Woods and field in southeastern corner; Common; C = 2; BSUH 18595.

*Rubus flagellaris* Willd.; Northern Dewberry; Old-field along RR track; Infrequent; C = 2; BSUH 18599.

*Rubus occidentalis* L.; Black Raspberry; Woods and field in southeastern corner; Common; C = 1; BSUH 18594.

#### Rubiaceae (Madder Family)

*Galium aparine* L.; Cleavers, Annual Bedstraw, Stickywilly; Old-field along S. Proctor Road and shrubby old-field; Infrequent; C = 1; BSUH 18677.

#### Salicaceae (Willow Family)

*Populus deltoides* W. Bartram ex Marshall ssp. *deltoides*; Eastern Cottonwood; Woodland and

old-field along S. Proctor Road; Common; C = 1; BSUH 18676.

*Salix interior* Rowlee; SYN: *Salix exigua* Nutt. ssp. *interior* (Rowlee) Cronquist; Sandbar Willow; Shrubby old-field, eastern-end in a low area; Rare but locally abundant; C = 1; BSUH 18603.

#### Scrophulariaceae (Figwort Family)

*VERBASCUM BLATTARIA* L.; Moth Mullein; Old-field along RR track; Rare; C = 0; BSUH 18839.

*VERBASCUM THAPSUS* L.; Common or Woolly Mullein; Old-field along RR track; Abundant; C = 0; BSUH 18837.

*VERONICA ARVENSIS* L.; Corn Speedwell; Old-fields along RR tract and S. Proctor Road; Abundant; C = 0; BSUH 18703.

*VERONICA SERPYLLIFOLIA* L. ssp. *SERPYL-LIFOLIA*; Thyme-Leaved Speedwell; Shrubby old-field; Common; C = 0; BSUH 18572, 18675.

#### Simaroubaceae (Quassia Family)

*AILANTHUS ALTISSIMA* (Mill.) Swingle; Tree of Heaven; Old-field along RR track; Abundant here; C = 0; BSUH 18666.

#### Smilacaceae (Catbrier Family)

*Smilax tannoides* L.; SYN: *Smilax hispida* Muhl. ex Torr., *Smilax tannoides* L. var. *hispida* (Muhl. ex Torr.) Fernald; Bristly Greenbrier or Catbrier; Woodland and old-field along S. Proctor Road; Infrequent; C = 3; BSUH 18575, 18592.

#### Solanaceae (Nightshade Family)

*Physalis heterophylla* Nees var. *heterophylla*; SYN: *Physalis nyctaginea* Dunal; Clammy Ground-Cherry; Old-field along RR track; Infrequent; C = 3; BSUH 18716, 18731.

*Solanum carolinense* L. var. *carolinense*; (Carolina) Horse-Nettle, Carolina Poppy; Old-field along RR track; Infrequent; C = 0; BSUH 18790.

*SOLANUM DULCAMARA* L. ssp. *DULCAMARA*; Bittersweet Nightshade, Climbing Nightshade; Old-field between planted woods and old-field along RR track; Rare; C = 0; BSUH 18841.

#### Tiliaceae (Linden Family)

*TILIA CORDATA* Mill.; Small-Leaved European Linden, Little-Leaf Linden; Planted woods; Rare but locally abundant, planted and naturalized; C = 0; BSUH 18708, 18709, 18710.

#### Ulmaceae (Elm Family)

*Celtis occidentalis* L., Northern or Common Hackberry; Woodland; Common; C = 3; BSUH 18597.

*Ulmus americana* L.; American or White Elm; Shrubby old-field and woodland; Common; C = 3; BSUH 18670.



*ULMUS PUMILA* L.; Siberian or Chinese Elm; Shrubby old-field and woodland, naturalized and spreading; Abundant; C = 0; BSUH 18689.

*Ulmus rubra* Muhl.; Red or Slippery Elm; Shrubby old-field, woodland and old field along S. Proctor Road; Infrequent; C = 3; BSUH 18659.

Urticaceae (Nettle Family)

*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; Old-field along RR track, Infrequent but locally common; C = 1; BSUH 18753.

Verbenaceae (Vervain Family)

*Verbena bracteata* Cav. ex Lag. & Rodr.; Long-Bracted or Big-Bract Vervain; Roadside along S. Proctor Road; Rare, one site; C = 0; BSUH 18629.

*Verbena urticifolia* L. var. *urticifolia*; White Vervain; Old-field along RR track; Infrequent; C = 3; BSUH 18687.

Violaceae (Violet Family)

*Viola palmata* L.; SYN: *Viola triloba* Schwein.; Three-Lobe Violet; Shrubby old-field; Infrequent; C = 5; BSUH 18697.

*Viola sororia* Willd.; SYN: *Viola papilionacea* Pursh p.p.; Common Blue Violet, Dooryard Violet; Shrubby old-field and woodlands; Infrequent; C = 1; BSUH 18661.

Vitaceae (Grape Family)

*Parthenocissus quinquefolia* (L.) Planch.; Virginia Creeper, Woodbine; Most habitats; Common; C = 2; BSUH 18846.

*Parthenocissus vitacea* (Knerr) Hitchc.; SYN: *Parthenocissus inserta* (Kern.) Fritsch; Grape Woodbine, Woodbine; Shrubby old-field; Common; C = 2; BSUH 18715, 18812.

*Vitis riparia* Michx.; Riverbank Grape; Shrubby old-field and woodland; Common; C = 1; BSUH 18807.

*Vitis vulpina* L.; Frost, Fox, Winter, or Chicken Grape; Shrubby old-field and woodland; Common; C = 3; BSUH 18577, 18578, 18797.

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