

THE VASCULAR FLORA AND VEGETATIONAL COMMUNITIES OF LICK CREEK SUMMIT NATURE PRESERVE IN WAYNE COUNTY, INDIANA

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ABSTRACT. An inventory of the vascular flora occurring at Lick Creek Summit Nature Preserve (LCSNP) revealed 387 species and varieties representing 243 genera and 90 families. The 12 families containing ~57% of the documented species (in order by number of species) were Asteraceae, Poaceae, Cyperaceae, Lamiaceae, Fabaceae, Liliaceae, Rosaceae, Apiaceae, Brassicaceae, Ranunculaceae, Scrophulariaceae, and Caryophyllaceae. Of the documented flora, 304 were native, 83 were adventives, and 42 represented Wayne County records. A detailed physiognomic analysis is presented as well as Floristic Quality Assessment. Using conservative boundaries for the study area, we found a Floristic Quality Index (FQI) of 64.6 and a mean Coefficient of Conservatism (C_{av}) of 3.5. The four exotics that are most invasive are *Alliaria petiolata*, *Lonicera maackii*, *Robinia pseudoacacia*, and *Rosa multiflora*. However, our analysis suggests that exotic species are having minimal negative impact at the nature preserve and that the site retains high natural quality. Point-centered-quarter (PCQ) analysis disclosed that the two small floodplain woods at the preserve have a different species composition. Based on relative importance values (RIV), the important species for the floodplain woods to the north of the summit are *Populus deltoides*, *Ulmus americana*, *Platanus occidentalis*, and *Robinia pseudoacacia*, while the important species for the floodplain woods to the south of the summit are *Acer saccharum*, *Aesculus glabra*, *Ulmus rubra*, and *Celtis occidentalis*. PCQ analysis of the slope forest indicated that it is an oak-hickory forest. The vascular flora of LCSNP includes one rare species (*Viburnum molle*), one threatened species (*Veronica anagallis-aquatica*), and one species on the watch list (*Panax quinquefolius*). Based on hydrology, soil types, and topography, the major community types (slope and hilltop forests, floodplain forests, moist meadows, hydrangea seeps, creek banks, tree plantation and dry field, gravel quarries, and roadsides) are described.

Keywords: Lick Creek Summit Nature Preserve, Floristic Quality Index (FQI), Point-Centered-Quarter method (PCQ), county records – vascular plants, oak-hickory forest, flora – Indiana

This study of Lick Creek Summit Nature Preserve (LCSNP) was undertaken as part of our continuing effort to determine the flora and floral communities of east-central Indiana. LCSNP is located 5.6 km (~3½ miles) southwest of Richmond, Indiana, in the general area known as the “Richmond Gorge.” The tract is owned and managed by the Whitewater Valley Land Trust and is under its administration. With funds from the Indiana Heritage Trust (IHT Project 275), the site was designated a State Nature Preserve in June 2007.

There have been no published studies concerning the flora at LCSNP. In fact, there has only been one detailed floristic study for Wayne County (Ruch et al. 2007). However, in 1988 Jacquelin Eichhorn, a naturalist hired by the Wayne County Resource Inventory Council,

listed 126 species occurring along the woodland road and hilltop trail. No voucher specimens were taken. Her list was prepared for the IDNR Division of Nature Preserves, which was interested in the site not only as a natural area of Indiana, but more importantly because it contained *Viburnum molle* (Kentucky viburnum) (*Homoya* pers. commun.). According to the minutes of the Natural Resources Commission Committee meeting held 17 July 2007 (Item #11), “The Nature Preserve consists of a mesophytic forest community and is underlain by a dome of gravel substrata with both northerly and southerly aspects, undoubtedly contributing to high plant diversity. The site is notable for being perhaps the most northern reach of the Switzerland Hills Natural Region of southeastern Indiana; this preserve’s plant

community and topography are more typical of southern rather than central Indiana. Indicative of this situation, the attractive shrub Kentucky viburnum, *Viburnum molle*, a state – rare plant species, occurs in large numbers at this site.” (NRC 2007). There is no question that this 15.8 ha preserve is a repository for native wild plants indigenous to Wayne County and the counties of the Whitewater Valley Drainage Basin in Indiana and Ohio. As a nature preserve, it serves as a permanent habitat for the native flora and fauna of this region.

As stated in earlier works (Ruch et al. 1998, 2002, 2007), an inventory of resources is the necessary first step in developing a long-term resource management plan. An inventory is the simplest means to document species diversity and is a fundamental step in monitoring changes that may occur in species composition. Additionally, measures of diversity are frequently seen as indicators of the well-being of ecological systems (Magurran 1988). As such, the goals in this study were (1) to inventory the vascular flora; (2) to visually estimate the relative distribution of each species; (3) to describe the seasonal changes in the vegetation for the various habitats; and (4) to analyze woody vegetation for the various forest types using the point-centered-quarter method.

THE STUDY AREA

Lick Creek Summit Nature Preserve (LCSNP) is a 15.8 ha (~ 39 acres) property located 5.6 km southwest of Richmond in Wayne County (approximately 39.7827°N, 84.9451°W [NAD 27] at the intersection of Hunt Road and Salisbury Road, to 39.7790°N, 84.9419°W at the intersection of Salisbury Road and Abington Pike, to 39.7785°N, 84.9466°W at the southwest corner of the site on Abington Pike, to 39.7823°N, 84.9465°W at the northwest corner of the site on Hunt Road (TopoZone 2006); or UTM Zone 16S, 676035E by 4405417N [NW corner of Salisbury Road and Hunt Road], NAD 27); or NW 1/4, Sec. 24, Twp. 13N, R2W, Center Township (Fig. 1). The property is bordered on the north by woodlands just north of Hunt Road, on the east by Salisbury Road, on the south by Abington Pike and woodlands just south of Abington Pike, and on the west by privately owned woodlands (Fig. 2).

LCSNP contains a variety of natural habitats. Jacqueline Eichhorn, in one of her

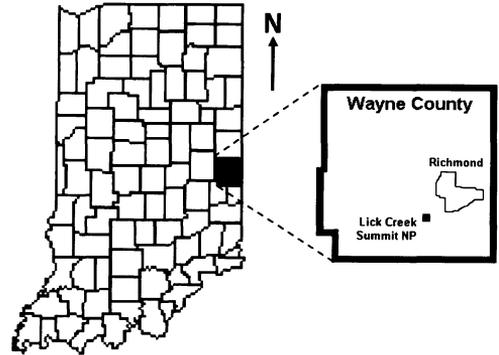


Figure 1.—Map of Indiana (left) showing the location of Wayne County and Richmond, and the location of Lick Creek Summit Nature Preserve southwest of Richmond (right).

communications with Mike Homoya at the Division of Nature Preserves, described the site (then designated Dunco Woods #1) as follows, “Strong southwest, south, east, and northeast slopes provide a variety of sun exposures and altitudes which encourage a rich and varied flora. A stream with its alluvial banks provides habitat to species needing more moisture.” (Eichhorn pers. commun.). The major habitat types present include a flat, ridgetop woodland, slopes forests in all aspects, especially south- and west-facing, two small but distinctly different floodplain forests, a low moist meadow in the northwest corner, a very dry field along Hunt Road, and woodland edges/road-sides (Fig. 3). The floodplain woodland to the north and east of the summit occurs along Lick Creek, while the floodplain woodland south of the summit occurs along a seasonal creek that flows into Lick Creek just south of Abington Pike.

LCSNP lies within the Whitewater River Watershed. Lick Creek, which cuts across the site, flows into the East Fork of the Whitewater River. The East Fork merges with the West Fork of the Whitewater River near Brookville, Indiana. The Whitewater River then flows into the Great Miami River, which in turn, empties into the Ohio River at the intersection of the Indiana, Ohio, and Kentucky state lines. For a detailed description of the Whitewater River Watershed, see Indiana Department of Natural Resources (1988), U.S. Environmental Protection Agency (2004), Ruch et al. (2007), Thorp (1983), and Woodfield (2001). It should be noted that there are two creeks bearing the

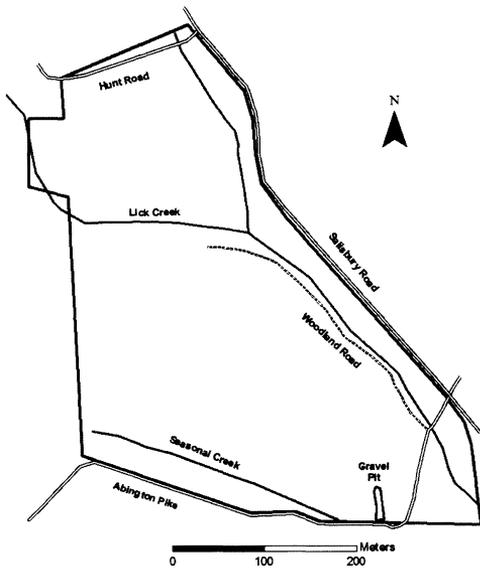


Figure 2.—Map displaying the boundary, prominent features, and reference points of Lick Creek Summit Nature Preserve.

name Lick Creek in this area of Wayne County. The Lick Creek, which is named on maps, flows southward along Abington Pike (east of LCSNP) and empties into the East Fork of the Whitewater River northeast of the preserve. The Lick Creek, which cuts across the preserve, flows southeastward emptying into the East Fork of the Whitewater River just south of Beelor Road southeast of the preserve. Although unnamed on maps, the local residents refer to this creek as Lick Creek and the preserve was named after it. It carries a much lower volume of water than the one to the northeast.

LCSNP lies on the border between the Tipton Till Plain and the Switzerland Hills (or Dearborn Upland) Natural Areas (Homoya et al. 1985; Ruch et al. 2007). The site consists primarily of mesophytic forest community and is underlain by a dome of gravel substrate with slopes in all directions; some of the slopes are quite steep, especially on the north and east sides. Geologically, the plateau consists of Wisconsinan till (e.g., unconsolidated sediments) that is up to 60 m deep (Indiana Geological Survey 1998). This unconsolidated material sets on the surface of the bedrock, which in the Richmond area is Ordovician shale and limestone (Woodfield 2001) and is part of the Cincinnati Arch (Indiana Depart-

ment of Natural Resources 1988; Woodfield 2001). Bedrock is exposed along portions of Lick Creek. Two small areas of the preserve have been quarried for gravel in the past. One site is on the south-facing slope along Abington Pike and the other site is on the east-facing slope along the old woodland road.

The soils at Lick Creek Summit are of the Miami-Wynn-Eden association and are described as “deep and moderately deep, gently sloping to very steep, well drained soils formed in glacial till, in material weathered from limestone and shale bedrock, and in glacial drift and material weathered from limestone and shale bedrock; on uplands” (Blank 1987). The specific soils at the site are clearly delineated. The flat top of the summit at LCSNP consists of Strawn clay loam, which is characterized as moderately sloping (6–12%), deep, well drained soil on knobs and breaks along drainageways in the uplands (Blank 1987). All slopes down from the summit contain Hennepin loam, described as steep to very steep (25–50% slope), deep, well drained soil on hillsides and sharp breaks along drainageways (Blank 1987). The floodplain woods and moist meadow along Lick Creek contain Stonelick loam (occasionally flooded) described as nearly level, deep, well drained soil on floodplains, that is flooded for very brief periods from late in fall through spring (Blank 1987). Lastly, the soil of the dry field located along Hunt Road is Eldean clay loam. This type of soil is described as moderately sloping (6–18%), well drained soil on outwash plains and terraces. It is usually very deep over very gravelly coarse sandy loam (Blank 1987). Except for the moist meadow adjacent to Lick Creek and a small dry field along Hunt Road, all soils at LCSNP are covered by woodlands.

BRIEF HISTORY OF LAND USE

Little substantive information is known of the early history of this site, other than its ownership changed infrequently and its boundaries remain still unchanged today as they appear in the 1874 Wayne County Atlas. From the mid-19th century into the early 1960s a two-story house stood near the eastern edge of the property, just west of Lick Creek at the foot of the northeast corner of the ridge which comprises the summit. Vandals burned the house in the 1960s and only foundation remnants are still visible. Additionally, in the

mid-1960s a pair of large mill stones remained sunken into the ground near the house and there are remnants of what appears to be a mill race running roughly parallel to Hunt Road on the adjacent property to the north. Guntis Atkins, assistant county surveyor, has suggested that a mill may have existed in the northwest corner of the property where there is an odd rectangular adjunct in the property boundary which sits astride the bend in Lick Creek, where it swings away from Hunt Road and cuts across the property (Hoff, Whitewater Valley Land Trust Treasurer pers. commun.).

Because the property slopes down from Abington Pike, some individuals used the site to dump trash during the 1900s. Remnants of this refuse still remain today on the north side of Abington Pike west of the old gravel pit. Pairs of large electrical transmission line poles ran along the western north/south boundary, running up and over the summit, until their removal in the 1960s and 1970s. Until their removal, they were maintained with an ~180 m wide swath of ground level clear cut. Following the removal of the power lines poles, ATV and 4-wheel drive enthusiasts used the old utility easement slope for recreational purposes and it wasn't until the early 1990s that natural succession had reclaimed back to forest all of the property except the ~1.4 ha tilled field at the sites' northeast corner. In 1991 this 1.5 ha field was planted with trees with the help of the USDA's Agricultural Conservation Practices (ACP) Reforestation Program. The merchantable timber was removed in 1990 prior to the sale of the property to Nancy Hoff, who in 2005 sold it to the Whitewater Valley Land Trust to become a state nature preserve.

Until the early 1950s, access to the two-story house was by fording the creek reached from the Hunt Road Curve entrance to the property. In the 1950s a lane was cut into the side of the hill from Abington Pike running north parallel to Salisbury Road and west of Lick Creek. Several small gravel removal sites are pocketed into the west (uphill) side of the lane. A much larger, older gravel pit was excavated on the south edge of the property in the Abington Pike curve. Because of the shape of this pocket, for decades it was used for target practice until the Hoff purchase. In 1993 a Timber Stand Improvement was implemented for the 12+ ha of old woods, and in 2002 the U.S. Fish and

Wildlife Service funded the removal of bush honeysuckle from the entire Preserve site.

METHODS

During the 2004 to 2006 growing seasons, one to two forays per week were made into the study area. Forays were random, but effort was made to cover all areas. Voucher specimens for each species observed were collected and deposited in the Ball State Herbarium (BSUH). Notes on vegetation consisted of species lists with visual estimates of their 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 followed the USDA Plants Database (USDA 2007). The species documented at Lick Creek Summit Nature Preserve (LCSNP) are listed in Appendix 1.

The floristic quality index (FQI) for LCSNP was determined using the program developed by the Conservation Research Institute in conjunction with Rothrock (2004). This program also calculates the mean Coefficient of Conservatism (C_{av}), and the mean Wetland Indicator Status (W_{av}). Additionally, it presents a detailed physiognomic analysis of the flora, both native and exotic (adventive).

Analysis of the woody vegetation at LCSNP was conducted using the point-centered-quarter (PCQ) method to sample stems greater than or equal to 10 cm dbh (diameter at breast height). PCQ is a plotless method in which the area around a point is divided into four quadrants and the distances measured from the central point are used to estimate density (Elzinga et al. 1998). Data were collected for three different woodland communities at LCSNP, e.g., hilltop and slope forest (upland forest), the floodplain forest along Lick Creek on the northern and eastern side of the preserve, and the floodplain forest along an unnamed creek running parallel to Abington Pike on the southern side of the preserve. For the two floodplains, points were located systematically; that is, transects were oriented approximately east-west and were 20 m apart with points taken every 20 m along each transect. For the upland forest, only one transect was run. Starting at the southern end of the summit (near Abington Pike) and approximately 10 m down the slope from the top of the hill, the transect was run at the same altitude along the western, southern, and

southeastern slope. Points were taken every 25 m along this transect. The northern and northeastern slopes were too steep to take readings.

At each sample point four quadrants were defined using the tape as the east-west boundary and imposing an imaginary line perpendicular to the tape for the north-south boundary. Quadrants were then numbered from one to four with quadrant one being the first clockwise quadrant from north. The nearest tree to the point in each quadrant with a dbh greater than or equal to 10 cm was selected. For each tree selected, the dbh (to the nearest 0.1 cm), the distance from the middle of the stem to the point (to the nearest 0.1 m), the species, and any pertinent observations concerning the site were recorded. Distance measurements were made using a Haglof Forestor DME 201 Distance Measuring Kit.

Data were analyzed to obtain information on the structure and composition of each woodland type. Stem density, in stems per ha for each species, was determined. To do this, the relative density, RDEN (the percent density of one species compared to all species per ha) was computed by dividing the number of individual trees per species by the total number of trees sampled and multiplying by 100. The average density (AVGDEN) was computed by dividing 10,000 (the factor to convert meters into hectares) by the square of the mean distance for all trees in meters. Lastly, density (DEN) was determined using the following equation:

$$\text{DEN} = (\text{RDEN}/100) \times \text{AVGDEN}$$

Next, the relative basal area, RBA (the percent basal area for one species compared to the total basal area for all species), was calculated. First, the dbh in cm for each tree was converted to a basal area in m^2 using the following equation:

$$\text{Basal area per tree} = \Pi(\text{dbh}/2)^2/10,000$$

The average basal area (AVGBA) for each species was then determined by summing the basal areas of all the trees of a species and dividing by the total number of trees for that species. The basal area per species (BA), in m^2 , was then calculated by multiplying the AVGBA by the DEN for each species. Finally, the relative basal area (RBA) for each species was determined using the following equation:

$$\text{RBA} = (\text{BA per species}/\text{total BA for all species}) \times 100$$

Next, relative frequency, RFRE (the percent frequency of one species per ha compared to all species), was determined. To do this, the frequency (FREQ) for each species was computed by dividing the total number of points at which a species occurred by the total number of points sampled, 30 for the upland slope woods, 30 for the floodplain woods along Lick Creek, and 20 for the floodplain woods along Abington Pike. RFRE was then calculated using the following equation:

$$\text{RFRE} = (\text{FREQ per species}/\text{total FREQ of all species}) \times 100$$

Lastly, the importance value (IV) for each species was calculated by summing the RDEN, RFRE and RBA; and the relative importance value (RIV) (percent IV of one species compared to all species) for each species was calculated by dividing the IV for each species by three.

RESULTS

The catalog of the vascular flora documented at LCSNP is listed in Appendix 1. The vascular flora occurring at LCSNP consists of 387 species and varieties representing 243 genera and 90 families. Thirty-seven families (~41%) are represented by only one species and seventeen families (~19%) are represented by only two species. The twelve families with the highest number of species are the Asteraceae (48 species), Poaceae (36 species), Cyperaceae (25 species, including 23 *Carex* spp.), Lamiales (16 species), Fabaceae (15 species), Liliales (16 species), Rosaceae (14 species), Apiaceae (13 species), Brassicaceae (12 species), Ranunculaceae (10 species), Scrophulariaceae (9 species), Caryophyllaceae (8 species). These twelve families account for 220 of the 387 species, or ~57%, of the species documented. Of the 126 species reported previously by Jacquelin Eichhorn, all but two were documented in this study. The two species not found were *Geum laciniatum* Murray and *Ranunculus sceleratus* L. Because she took no voucher specimens, these were not included in the catalog in Appendix 1.

Table 1.—Physiognomic analysis of the flora, both native and exotic (adventive), at Lick Creek Summit Nature Preserve. W = woody; H = herbaceous; P = perennial; B = biennial; A = annual. Percent is based on total species (386).

	Native species count (percent)		Exotic species count (percent)	
Number	304	78.6	83	21.4
Trees	37	9.6	2	0.5
Shrubs	18	4.7	7	1.8
W-Vines	8	2.1	0	0.0
H-Vines	5	1.3	1	0.3
P-Forbs	146	37.8	22	5.7
B-Forbs	9	2.3	14	3.6
A-Forbs	30	7.8	19	4.9
P-Grasses	15	3.9	8	2.1
A-Grasses	3	0.8	10	2.6
P-Sedges	25	6.5	0	0.0
A-Sedges	0	0.0	0	0.0
Ferns	8	2.1	0	0.0

The physiognomic analysis of the flora at LCSNP revealed some interesting information on plant composition (Table 1). Of the 387 plants documented, 304, or 78.6%, are native and 83, or 21.4% are adventives. Of the 304 native species, 63 species are woody, 190 are herbaceous vines or forbs, 43 are graminoids, and 8 are ferns and their allies. Of the 83 adventives, 9 are woody, 56 are vines or forbs, and 18 are grasses.

The Floristic Quality Indices (FQI) and the mean Coefficients of Conservatism (C_{av}) unveil the quality of the preserve (Table 2). An examination of Appendix 1 reveals that one plant, *Viburnum molle*, has a Coefficient of Conservatism (C) of 10 and one plant, *Carex careyana*, has a C of 9. Nineteen species, including *Aristolochia serpentaria*, *Arnoglossum reniforme*, *Asclepias quadrifolia*, *Aureolaria virginica*, *Clematis viorna*, *Symphyotrichum prenanthoides*, and *Trillium nivale*, have a C of 8. Additionally, 33 species have a C of 7.

Based upon the Indiana Natural Heritage Data Center's records for Wayne County and the species listed at Hayes Arboretum (Ruch et al. 2007), 42 species documented at LCSNP are reported for the first time and represent Wayne County records. Lastly, based on the list compiled by the Indiana Natural Heritage program (3 May 1996 draft), the status of several plants at LCSNP is as follows: Rare: *Viburnum molle*; Threatened: *Veronica anagal-*

Table 2.—Floristic Quality summary for Lick Creek Summit Nature Preserve. C_{av} is the mean Coefficient of Conservatism, FQI is the Floristic Quality Index, and W_{av} is the means Wetland Indicator Status.

	Count	C_{av}	FQI	W_{av}
Native species	304	3.9	68.4	1.3
Total species	387	3.1	60.6	1.6

lis-aquatica; and on the Watch List: *Panax quinquefolius*.

HABITAT DESCRIPTIONS

This preserve encompasses several habitats, each with rather distinct plant communities (Fig. 3). These communities are separated by topographic features, water regime, and history of human use. Plant communities of the northern half and the western border are recovering from human-induced disturbances. The woodland communities of the southern half, although affected by logging and invasive species, have retained most of the natural quality associations with this region. Lastly, several community subtypes occur within the boundaries of the mixed mesophytic forest (Fig. 3).

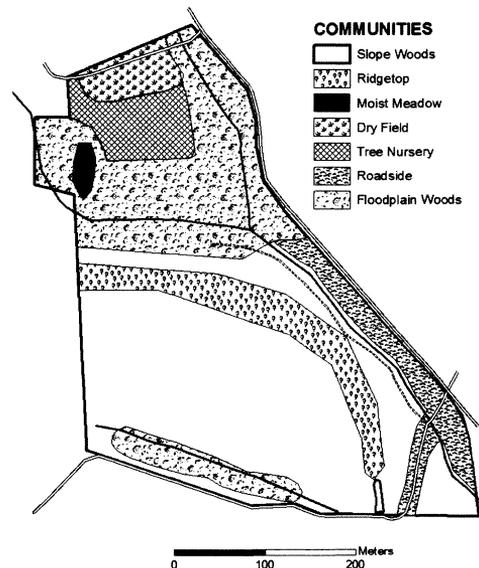


Figure 3.—Map illustrating the distribution of the major habitat types at Lick Creek Summit Nature Preserve.

Slope forests.—The southern half of the preserve consists of the Lick Creek Summit hill and its surrounding slopes. The slopes support a diverse deciduous forest. The more dominant trees include *Acer saccharum*, *Carya cordiformis*, *C. glabra*, *Fraxinus quadrangulata*, *Quercus alba*, *Q. muhlenbergii*, and *Q. rubra*. Shrubs include *Lonicera maaackii*, *Ribes cynosbati*, and *Viburnum prunifolium*, and the woody vines are represented by *Parthenocissus quinquefolia*, *Toxicodendron radicans*, and *Vitis* spp. The spring herbaceous flora includes *Asarum canadense*, *Cardamine concatenata*, *C. douglassii*, *Claytonia virginica*, *Dicentra* spp., *Erigenia bulbosa*, *Erythronium americanum*, *Geranium maculatum*, *Geum vernum*, *Hydrophyllum macrophyllum*, *Isopyrum biternatum*, *Jeffersonia diphylla*, *Maianthemum racemosum*, *Osmorhiza longistylis*, *Packera obovata*, *Phlox divaricata*, *Podophyllum peltatum*, *Sanguinaria canadensis*, *Stellaria pubera*, *Trillium grandiflora*, *T. sessile*, *Uvularia grandiflora*, and several *Viola* spp. Plants blooming later in the season include *Ageratina altissima*, *Agrimonia* spp., *Campanulastrum americanum*, *Cryptotaenia canadensis*, *Sanicula odorata*, *Solidago caesia*, *Symphyotrichum cordifolium*, and *S. lateriflorum*. Several woodland sedges occurred in this habitat, including *Carex albicans*, *C. albursina*, *C. blanda*, *C. careyana*, and *C. laxiflora*, while grasses were represented by *Elymus hystrix*, *Festuca subverticillata*, and *Poa sylvestris*. Although a number of fern species occurred, other than *Cystopteris protrusa*, none were common.

Hilltop forest.—The hilltop (summit) and its immediate slopes provide a special habitat populated by plants shared partially with the surrounding slopes but also by plants found nowhere else in the preserve. The hilltop habitat is a long, flat ridge approximately 0.4 km long. Its gravel composition makes it well-drained, but providing continual soil moisture. Sunlight penetrates between the tree trunks both in early morning and late afternoon, making this a considerably more sunlit habitat than the forest of the surrounding lower slopes. In addition to some of the species listed in the slope forest, tree species found primarily in the hilltop forest include *Fraxinus quadrangulata* and *Quercus muhlenbergii*. At the southern part of the summit, just north of the gravel pit on Abington Pike, plant species adapted to the hilltop or slope habitat are most numerous.

A large colony of *Frasera caroliniensis* occupies much of the far southern hilltop. Additional herbaceous species occurring here are *Arabis laevigata*, *Aureolaria virginica*, *Blephilia ciliata*, *Heuchera americana*, *Hybanthus concolor*, *Packera obovata*, *Oxalis violacea*, *Scutellaria incana*, *S. ovata*, and *Viola palmata*. Further north the hilltop is covered with *Carex jamesii*, a very large stand of *Staphylea trifolia*, and scattered colonies of *Arnoglossum reniforme*. On the far north- and northeast-facing slope, a large colony of *Trillium nivale* is found on eroding banks. On the eastern slopes near the hilltop is the only location where *Corydalis flavula* and *Panax quinquefolium* occur.

Gravel quarries.—An excavation of the south side of the summit at LCSNP, along Abington Pike, provides a somewhat open, dry environment. Plants found only in this site include *Arnoglossum atriplicifolium* and *Symphyotrichum shortii*. Other excavations along the east and north hill slopes west of the woodland road are shaded and in part characterized by seepage. *Cryptotaenia canadensis*, *Impatiens capensis*, *Packera aurea*, and *Pilea pumila* occur in these wet spots. A very steep, seeping slope on the north side supports colonies of *Solidago flexicaulis* along the margins of the seep.

Hydrangea seeps.—These sites are infrequent and occur on very steep slopes with modest seepage above Lick Creek on the east side of the property. Very little else but *Hydrangea arborescens* grows in these environments.

Moist meadow.—Just north of the forested hill on the west side of the property lies a small open meadow that becomes more shrubby towards its eastern margin where it borders the bottomland forest. Although water rarely stands on the surface, the soil remains wet to moist throughout the year. Plants in this site include the sedges *Carex aggregata*, *C. cristatella*, *C. emoryi*, *C. hystericina*, *C. laevivaginata*, *C. lurida*, *C. shortiana*, *C. stipata*, and *C. vulpinoidea*, and the grasses *Cinna arundinacea*, *Glyceria striata*, and *Phalaris arundinacea*. Herbaceous plants found in the meadow were *Agrimonia parviflora*, *Amphicarpaea bracteata*, *Asclepias incarnata*, *Boehmeria cylindrica*, *Cardamine bulbosa*, *Cuscuta gronovii*, *Eupatorium perfoliatum*, *Impatiens* spp., *Lobelia siphilitica*, *Lycopus americanus*, *Mentha arvensis*, *Pilea pumila*, *Polygonum* spp., *Rudbeckia laciniata*, *Solidago patula*, *Stachys nuttallii*, and *Veronica anagallis-aquatica*. This was the only site that

the fern *Onoclea sensibilis* was found. *Lysimachia nummularia* covers the soil surface in most areas.

Northern floodplain forest.—This area, located to the north and east of the summit, is much affected by previous human use and is currently in a successional state. Although native bottomland trees occur here (e.g., *Acer negundo*, *A. saccharum*, *Aesculus glabra*, *Carpinus caroliniana*, *Fraxinus pennsylvanica*, *Juglans nigra*, *Platanus occidentalis*, *Populus deltoides*, *Ulmus americana*, and *U. rubra*), there are some planted and naturalized non-native species (e.g., *Maclura pomifera* and *Robinia pseudoacacia*) that are very common. A single tree of *Juglans cinerea* of moderate size was also seen. The most notable ground plants are *Bidens frondosa*, *Elymus riparius*, *Equisetum hyemale*, *Impatiens* spp., *Laportea canadensis*, *Lysimachia nummularia*, *Rudbeckia laciniata*, and *Verbesina alternifolia*.

Tree plantation and dry field.—The southernmost portion of this area contains more moisture and supports larger trees, mainly *Juglans nigra* with some *Quercus rubra*. Herbaceous plants occurring beneath these taller trees are *Ageratina altissima*, *Cinna arundinacea*, *Dichanthelium clandestinum*, *Elymus virginicus*, *Galium aparine*, *Geum canadense*, *Muhlenbergia schreberi*, *Poa trivialis*, *Rubus occidentalis*, *Sanicula odorata*, *Stellaria media*, *Symphyotrichum lateriflorum*, and *Verbesina alternifolia*. Northward on higher, drier ground, the tree plantation is much more open, in part a dry open field, and in part a stand of very young trees, particularly *Alnus glutinosa*. The dry open field habitat is populated by *Ambrosia artemisiifolia*, *Cirsium discolor*, *Conyza canadensis*, *Dipsacus fullonum*, *Medicago lupulina*, *Plantago virginica*, *Potentilla recta*, *Setaria pumila*, *Solidago canadensis*, *Tridens flavus*, and *Verbascum blattaria*.

Creek banks.—All creeks on the preserve are bordered by dense stands of *Equisetum hyemale*, often to the virtual exclusion of other plants. However, in the area between Lick Creek and Salisbury Road on the east side, increased sunlight allows for the growth of many other plants including *Apios americana*, *Arisaema dracontium*, *Cornus alternifolia*, *Elymus riparius*, *Euonymus atropurpurea*, *Lilium michiganense*, *Monarda fistulosa*, *Symphyotrichum lanceolatum*, *S. prenanthoides*, *Valeriana pauciflora*, and *Verbesina alternifolia*.

POINT-CENTERED-QUARTER (PCQ) RESULTS

Floodplain woods.—The results of the PCQ analysis for the floodplain woodlands to the north and east of the summit are seen in Table 3. This information is based on data from 30 points or 120 trees. Sixteen species were recorded for this woodland site. The five most important species, based on RIV, were *Populus deltoides* (17.4), *Ulmus americana* (15.2), *Platanus occidentalis* (14.4), *Robinia pseudoacacia* (11.6), and *Ulmus rubra* (9.5). The remaining 11 species all had RIVs equal to or lower than 6.0. The high RIVs of *P. deltoides* and *P. occidentalis* were due to a relatively few number of larger diameter stems, while the high RIVs of *U. americana*, *R. pseudoacacia*, and *U. rubra* were due to a higher frequency and density of smaller diameter stems. Other trees typical of floodplains, including *Fraxinus pennsylvanica*, *Juglans nigra*, *Aesculus glabra*, and *Acer negundo*, were relatively unimportant, having RIVs equal to or lower than 5.5. Lastly, the density of woody species in this floodplain was much higher than the southern floodplain (Tables 3, 4).

The results of the PCQ analysis for the floodplain woodlands to the south of the summit are seen in Table 4. This information is based on data from 20 points or 80 trees, as this is a relatively small site lying between the slope woods and Abington Pike. Fifteen species were recorded from this woodland site, of which only seven also occurred in the northern floodplain. The five most important species, based on RIV, were *Acer saccharum* (20.5), *Aesculus glabra* (16.2), *Ulmus rubra* (14.1), *Celtis occidentalis* (14.0), and *Juglans nigra* (9.0). The remaining 10 species all had RIVs equal to or lower than 4.5. The only species to occur in the top five important species from both floodplains was *U. rubra* (Tables 3, 4). With the exception of *C. occidentalis*, all of these species had high RIVs due to a higher frequency and density of smaller diameter stems.

Slope woods.—The results of the PCQ analysis for the slope woodlands are seen in Table 5. This information is based on data from 30 points or 120 trees. Eighteen species were recorded. The six most important species, based on RIV, were *Acer saccharum* (17.8), *Carya glabra* (12.6), *Quercus rubra* (12.5), *Fraxinus quadrangulata* (8.6), *Quercus muhlen-*

Table 3.—Stand table for the floodplain forest to the north and east of the summit at Lick Creek Summit Nature Preserve. Species are listed in descending order based on relative importance values (RIV). DEN (density) is the number of stems per hectare. RDEN (relative density) is the percent density of one species compared to all other species. FRE (frequency) refers to the percentage of points in which each species occurs. RFRE (relative frequency) is the frequency of occurrence of each species relative to all species. BA (basal area) is in meters squared per hectare for each species. RBA (relative basal area) is the percent basal area for one species compared to the total basal area for all species. IV (importance value) is the sum of RDEN, RFRE, and RBA. RIV is the average of RDEN, RFRE, and RBA, expressed in percent.

Species	DEN	RDEN	FRE	RFRE	BA	RBA	IV	RIV
<i>Populus deltoides</i>	55.5	10.8	0.33	10.6	7.7	30.8	52.3	17.4
<i>Ulmus americana</i>	102.5	20.0	0.53	17.0	2.1	8.5	45.6	15.2
<i>Platanus occidentalis</i>	47.0	9.2	0.30	9.6	6.1	24.3	43.1	14.4
<i>Robinia pseudoacacia</i>	64.0	12.5	0.37	11.7	2.6	10.5	34.7	11.6
<i>Ulmus rubra</i>	64.0	12.5	0.33	10.6	1.4	5.4	28.6	9.5
<i>Acer saccharum</i>	34.2	6.7	0.27	8.5	0.7	2.9	18.1	6.0
<i>Fraxinus pennsylvanica</i>	29.9	5.8	0.20	6.4	1.1	4.4	16.6	5.5
<i>Juglans nigra</i>	25.6	5.0	0.20	6.4	1.0	4.0	15.4	5.1
<i>Aesculus glabra</i>	21.3	4.2	0.17	5.3	0.3	1.1	10.6	3.5
<i>Liriodendron tulipifera</i>	12.8	2.5	0.07	2.1	0.7	2.8	7.5	2.5
<i>Acer negundo</i>	12.8	2.5	0.07	2.1	0.5	1.9	6.5	2.2
<i>Machura pomifera</i>	12.8	2.5	0.10	3.2	0.2	0.7	6.4	2.1
<i>Prunus serotina</i>	8.5	1.7	0.07	2.1	0.4	1.4	5.2	1.8
<i>Cercis canadensis</i>	8.5	1.7	0.07	2.1	0.1	0.5	4.3	1.4
<i>Quercus macrocarpa</i>	8.5	1.7	0.03	1.1	0.1	0.5	3.2	1.1
<i>Morus alba</i>	4.3	0.8	0.03	1.1	0.04	0.2	2.1	0.7
	512.3	100.0	3.13	100.0	25.0	100.0	300.0	100.0

Table 4.—Stand table for the floodplain forest to the south and west of the summit at Lick Creek Summit Nature Preserve. Species are listed in descending order based on relative importance values (RIV). DEN (density) is the number of stems per hectare. RDEN (relative density) is the percent density of one species compared to all other species. FRE (frequency) refers to the percentage of points in which each species occurs. RFRE (relative frequency) is the frequency of occurrence of each species relative to all species. BA (basal area) is in meters squared per hectare for each species. RBA (relative basal area) is the percent basal area for one species compared to the total basal area for all species. IV (importance value) is the sum of RDEN, RFRE, and RBA. RIV is the average of RDEN, RFRE, and RBA, expressed in percent.

Species	DEN	RDEN	FRE	RFRE	BA	RBA	IV	RIV
<i>Acer saccharum</i>	95.1	23.8	0.70	21.2	4.3	16.5	61.5	20.5
<i>Aesculus glabra</i>	85.1	21.3	0.65	19.7	2.0	7.7	48.7	16.2
<i>Ulmus rubra</i>	50.0	12.5	0.40	12.1	4.6	17.7	42.3	14.1
<i>Celtis occidentalis</i>	40.0	10.0	0.35	10.6	5.6	21.2	41.9	14.0
<i>Juglans nigra</i>	30.0	7.5	0.30	9.1	2.7	10.5	27.1	9.0
<i>Prunus serotina</i>	20.0	5.0	0.20	6.1	0.7	2.5	13.6	4.5
<i>Carya cordiformis</i>	15.0	3.8	0.15	4.5	0.9	3.3	11.6	3.9
<i>Fraxinus pennsylvanica</i>	10.0	2.5	0.10	3.0	1.4	5.2	10.7	3.6
<i>Quercus alba</i>	10.0	2.5	0.05	1.5	1.6	6.1	10.1	3.4
<i>Ulmus americana</i>	15.0	3.8	0.10	3.0	0.3	1.2	8.0	2.7
<i>Liriodendron tulipifera</i>	5.0	1.3	0.05	1.5	1.0	3.8	6.6	2.2
<i>Quercus muhlenbergii</i>	10.0	2.5	0.10	3.0	0.3	1.0	6.5	2.2
<i>Quercus rubra</i>	5.0	1.3	0.05	1.5	0.7	2.7	5.5	1.8
<i>Carya ovata</i>	5.0	1.3	0.05	1.5	0.1	0.3	3.1	1.0
<i>Fraxinus americana</i>	5.0	1.3	0.05	1.5	0.0	0.2	2.9	1.0
	400.3	100.0	3.30	100.0	26.2	100.0	300.0	100.0

bergii (8.4), and *Quercus alba* (7.9). The remaining 12 species all had RIVs equal to or lower than 5.2. The high RIV of *A. saccharum* was due to its very high frequency and density, nearly double that of the second species in either category. *Carya glabra*, the second most important species, was in fact second in all three categories (e.g., RDEN, RFRQ, and RBA). Three of the remaining four most important species are oaks. The high RIVs of *Q. rubra* and *Q. alba* were due to a few relatively large stems, while the high RIVs of *Q. muhlenbergii* and *F. quadrangulata* were due to a higher frequency and density of smaller diameter stems. It should be noted that four of the top six important species were oaks and hickories. The importance value (IV) for all *Quercus* species (e.g., *Q. alba*, *Q. muhlenbergii*, and *Q. rubra*) was 86.2, for all *Carya* species (e.g., *C. cordiformis*, *C. glabra*, and *C. ovata*) was 65.5, and for all *Fraxinus* species (e.g., *F. americana*, *F. pennsylvanica*, and *F. quadrangulata*) was 44.8.

DISCUSSION

Flora and floristic quality analysis.—The vascular flora at Lick Creek Summit Nature Preserve includes the same core of plants, and consequently plant families, reported for other comparative sites in east-central Indiana (Rothrock et al. 1993; Rothrock 1997; Ruch et al. 1998, 2002, 2004, 2007; Stonehouse et al. 2003). The 10 plant families, accounting for more than 50% of the plants reported at LCSNP and all the sites referred to above, are the Apiaceae, Asteraceae, Brassicaceae, Cyperaceae, Fabaceae, Lamiaceae, Liliaceae, Poaceae, Ranunculaceae, and Rosaceae.

The flora at LCSNP is dominated by herbaceous plant species (307 species or 79.3%) including forbs (240 species), vines (6), grasses (36 species), and sedges (25 species). Woody species (72 species) comprise 18.6% of the total species including trees (39 species), shrubs (25 species), and woody vines (8 species). Ferns and their allies account for approximately 2.1% (8 species) of the total.

For the native vascular flora, LCSNP has a floristic quality index (FQI) of 68.4, with a mean coefficient of conservatism (C_{av}) of 3.9. The FQI indicates that this site is of remnant natural quality, and suggests that it contains “noteworthy remnants of a region’s natural heritage” (Rothrock & Homoya 2005). The

FQI at LCSNP compares favorably to many other natural areas, including Barker Woods Nature Preserve in LaPorte County (FQI = 60.7), Bendix Woods Nature Preserve in St. Joseph County (FQI = 49.3), Botany Glen in Grant County (FQI = 68.5), Fall Creek Gorge Nature Preserve in Warren County (FQI = 64.1), Fogwell Forest Nature Preserve in Allen County (FQI = 59.3), Ginn Woods in Delaware County (FQI = 74.1), Hayes Arboretum in Wayne County (FQI = 72.0), Hemlock Bluff Nature Preserve in Jackson County (FQI = 64.9), and Wilbur Wright Fish and Wildlife Area in Henry County (FQI = 77.3) (Rothrock & Homoya 2005; Ruch et al. 2007). However, the FQI at Mounds State Park (87.3) is considerably higher (Rothrock & Homoya 2005).

Rothrock & Homoya (2005) indicated that the best quality reference sites in central Indiana had C_{av} ranging from 3.8–4.1. The C_{av} for LCSNP falls within this range. The C_{av} for LCSNP is similar to those obtained for natural areas in neighboring counties, e.g., Ginn Woods in Delaware County (C_{av} = 3.9), Hayes Arboretum in Wayne County (3.7), and Wilbur Wright Fish and Wildlife Area in Henry County (C_{av} = 3.9). (It should be noted that these three sites were inventoried by our research team.) However, it is lower than that for the other studies cited above (C_{av} of 4.0 to 4.5) with the exception of Fall Creek Gorge Nature Preserve in Warren County (Rothrock & Homoya 2005). As suggest earlier by Ruch et al. (2007), the lower C_{av} at sites that we inventory may be due to our sampling technique, that is, we documented plants to the asphalt roads, to the railroad tracks, in manicured field and lawns, and in gardens and other disturbed areas. In addition to containing a high number of exotic species, these sites also include an inordinate number of native plants with low C values. The fact that central Indiana natural areas have a limited number of species from the highest fidelity categories was noted by Rothrock & Homoya (2005), however they gave no specific reasons for this observation. In fact the flora from LCSNP contained only 19 species with C = 8, one species with C = 9, and one species with C = 10.

The FQI and C_{av} for all species, both native and adventives, provide additional information about the flora at the preserve. The FQI for all

species is 60.6, or 7.8 units lower than the FQI for native species alone. Likewise, for all species, including adventives, the C_{av} is 3.1, compared to a C_{av} of 3.9 for native species alone. Rothrock & Homoya (2005) have suggested that natural quality of an area is compromised when adventive diversity lowers C_{av} by more than 0.7 units. We documented 83 exotic species at LCSNP. From these numbers it would appear that the adventive flora is having a negative impact on the native flora. However, if we recalculate the FQI and C_{av} for all species minus the 47 exotics that only occurred along the roadside (and not within the field, meadows, and woods of the site), then we get a revised FQI of 64.6 and a revised C_{av} of 3.5. (We believe these roadside habitats were not included in studies done by other workers.) The difference between the FQI for native species (68.4) and the revised FQI for all species is only 3.8, and the difference between the C_{av} for native species (3.9) and the revised C_{av} for all species is only 0.4 units. Consequently, using the revised numbers, which eliminate exotics occurring only along the edge of the site, it appears that the exotics are having only a minimal negative impact at the nature preserve. Of the remaining 36 exotics, only four are common, i.e., *Alliaria petiolata*, *Lonicera maackii*, *Robinia pseudoacacia* (in the northern floodplain woods only), and *Rosa multiflora*.

PCQ analysis of the floodplain forests.—Based on tree composition, the two small floodplains at LCSNP are clearly different (Tables 3, 4). The larger floodplain lying to the north and east of the summit fits well the general description of an Indiana floodplain as delineated by Lindsey & Schmelz (1970), while the smaller floodplain south of the summit does not. The difference between the two sites most likely originates from differences in size, topography, and hydrology. The southern edge of the northern floodplain is bounded by Lick Creek and the slope to the summit. North of Lick Creek is a broad, flat woodlands. Lick Creek frequently overflows parts of its bank for brief periods from late in fall through spring, as well as during heavy summer rains. Thus, the trees growing here must be very well adapted to periodic flooding. Additionally, our inventory revealed a high diversity of herbaceous plant species due to flood waters removing and depositing alluvium, thus creating microhabitats suitable for many species. The floodplain

lying south of the summit is essentially a bowl with a small seasonal creek running through it. Water drains into the area from the slopes of the summit, as well as down the slope from Abington Pike. The upper half of the creek carries water only through the spring and except for summer rains is essentially dry the rest of the growing season. The lower half of the creek carries a low volume of water throughout the year from small seeps at the base of the hill. This woodlands is only infrequently flooded. However, there is a high diversity of floodplain herbs at the site due to the constant influx of nutrients draining down the slopes and the moister conditions at the bottom of the bowl.

The species occurring in the floodplain north of the summit are consistent with those that would be expected in frequently-flooded woodlands with a constant and high availability of moisture (Appendix 1). Yet, when compared to other floodplain woods in east-central Indiana, LCSNP, based on RIVs, has a unique community composition. Like the floodplain woods (or swamp forest) at the Red Tail Nature Conservancy Preserve (RTNCP) in Delaware County, *Populus deltoides* and *Ulmus americana* are the top two important species, respective (Ruch unpubl. data). However, unlike the floodplain at LCSNP, the RTNCP contained little *Platanus occidentalis* or *Ulmus rubra*. Additionally, the floodplain at Botany Glen in Grant County was dominated by *P. occidentalis*, *U. americana*, *Aesculus glabra*, and *Juglans nigra* (Stonehouse et al. 2003). While the first two species were important at the LCSNP floodplain, the latter two were insignificant. Furthermore, the floodplain forest at Yuhas Woods in Randolph County was dominated by *Tilia americana*, *A. glabra*, *Acer negundo*, and *Fraxinus nigra* (Ruch unpubl. data). None of these species were important at LCSNP, and in fact, two species did not occur at the site.

PCQ analysis of the slope forest.—According to Lindsey et. al. (1965), for a wooded area to be classified as oak-hickory the total IV of *Quercus* spp. + *Carya* spp. must be double that of *Acer saccharum* + *Fagus grandifolia*. Respectively, their IVs are 151.7 and 57.6, giving a ratio of 2.6 (Table 5). Clearly, these IV values meet the requirements set down by Lindsey et. al. (1965), thus allowing the slope forests at LCSNP to be classified as oak-hickory.

Table 5.—Stand table for the slope forest at Lick Creek Summit Nature Preserve. Species are listed in descending order based on relative importance values (RIV). DEN (density) is the number of stems per hectare. RDEN (relative density) is the percent density of one species compared to all other species. FRE (frequency) refers to the percentage of points in which each species occurs. RFRQ (relative frequency) is the frequency of occurrence of each species relative to all species. BA (basal area) is in meters squared per hectare for each species. RBA (relative basal area) is the percent basal area for one species compared to the total basal area for all species. IV (importance value) is the sum of RDEN, RFRQ, and RBA. RIV is the average of RDEN, RFRQ, and RBA, expressed in percent.

Species	DEN	RDEN	FRQ	RFRQ	BA	RBA	IV	RIV
<i>Acer saccharum</i>	108.6	22.5	0.63	19.6	3.2	11.3	53.4	17.8
<i>Carya glabra</i>	56.3	11.7	0.37	11.4	4.3	14.9	37.9	12.6
<i>Quercus rubra</i>	40.2	8.3	0.33	10.3	5.4	18.7	37.4	12.5
<i>Fraxinus quadrangulata</i>	44.3	9.2	0.27	8.3	2.4	8.3	25.8	8.6
<i>Quercus muhlenbergii</i>	48.3	10.0	0.27	8.3	2.0	6.9	25.2	8.4
<i>Quercus alba</i>	28.2	5.8	0.20	6.2	3.3	11.6	23.6	7.9
<i>Carya cordiformis</i>	24.1	5.0	0.17	5.2	1.6	5.5	15.7	5.2
<i>Fraxinus americana</i>	16.1	3.3	0.13	4.1	2.0	6.9	14.4	4.8
<i>Carya ovata</i>	20.1	4.2	0.17	5.2	0.7	2.6	11.9	4.0
<i>Aesculus glabra</i>	24.1	5.0	0.17	5.2	0.4	1.5	11.6	3.9
<i>Ulmus rubra</i>	16.1	3.3	0.13	4.1	0.5	1.8	9.2	3.1
<i>Celtis occidentalis</i>	16.1	3.3	0.13	4.1	0.4	1.5	8.9	3.0
<i>Ostrya virginiana</i>	16.1	3.3	0.07	2.1	0.2	0.7	6.1	2.0
<i>Fraxinus pennsylvanica</i>	4.0	0.8	0.03	1.0	0.8	2.7	4.6	1.5
<i>Carpinus caroliniana</i>	4.0	0.8	0.03	1.0	0.7	2.5	4.4	1.5
<i>Fagus grandifolia</i>	8.0	1.7	0.07	2.1	0.1	0.4	4.2	1.4
<i>Juglans nigra</i>	4.0	0.8	0.03	1.0	0.6	2.1	4.0	1.3
<i>Cercis canadensis</i>	4.0	0.8	0.03	1.0	0.0	0.2	2.0	0.7
	482.8	100.0	3.23	100.0	28.8	100.0	300.0	100.0

Although classified as an oak-hickory forest, it should be noted that *Acer saccharum* was the most important species in the slope forest with a RIV = 17.8 (Table 5). A similar trend has been documented in the upland mesic woods of Mounds State Park in Madison County, Indiana, where *A. saccharum* appears to be overtaking both of these oak-dominated woodlands and outcompeting *F. grandifolia* (Rothrock et al. 1993). Likewise, in the mesic upland forest at Yuhus Woods in Randolph County, *A. saccharum* was the most important species with an RIV = 25.5, more than doubling the second most important species, *Q. alba* with an RIV = 12.5 (Baltzer et al. 2007). There may be several reasons for the advance of *A. saccharum* in these sites. First, selective logging of oaks could result in this response. In 1983, Lorimer demonstrated that selective harvesting of oak forests does not always promote oak re-establishment; and it may hasten the conversion of the land to another type of woods. Second, Parker & Sherwood (1986) illustrated that *A. saccharum* out competes *Quercus* spp. in small canopy gaps due to

logging or windfall. Third, and probably most important, is the suppression of fire in this region, and many other regions of the United States, since European settlement (Abrams 1992; McClain 1993). Oak-hickory forests are considered to be an early to mid-stage of succession, eventually to be replaced with more shade-tolerant trees such as *A. saccharum*. However, *A. saccharum* is very intolerant to fire. It is postulated that due to the activity of Native Americans, frequent fires in the Great Lakes Region prevented many forests from reaching a climax community. However, when the Europeans colonized this area, they suppressed wildfires to protect their towns and agriculture (Abrams 1992). The suppression of fire by settlers would have freed the forest from its stasis in succession, thus allowing *A. saccharum* and other shade-tolerant, but fire-sensitive trees, to begin replacing the oaks.

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APPENDIX 1

CATALOG OF VASCULAR FLORA AT LICK CREEK SUMMIT (arranged alphabetically by family)

Listed are voucher specimens for all naturally-occurring species observed at Lick Creek Summit Nature Preserve. Nomenclature follows the USDA Plants Database (USDA 2006). 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 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; frequent = common throughout its potential habitats and may be locally abundant at one or more sites; and abundant = common and numerous throughout its potential habitats.

The symbols in parentheses immediately proceeding each species refer to the following: (*) = naturalized, non-native (exotic) species, and (#) = Wayne County record. Species were deemed unreported for Wayne County (and hence considered a county record) if they did not appear in the computer database of Keller et al. (1984) or reported from Hayes Arboretum, Richmond, Indiana (Ruch et al 2007). (The database of Keller et al (1984) is the same list of plants for Wayne County as the one at the Indiana Natural Heritage Data Center, IDNR.)

The status categories of certain species in brackets (e.g., [Endangered] [Rare], [Threatened], and [Watch List]) is from the list compiled by the Indiana Natural Heritage Program (3 May 1996).

DIVISION EQUISETOPHYTA Horsetails and Scouring Rushes Equisetaceae (Horsetail Family)

Equisetum arvense L.; Common or Field Horsetail; Roadside and edge of woods along Abington Pike

near Lick Creek; Rare; C = 1; BSUH 13183, 13255.

Equisetum hyemale L. var. *affine* (Engelm.) A.A. Eat.; Common or Tall Scouring Rush; Floodplain forest; Abundant; C = 2; BSUH 13256.

DIVISION POLYPODIOPHYTA Ferns

Aspleniaceae (Spleenwort Family)

(#) *Asplenium platyneuron* (L.) B.S.P.; Ebony Spleenwort; Edge of field along Hunt Road and along woodland road; Rare, but locally common; C = 3; BSUH 13304.

Cystopteris protrusa (Weatherby) Bladell; Common Fragile Fern, Lowland Bladder Fern; Floodplain forest and north-facing woodland slope; Infrequent; C = 4; BSUH 13230.

Polystichum acrostichoides (Michx.) Schott; Christmas Fern; North-facing woodland slope; Rare; C = 5; BSUH 13316.

Onocleaceae (Sensitive Fern Family)

Onoclea sensibilis L.; Sensitive Fern; Wet meadow; Rare; C = 4; BSUH 13367.

Ophioglossaceae (Adder's Tongue Family)

Botrychium dissectum Spreng. var. *obliquum* (Muhl.) Clute; Lace-frond Grape Fern, Bronze Fern; Slope woods; Infrequent; C = 3; BSUH 13876.

Botrychium virginianum (L.) Swartz; Rattlesnake Fern; Tree farm; Rare; C = 4; BSUH 13312.

DIVISION CONIFEROPHYTA Gymnosperms or Conifers Cupressaceae (Cypress Family)

Juniperus virginiana L.; Eastern Red Cedar; Edge of woods along Abington Pike; Rare; C = 2; BSUH 13254.

DIVISION MAGNOLIOPHYTA Angiosperms

Acanthaceae (Acanthus Family)

Ruellia strepens L.; Smooth Ruellia, Limestone Wild Petunia; South-facing woodland slope; Infrequent; C = 4; BSUH 13289.

Aceraceae (Maple Family)

- Acer negundo* L.; Boxelder; Ash-leaved Maple; Floodplain woods and edge of meadows; Infrequent; C = 1; BSUH 13294, 13339.
- Acer nigrum* Michx. f.; SYN: *Acer saccharum* s. *nigrum*; Black Maple; Southern floodplain woods and edge of wet meadow; C = 6; BSUH 13160.
- Acer saccharinum* L.; Silver Maple; Creek bank near Salisbury Road and Abington Pike; Rare; C = 1; BSUH 13278.
- Acer saccharum* Marshall; Sugar Maple; Woods; Abundant; C = 4; BSUH 13448.

Amaranthaceae (Amaranth Family)

- (* *Amaranthus retroflexus* L.; Redroot, Rough Pigweed, Redroot Amaranth; Roadside along Abington Pike; Rare; C = 0; BSUH 13162.

Anacardiaceae (Cashew Family)

- Toxicodendron radicans* (L.) Kuntze var. *negundo* (Greene) Reveal; Common or Eastern Poison Ivy; Widespread; Abundant; C = 1; BSUH 13360.

Apiaceae (Carrot Family)

- (* #) *Aethusa cynapium* L.; Fool's Parsley; Roadside to edge of woods along Hunt and Salisbury Roads; Infrequent but locally abundant; C = 0; BSUH 13305.
- Chaerophyllum procumbens* (L.) Crantz; Spreading or Common Streambank Chervil; Slope and floodplain woods; Common; C = 2; BSUH 13218.
- (* *Conium maculatum* L.; Poison Hemlock; Roadside; Infrequent; C = 0; BSUH 13274.
- Cryptotaenia canadensis* (L.) DC.; Canadian Honewort; Woods; Abundant; C = 3; BSUH 13313.
- (* *Daucus carota* L.; Wild Carrot, Queen Anne's Lace; Roadside; Infrequent; C = 0; BSUH 13276.
- Erigenia bulbosa* (Michx.) Nutt.; Harbinger-of-Spring; Woods; Abundant; C = 5; BSUH 13858.
- Osmorhiza claytonii* (Michx.) C.B. Clarke; Bland or Hairy Sweet Cicely; South-facing woodlands; Infrequent; C = 3; BSUH 13200.
- Osmorhiza longistylis* (Torr.) DC.; Long-styled Sweet Cicely, Aniseroot; Woods; Common to abundant; C = 3; BSUH 13195.
- (* *Pastinaca sativa* L.; Wild Parsnip; Roadside; Rare; C = 0; BSUH 13300.
- Sanicula odorata* (Raf.) K.M. Pryer & L.R. Phillippe; SYN: *Sanicula gregaria* Bickn.; Cluster Sanicle, Clustered Black Snakeroot; Woods; Abundant; C = 2; BSUH 13311, 13318.
- Sanicula trifoliata* E. Bickn.; Beaked Sanicle; Woods; Infrequent; C = 8; BSUH 13317, 13474.
- Thaspium barbinode* (Michx.) Nutt.; Bearded or Hairyjoint Meadow Parsnip; Woods; Common; C = 7; BSUH 13247.

- Thaspium trifoliatum* (L.) A. Gray var. *aureum* Britton; Smooth or Yellow Meadow Parsnip; Woods; Common; C = 5; BSUH 13272, 13329.

Apocynaceae (Dogbane Family)

- Apocynum cannabinum* L.; Dogbane, Indian Hemp; Roadside; Infrequent; C = 2; BSUH 13273.

Araceae (Arum Family)

- Arisaema dracontium* (L.) Schott; Green Dragon, Dragon Root; Between Salisbury Road and Lick Creek; Infrequent but locally common; C = 5; BSUH 13246.
- Arisaema triphyllum* (L.) Schott; Jack-in-the-Pulpit, Indian Turnip; Between Salisbury Road and Lick Creek; Infrequent; C = 4; BSUH 13240.

Araliaceae (Ginseng Family)

- Panax quinquefolius* L.; American Ginseng; Ridgetop woods; Rare; C = 7; BSUH 13877. [Watch List]

Aristolochiaceae (Birthwort Family)

- Aristolochia serpentaria* L.; Virginia Snakeroot; Slope woods; Rare; C = 8; BSUH 13863.
- Asarum canadense* L.; Canadian Wild Ginger; Woods; Abundant; C = 5; BSUH 13184.

Asclepiadaceae (Milkweed Family)

- Asclepias incarnata* L.; Swamp Milkweed; Wet meadow; Rare; C = 4; BSUH 13534.
- Asclepias syriaca* L.; Common Milkweed; Roadside; Infrequent; C = 1; BSUH 13509.
- (#) *Asclepias quadrifolia* Jacq.; Four-leaved Milkweed; South-facing woodlands slope; Rare but locally common; C = 8; BSUH 13319.
- Cynanchum laeve* (Michx.) Pers.; SYN: *Ampelamus albidus* (Nutt.) Britt.; Sandvine, Bluevine, Honeyvine; Roadside; Rare; C = 1; BSUH 13480.

Asteraceae (Aster Family)

- Achillea millefolium* L.; Common Yarrow; Common Milfoil; Roadside; Rare; C = 0; BSUH 13302.
- Ageratina altissima* (L.) R.M. King & H. Rob.; SYN: *Eupatorium rugosum* Houtt.; White Snakeroot; Woods; Common; C = 2; BSUH 13531.
- Ambrosia artemisiifolia* L. var. *elatior* Descourt.; Common or Annual Ragweed; Dry fields and roadside; Common; C = 0; BSUH 13517.
- Ambrosia trifida* L.; Giant Ragweed; Dry field and roadside; Common; C = 0; BSUH 13518.
- Antennaria plantaginifolia* (L.) Hook.; Common or Plantain Pussytoes, Woman's Tobacco; Dry ridge around gravel pit on Abington Pike; Rare; C = 3; BSUH 13224.
- (* *Arctium minus* Bernh.; Common or Lesser Burdock; Roadside; Rare; C = 0; BSUH 13330, 13502.

- Arnoglossum atriplicifolium* (L.) H. Rob.; SYN: *Cacalia atriplicifolia* L.; Pale Indian Plantain; Old gravel pit along Abington Pike; Rare, one site with several dozen plants; C = 6; BSUH 13481.
- Arnoglossum reniforme* (Hook.) H. Rob.; SYN: *Cacalia muehlenbergii* (Schultz-Bip.) Fernald, *Arnoglossum muehlenbergii* (Sch. Bip.) H. Rob.; Great Indian Plantain; Slope and upland woods; Common; C = 8; BSUH 13364.
- Bidens frondosa* L.; Common or Devil's Beggar's Ticks; Floodplain woods along Lick Creek; Infrequent; C = 1; BSUH 13175.
- (*) *Cichorium intybus* L.; Chicory; Roadside; Common to abundant; C = 0; BSUH 13355.
- (*) *Cirsium arvense* (L.) Scop.; SYN: *Cirsium arvense* (L.) Scop. var. *horridum* Wimmer & Grab.; Field or Canada Thistle; Roadside; Rare but locally abundant; C = 0; BSUH 13405.
- Cirsium discolor* (Muhl.) Spreng.; Field or Pasture Thistle; Dry field, common at this site; C = 3; BSUH 13536.
- Conyza canadensis* (L.) Cronq. var. *canadensis*; Canadian Horseweed; Dry field and roadside; Infrequent; C = 0; BSUH 13537.
- Erechtites hieraciifolius* (L.) Raf.; Fireweed; Edge of woods along Abington Pike near Lick Creek; Rare; C = 2; BSUH 13521.
- Erigeron annuus* (L.) Pers.; Annual Fleabane, Eastern Daisy Fleabane; Roadside; Common; C = 0; BSUH 13292.
- Erigeron philadelphicus* L.; Philadelphia Daisy, Marsh Fleabane; Roadside; Common; C = 3; BSUH 13250.
- Eupatoriadelphus purpureus* (L.) R.M. King & H. Rob.; SYN: *Eupatorium purpureum* L.; Purple-nodded or Sweet-scented Joe Pye Weed; Edge of woods between woodland road and Lick Creek on Abington Pike; Rare but locally common; C = 5; BSUH 13507.
- Eupatorium perfoliatum* L.; Common Boneset; Wet meadow; Rare; C = 4; BSUH 13527.
- Euthamia graminifolia* (L.) Nutt.; Common Flat-topped Goldenrod, Grass-leaved Goldenrod; Moist meadow; Rare but locally common; C = 3; BSUH 13516.
- (*) *Galinsoga quadriradiata* Cav.; Common Quickweed, Peruvian Daisy; Roadside; Infrequent but locally abundant; C = 0; BSUH 13496.
- (#) *Helianthus tuberosus* L.; Jerusalem Artichoke; Dry field and edge of woods along Hunt Road; Rare; C = 2; BSUH 13520.
- Heliopsis helianthoides* (L.) Sweet; Sunflower Everlasting, False Sunflower, Smooth Oxeye; Roadside and woods; Infrequent; C = 4; BSUH 13279.
- Lactuca biennis* (Moench) Fernald; Tall Blue Lettuce; Roadside along Abington Pike; Rare; C = 2; BSUH 13538.
- Lactuca canadensis* L.; Tall or Canada Wild Lettuce; Roadside; Infrequent; C = 2; BSUH 13464.
- (*) *Lactuca serriola* L.; Prickly Lettuce; Roadside; Infrequent; C = 0; BSUH 13873.
- (*) *Leucanthemum vulgare* Lam.; SYN: *Chrysanthemum leucanthemum* L.; Ox-eye Daisy; Roadside; Rare; C = 0; BSUH 13866.
- Packera aurea* (L.) A.& D. Löve; SYN: *Senecio aureus* L.; Heart-leaved Groundsel, Golden Ragwort; In a woodland seep along the woodland road; Rare but common at this site; C = 4; BSUH 13187.
- Packera glabella* (Poir.) C. Jeffrey; SYN: *Senecio glabellus* Poir.; Butterweed, Yellowtop; Roadside; Infrequent; C = 0; BSUH 13251.
- Packera obovata* (Muhl.) W.A. Weber & A. Löve; SYN: *Senecio obovatus* Muhl.; Round-Leaved Ragwort, Running Groundsel; Woods, especially slope woods; Abundant; C = 7; BSUH 13260.
- Polymnia canadensis* L.; Pale-flowered or White-flower Leafcup; Woods along Lick Creek; Abundant; C = 3; BSUH 13381.
- Prenanthes altissima* L.; Tall White Lettuce; Woods; Abundant; C = 5; BSUH 13406, 13880.
- Rudbeckia laciniata* L.; Cut-Leaf Coneflower, Wild Golden Glow; Wet meadow and the northern floodplain woods; Rare; C = 3; BSUH 13529.
- Solidago caesia* L.; Axillary Goldenrod, Bluestem Goldenrod; Woods; Abundant; C = 7; BSUH 13171.
- Solidago canadensis* L. var. *canadensis*; Common or Canada Goldenrod; Dry field and roadside; Abundant; C = 0; BSUH 13511.
- Solidago flexicaulis* L.; Zigzag Goldenrod; North-facing slope; Rare; C = 6; BSUH 13172.
- Solidago patula* Muhl.; Rough-leaved or Roundleaf Goldenrod; Moist meadow; Infrequent; C = 8; BSUH 13178.
- (*) *Sonchus asper* (L.) Hill; Prickly or Spiny Sow Thistle; Roadside along Abington Pike; Infrequent; C = 0; BSUH 13334.
- Symphotrichum cordifolium* (L.) G.L. Nesom; SYN: *Aster cordifolius* L.; Common Blue Wood Aster, Common Blue Heart-Leaved Aster; Woods; Common; C = 5; BSUH 13170.
- Symphotrichum lanceolatum* (Willd.) G.L. Nesom; SYN: *Aster lanceolatus* Willd. var. *simplex* (Willd.) A.G. Jones, *Aster simplex* Willd.; White Panicle Aster, Eastern Lined Aster; Along Lick Creek on Salisbury Road; Infrequent; C = 3; BSUH 13164, 13182.
- Symphotrichum lateriflorum* (L.) A.& D. Löve; SYN: *Aster lateriflorus* (L.) Britton; Goblet, Calico, or Side-Flowering Aster; Woods; Common to abundant; C = 3; BSUH 13169.
- Symphotrichum novae-angliae* (L.) G.L. Nesom; SYN: *Aster novae-angliae* L.; New England Aster; Meadow at corner of Abington Pike and Salisbury Road; Rare; C = 3; BSUH 13166.

Symphytotrichum pilosum (Willd.) G.L. Nesom; SYN: *Aster pilosus* var. *pilosus* Willd.; Awl Aster, Hairy White Old-Field Aster; Dry field; Rare; C = 0; BSUH 13179.

(#) *Symphytotrichum prenanthoides* (Muhl.) G.L. Nesom; SYN: *Aster prenanthoides* Muhl.; Zigzag Aster; Crooked-stem Aster; Floodplain woods and creek banks; Common; C = 8; BSUH 13165, 13514.

(#) *Symphytotrichum shortii* (Lindl.) G.L. Nesom; SYN: *Aster shortii* Lindl.; Midwestern Blue Heart-leaved Aster, Short's Aster; Woods east of the gravel pit on Abington Pike; Rare; C = 6; BSUH 13168.

(*) *Taraxacum officinale* Weber; Common Dandelion; Roadside, dry field, and open areas of woods; Common; C = 0; BSUH 13219.

(*) *Tragopogon dubius* Scop.; Fistulose Goat's Beard; Roadside along Hunt Road; Rare; C = 0; BSUH 13306.

Verbesina alternifolia (L.) Britton; Wingstem; Northern floodplain woods; C = 3; BSUH 13450.

Vernonia gigantea (Walt.) Trel.; Tall Ironweed; Dry field and roadside; Infrequent; C = 2; BSUH 13489.

Balsaminaceae (Touch-Me-Not Family)

Impatiens capensis Meerb.; Orange or Spotted Touch-Me-Not or Jewelweed; Wet meadow, floodplain woods, and roadside along Salisbury Road; Common but locally abundant; C = 2; BSUH 13530.

Impatiens pallida Nutt.; Pale or Yellow Touch-Me-Not or Jewelweed; Wet meadows and floodplain woods; Common but locally abundant; C = 4; BSUH 13357.

Berberidaceae (Barberry Family)

(*) *Berberis thunbergii* DC.; Japanese Barberry; Northern floodplain woods; Rare; C = 0; BSUH 13470.

Jeffersonia diphylla (L.) Pers.; Twinleaf; Woods; Abundant; C = 7; BSUH 13262.

Podophyllum peltatum L.; Mayapple; Woods; Abundant; C = 3; BSUH 13258.

Betulaceae (Birch Family)

(* #) *Alnus glutinosa* (L.) Gaertn.; Black or European Alder; Planted in dry field and tree farm, they have naturalized; Abundant at these sites; C = 0; BSUH 13233.

Carpinus caroliniana Walt. var. *virginiana* (Marshall) Furlow; American Hornbeam, Blue Beech, Muscledwood; Woods; Common; C = 5; BSUH 13476.

Ostrya virginiana (Mill.) K. Koch; Hop Hornbeam, Ironwood; Woods; Infrequent; C = 5; BSUH 13337.

Boraginaceae (Borage Family)

Hackelia virginiana (L.) I.M. Johnst.; Stickseed, Beggar's Lice; Edge of woods along Salisbury

Road; Infrequent but locally common; C = 0; BSUH 13499.

Brassicaceae (Mustard Family)

(*) *Alliaria petiolata* (Bieb.) Cavara & Grande; Garlic Mustard; Woods; Abundant; C = 0; BSUH 13270.

Arabis laevigata (Muhl.) Poir.; Smooth Rock Cress; Dry ridge top around gravel pit on Abington Pike; Rare; C = 5; BSUH 13209.

(*) *Barbarea vulgaris* Ait. f.; Yellow Rocket; Roadside along Hunt Road; Rare; C = 0; BSUH 13238.

(*) *Capsella bursa-pastoris* (L.) Medik.; Shepherd's Purse; Roadside; Infrequent; C = 0; BSUH 13857.

Cardamine bulbosa (Schreb. ex Muhl.) B.S.P.; SYN: *Cardamine rhomboidea* (Pers.) DC.; Bulbous Bittercress, Spring Cress; Moist meadow; Rare, but abundant in this meadow; C = 4; BSUH 13231.

Cardamine concatenata (Michx.) Sw.; SYN: *Dentaria laciniata* Muhl.; Cutleaf or Five-parted Toothwort; Woods; Abundant; C = 4; BSUH 13259.

Cardamine douglassii Britt.; Purple Spring Cress, Limestone Bittercress, Northern Bitter Cress; Woods; Abundant; C = 5; BSUH 13861.

(*) *Cardamine hirsuta* L.; Hoary or Hairy Bittercress; Southern floodplain woods; Abundant; C = 0; BSUH 13852.

(*) *Hesperis matronalis* L.; Dame's Rocket; Roadside and northern floodplain woods; Common to abundant; C = 0; BSUH 13253.

Iodanthus pinnatifidus (Michx.) Steud.; Purple Rocket; Southern floodplain woods; Rare; C = 6; BSUH 13407.

(*) *Lepidium campestre* (L.) Ait. f.; Field Pepper Grass or Pepper Weed, Field Cress; Roadside, in and around the gravel pit on Abington Pike and in the dry field; Common; C = 0; BSUH 13212, 13222.

Lepidium virginicum L.; Poor Man's Pepper, Common or Wild Pepper Grass, Virginia Pepper Weed; Roadside along Abington Pike; Infrequent; C = 0; BSUH 13463.

Campanulaceae (Bellflower Family)

Campanulastrum americanum (L.) Small; SYN: *Campanula americana* L.; Tall or American Bellflower; Woods; Abundant; C = 4; BSUH 13354.

Lobelia inflata L.; Indian Tobacco; Woods; Infrequent; C = 3; BSUH 13878.

Lobelia siphilitica L.; Great Blue Lobelia; Moist meadow; Rare, but common in this meadow; C = 3; BSUH 13513.

Triodanis perfoliata (L.) Nieuwl.; Round-Leaved Triodanis, Claspings Venus's Looking Glass; Tree farm; Rare; C = 2; BSUH 13309.

Cannabaceae (Indian Hemp Family)

(* #) *Humulus japonicus* Sieb. & Zucc.; Japanese Hops; Roadside along Abington Pike; Rare; C = 0; BSUH 15827.

Caprifoliaceae (Honeysuckle Family)

- (*) *Lonicera x bella* Zabel; Showy Fly or Bell's Honeysuckle; Edge of floodplain woods and moist meadow; Rare; C = 0; BSUH 13232.
- (*) *Lonicera maaeckii* (Rupr.) Herder; Amur Honeysuckle; Woods and edge of dry field next to Hunt Road; Abundant; C = 0; BSUH 13239.
- Sambucus nigra* L. ssp. *canadensis* (L.) R. Bolli; SYN: *Sambucus canadensis* L.; Common Elder or Elderberry; Floodplain woods; Infrequent; C = 2; BSUH 13275.
- (#) *Triosteum aurantiacum* E. Bickn.; Orange Fruited Horse Gentian; Slope woods; Rare; C = 5; BSUH 13215.
- Viburnum molle* Michx.; Missouri Arrow Wood, Softleaf Arrow Wood; Woods; Common; C = 10; BSUH 13301.
- Viburnum prunifolium* L.; Black Haw; Woods; Infrequent; C = 4; BSUH 13205.

Caryophyllaceae (Pink Family)

- (*) *Dianthus armeria* L.; Deptford Pink; Dry field; Rare and infrequent at this site; C = 0; BSUH 13283.
- (*) *Saponaria officinalis* L.; Bouncing Bet; Roadside and edge of woods along Salisbury Road; Common; C = 0; BSUH 13356.
- (#) *Silene nivea* (Nutt.) Muhl. ex Otth.; White Campion, Evening Campion; Moist meadow; Rare; C = 7; BSUH 13368.
- (*) *Silene noctiflora* L.; Night-flowering Catchfly; Sticky Cockle; Woods along woodland road; Rare; C = 0; BSUH 13409.
- (#) *Silene stellata* (L.) Ait. f.; Starry Campion, Widow's Frill; Woods around gravel pit along Abington Pike; Rare, but locally common; C = 5; BSUH 13361.
- Silene virginica* L.; Fire Pink; Slope woods just east of gravel pit on Abington Pike; Rare but locally common; C = 7; BSUH 13326.
- (*) *Stellaria media* (L.) Vill.; Common Chickweed; Tree farm; Abundant; C = 0; BSUH 13257.
- Stellaria pubera* Michx.; Giant or Star Chickweed; Woods; Abundant; C = 7; BSUH 13264.

Celastraceae (Staff-tree Family)

- (*) *Euonymus alata* (Thunb.) Sieb.; Winged Burning Bush, Winged Euonymus; Woods; Infrequent; C = 0; BSUH 13475.
- Euonymus atropurpurea* Jacq.; Eastern Wahoo; Woods; Infrequent; C = 5; BSUH 13284, 13348, 13869.
- (*) *Euonymus fortunei* (Turcz.) Hand.-Maz.; Winter-creeper; Woods; Rare; C = 0; BSUH 13485.
- Euonymus obovata* Nutt.; Running Strawberry Bush; Woods; Infrequent; C = 7; BSUH 13173, 13477.

Chenopodiaceae (Goosefoot Family)

- (*) *Chenopodium album* L.; Lamb's Quarters; Roadside along Abington Pike; Rare; C = 0; BSUH 13161.

Clusiaceae (Mangosteen Family)

- Hypericum punctatum* Lam.; Spotted St. John's Wort; Moist meadow; Infrequent; C = 3; BSUH 13486.

Commelinaceae (Spiderwort Family)

- (*) *Commelina communis* L.; Common or Asiatic Dayflower; Roadside along Salisbury Road; Infrequent; C = 0; BSUH 13382.
- Tradescantia subaspera* Ker-Gawl.; Zigzag or Wide-leaved Spiderwort; Edge of woods along Hunt Road; Rare; C = 4; BSUH 13346.
- Tradescantia virginiana* L.; Virginia Spiderwort; Slope woods east of the old gravel pit on Abington Pike; Rare but locally abundant; C = 7; BSUH 13266.

Convolvulaceae (Morning-glory Family)

- Calystegia sepium* (L.) R. Br.; American or Hedge Bindweed; Roadside and moist meadow; Infrequent; C = 1; BSUH 13498.
- Ipomoea pandurata* (L.) G. Mey.; Wild Sweet Potato; Roadside along Salisbury Road; Infrequent; C = 3; BSUH 13497.

Cornaceae (Dogwood Family)

- Cornus alternifolia* L.f.; Pagoda Dogwood, Alternate-leaf Dogwood; Wet meadow and northern floodplain woods; Rare; C = 8; BSUH 13243, 13443.
- Cornus drummondii* C.A. Mey.; Rough-leaved Dogwood; Edge of woods along Hunt Road; Rare but locally common; C = 2; BSUH 13872.
- Cornus florida* L.; Flowering Dogwood; Woods; Infrequent; C = 4; BSUH 13522, 15829.
- Nyssa sylvatica* Marshall; Black Gum or Tupelo; Woods; Rare; C = 5; BSUH 13544.

Crassulaceae (Stonecrop Family)

- Sedum ternatum* Michx.; Woodland or Three-Leaved Stonecrop; Floodplain woods along creeks; Infrequent; C = 8; BSUH 13408, 15828.

Cucurbitaceae (Gourd Family)

- Echinocystis lobata* (Michx.) Torr. & A. Gray; Balsam Apple, Wild Cucumber; Edge of woods along Abington Pike; Rare; C = 3; BSUH 13163.

Cuscutaceae (Dodder Family)

- (#) *Cuscuta gronovii* Willd.; Common Dodder, Scaldweed; Moist meadow; Rare; C = 2; BSUH 13524.

Cyperaceae (Sedge)

- Carex aggregata* Mack.; Smooth Clustered Sedge; Meadows; Infrequent; C = 2; BSUH 13412.

- Carex albicans* Willd. ex Spreng.; Blunt-scaled Oak Sedge; Dry ridge around gravel pit on Abington Pike; Rare, but common here; C = 6; BSUH 13413.
- Carex albursina* Sheldon; Blunt-scaled Wood Sedge; Woods; Common; C = 7; BSUH 13414.
- Carex amphibola* Steud.; False Gray Sedge; Moist meadow, roadside, and woods; Common; C = 8; BSUH 13420.
- Carex blanda* Dewey; Common Wood Sedge; Woods and roadside; Common; C = 1; BSUH 13393, 13415.
- Carex careyana* Dewey; Carey's Wood Sedge; Slope woods; Infrequent; C = 9; BSUH 13416.
- Carex cephalophora* Muhl. ex Willd.; Short-headed Bracted Sedge; Dry ridge around gravel pit on Abington Pike and moist meadow; Rare; C = 3; BSUH 13417, 13427.
- (#) *Carex cristatella* Britton; Crested Oval Sedge; Moist meadow; Common; C = 3; BSUH 13418.
- (#) *Carex emoryi* Dewey; Riverbank Sedge, Emory's Sedge; Moist meadows; Rare, only three sites, but locally abundant at all sites; C = 7; BSUH 13419.
- Carex frankii* Kunth; Bristly Cattail or Frank's Sedge; Moist meadows; Rare; C = 2; BSUH 13525.
- Carex hirtifolia* Mack.; Hairy Wood Sedge; Woods on north-facing slope; Rare; C = 5; BSUH 13421.
- Carex hitchcockiana* Dewey; Hairy Gray or Hitchcock's Sedge; Upland woods; Infrequent; C = 8; BSUH 13496.
- Carex hystericina* Willd.; Porcupine Sedge, Bottlebrush Sedge; Moist meadow; Rare; C = 5; BSUH 13392.
- Carex jamesii* Schwein.; Grass Sedge; Ridgetop woods; Abundant; C = 4; BSUH 13423, 13881.
- Carex laevivaginata* (Kuk.) Mack.; Smooth-sheathed Fox Sedge; Moist meadows; Rare, but locally common; C = 7; BSUH 13422.
- Carex laxiculmis* Schwein.; Weak-stemmed Wood Sedge; Woods on south-facing slope; Infrequent; C = 7; BSUH 13425.
- Carex laxiflora* Lam.; Beech Wood Sedge; Woods; Infrequent; C = 7; BSUH 13424.
- Carex lurida* Wahl.; Bottlebrush Sedge; Moist meadows; Infrequent; C = 4; BSUH 13402.
- Carex normalis* Mack.; Spreading Oval Sedge; Dry ridge around gravel pit and roadside; Infrequent; C = 3; BSUH 13426.
- Carex shortiana* Dewey; Short's Sedge; Moist meadows; Rare, but locally common; C = 3; BSUH 13390.
- Carex sparganioides* Muhl. ex Willd.; Loose-headed Bracted Sedge; Open woods around gravel pit; Rare; C = 4; BSUH 13428.
- Carex stipata* Muhl.; Common Fox Sedge; Moist meadows; Common; C = 2; BSUH 13429.
- Carex vulpinoidea* Michx.; Brown Fox Sedge; Moist meadows; Common to abundant; C = 2; BSUH 13400.
- Cyperus strigosus* L.; False Nut Sedge, Long-scaled Nut Sedge, Straw-colored Flat Sedge; Moist meadow/roadside along Abington Pike; Rare; C = 0; BSUH 13430, 13874.
- Scirpus hattorianus* Makino; Early Dark-Green Bulrush; Moist meadow; Infrequent; C = 3; BSUH 13432.

Dioscoreaceae (Yam Family)

- (#) *Dioscorea villosa* L.; Colic Root; Wild Yamroot, Wild Yam; Woods; Common; C = 4; BSUH 13288.

Dipsacaceae (Teasel Family)

- (*) *Dipsacus fullonum* L. ssp. *sylvestris* (Huds.) Clapham; SYN: *Dipsacus sylvestris* Huds.; Common or Fuller's Teasel; Dry field and roadside; Infrequent but locally common; C = 0; BSUH 13454.

Elaeagnaceae (Oleaster Family)

- (*) *Elaeagnus umbellata* Thunb.; Autumn Olive; Woods; Rare; C = 0; BSUH 13201.

Euphorbiaceae (Spurge Family)

- Acalypha rhomboidea* Raf.; Rhombic Copperleaf, Virginia Three-seed Mercury; Roadside; Common; C = 0; BSUH 13508.
- Chamaesyce maculata* (L.) Small; SYN: *Euphorbia maculata* L.; Milk Purslane, Spotted Spurge, Spotted Sandmat; Roadside; Common; C = 0; BSUH 13503.
- Chamaesyce nutans* (Lag.) Small; SYN: *Euphorbia nutans* Lag.; Small Eyebane; Roadside; Common; C = 0; BSUH 13505.
- Euphorbia dentata* Michx.; Toothed Spurge; Roadside along Abington Pike and in woods along the woodland road; Infrequent but locally abundant; C = 0; BSUH 13468.

Fabaceae (Pea or Bean Family)

- Amphicarpaea bracteata* (L.) Fernald; American Hog Peanut; Northern floodplain woods and wet meadow; Common; C = 5; BSUH 13343.
- (#) *Apios americana* Medik.; Common Ground Nut; Along Lick Creek at Abington Pike; Rare but locally abundant; C = 3; BSUH 13281, 13504.
- Cercis canadensis* L.; Eastern Redbud; Edge of woods; Infrequent; C = 3; BSUH 13268.
- (*) *Coronilla varia* L.; Purple Crown Vetch; Roadside along Salisbury Road; Rare; C = 0; BSUH 13352.
- (#) *Desmodium cuspidatum* (Muhl.) Loud.; Big Tick Trefoil, Large Bract Tick Trefoil; Roadside and dry field; Infrequent; C = 6; BSUH 13519.
- Desmodium glutinosum* (Muhl.) A. Wood; Cluster-leaf or Pointed-leaf Tick Trefoil; Woodland seep; Rare; C = 6; BSUH 13451.

Gleditsia triacanthos L.; Honey Locust; Open woods along hilltop near gravel pit; Rare; C = 1; BSUH 13542.

Gymnocladus dioicus (L.) K. Koch; Kentucky Coffee Tree; Northern floodplain forest; Rare; C = 4; BSUH 15824.

(*) *Medicago lupulina* L.; Black Medic; Roadside and dry field; Common to abundant; C = 0; BSUH 13236.

(*) *Medicago sativa* L.; Common Alfalfa; Roadside along Salisbury Road; Rare; C = 0; BSUH 13466.

(*) *Melilotus alba* Medik.; White Sweet Clover; Roadside along Salisbury Road; Infrequent; C = 0; BSUH 13378.

(*) *Melilotus officinalis* (L.) Lam.; Yellow Sweet Clover; Roadside along Abington Pike; Common; C = 0; BSUH 13324.

Robinia pseudoacacia L.; Black Locust; Northern floodplain woods; Common; C = 1; BSUH 13252..

(*) *Trifolium campestre* Schreb.; Pinnate or Low Hop Clover; Dry field; Rare; C = 0; BSUH 13308.

(*) *Trifolium pratense* L.; Red Clover; Roadside; Common; C = 0; BSUH 13328.

(*) *Trifolium repens* L.; White Clover; Roadside along Salisbury Road; Infrequent; C = 0; BSUH 13298.

Fagaceae (Beech Family)

Fagus grandifolia Ehrh.; American Beech; Woods; Infrequent; C = 8; BSUH 13445.

Quercus alba L.; White Oak; Woods; Infrequent; C = 5; BSUH 13375.

Quercus macrocarpa Michx.; Bur Oak; Floodplain woods; Infrequent; C = 5; BSUH 13478.

Quercus muhlenbergii Engelm.; Yellow, Chinkapin, or Chinquapin Oak; Ridgetop woods and adjacent upland slopes; Infrequent; C = 4; BSUH 13362.

Quercus rubra L.; Northern Red Oak; Woods, especially upland woods; Common; C = 4; BSUH 13365.

Fumariaceae (Fumitory Family)

Corydalis flavula (Raf.) DC.; Pale or Short-spurred Corydalis; Ridgetop woods; Rare, one colony; C = 3; BSUH 13851.

Dicentra canadensis (Goldie) Walp.; Squirrel Corn; Woods; Abundant; C = 7; BSUH 13855.

Dicentra cucullaria (L.) Bernh.; Dutchman's Breeches; Woods; Abundant; C = 6; BSUH 13853.

Gentianaceae (Gentian Family)

(#) *Frasera caroliniensis* Walt.; SYN: *Swertia caroliniensis* (Walt.) Kuntze; American Columbo; Ridgetop woods and south-facing slope woods; Rare but locally abundant; C = 8; BSUH 13320.

Geraniaceae (Geranium Family)

(* #) *Geranium dissectum* L.; Wrinkled Seeded Cranesbill, Cutleaf Geranium; Dry field; Infrequent; C = 0; BSUH 13307.

Geranium maculatum L.; Wild Geranium; Woods; Abundant; C = 4; BSUH 13185.

Grossulariaceae (Gooseberry)

(#) *Ribes cynosbati* L.; Dogberry, Eastern Prickly Gooseberry; Woods; Infrequent; C = 4; BSUH 13208.

Hippocastanaceae (Horse-chestnut Family)

Aesculus glabra Willd.; Ohio Buckeye; Woods, especially floodplain woods; Common; C = 5; BSUH 13271.

Hydrangeaceae (Hydrangea Family)

Hydrangea arborescens L.; American or Wild Hydrangea; Steep slope along Lick Creek; Rare but locally common; C = 7; BSUH 13380.

Hydrophyllaceae (Waterleaf Family)

Hydrophyllum appendiculatum Michx.; Biennial or Great Waterleaf; Woods; Common to abundant; C = 6; BSUH 13198.

Hydrophyllum macrophyllum Nutt.; Hairy or Large-leaf Waterleaf; Woods; Common to abundant; C = 7; BSUH 13325.

Phacelia purshii Buckl.; Miami Mist; Floodplain woods on north end of property; Rare; C = 3; BSUH 13227.

Iridaceae (Iris Family)

Sisyrinchium angustifolium P. Mill.; Stout Blue-eyed Grass; Ridgetop woods near the gravel pit; Infrequent; C = 3; BSUH 13322.

Juglandaceae (Walnut Family)

Carya cordiformis (Wangenh.) K. Koch; Bitternut Hickory; Woods; Infrequent; C = 5; BSUH 13180, 13444.

(#) *Carya glabra* (Mill.) Sweet; Pignut Hickory; Woods; Common; C = 4; BSUH 13453.

Carya ovata (Mill.) K. Koch; Shagbark Hickory; Woods; Common; C = 4; BSUH 13447.

(#) *Juglans cinerea* L.; Butternut; Northern floodplain woods; Rare; C = 5; BSUH 13772.

Juglans nigra L.; Black Walnut; Planted in dry field and tree farm and naturally in woods; Infrequent; C = 2; BSUH 13340.

Juncaceae (Rush Family)

Luzula multiflora (Retz.) Lej.; Common Wood Rush; South-facing woodland slope; Infrequent; C = 6; BSUH 13431.

Lamiaceae (Mint Family)

(#) *Agastache nepetoides* (L.) Kuntze; Catnip Giant Hyssop, Yellow Giant Hyssop; Dry field; Infrequent; C = 4; BSUH 13533.

- (#) *Blephilia ciliata* (L.) Benth.; Downy Wood Mint, Downy Pagoda Plant; Woods in and around the gravel pit; Common; C = 7; BSUH 13321, 13462.
- (#) *Collinsonia canadensis* L.; Northern Horse Balm, Richweed; Woods along path from woodland road to ridgetop; Rare, but locally common; C = 8; BSUH 13484.
- (*) *Glechoma hederacea* L.; Ground Ivy, Gill-Over-The-Ground, Creeping Charlie; Floodplain woods, roadside, and moist meadows; Common; C = 0; BSUH 13196, 13267.
- (*) *Lamium purpureum* L.; Purple Dead Nettle; Ridgetop around gravel pit and roadside; Infrequent; C = 0; BSUH 13207.
- Lycopus americanus* Muhl.; Common or American Water Horehound; Moist meadow; Infrequent; C = 3; BSUH 13488.
- Mentha arvensis* L. var. *canadensis* (L.) Kuntze; SYN: *Mentha arvensis* L. var. *villosa* (Benth.) S.R. Stewart; Field or Wild Mint; Moist meadow; Infrequent, but locally abundant; C = 4; BSUH 13528.
- (#) *Monarda clinopodia* L.; Basil Bee Balm; South-facing woodland slope near top of hill; Infrequent; C = 7; BSUH 13410.
- Monarda fistulosa* L.; Wild Bergamot; Edge of woods along Salisbury Road; Rare, but locally common; C = 3; BSUH 13359.
- (*) *Nepeta cataria* L.; Catnip; Roadside along Abington Pike; Rare, one large colony; C = 0; BSUH 13331.
- (*) *Prunella vulgaris* L.; Common Self Heal, Lawn Prunella; Woods and gravel pit along Abington Pike; Infrequent; C = 0; BSUH 13335.
- Scutellaria incana* Biehler; Downy or Hoary Skullcap; Woods in and around the gravel pit; Rare, but locally abundant; C = 4; BSUH 13358.
- Scutellaria lateriflora* L.; Mad-dog Skullcap; Northern floodplain woods; Rare; C = 4; BSUH 13870.
- (#) *Scutellaria ovata* Hill; Forest or Heartleaf Skullcap; Open woods on the ridgetop near the gravel pit; Rare, but locally common; C = 7; BSUH 13286.
- Stachys nuttallii* Shuttlw. ex Benth.; SYN: *Stachys cordata* Riddell; Heart-Leaved Hedge Nettle; Floodplain woods and moist meadow; Infrequent; C = 7; BSUH 13369.
- Teucrium canadense* L.; SYN: *Teucrium canadense* L. var. *virginicum* (L.) Eat.; American Germander; Northern floodplain woods near Salisbury Road; Rare, but locally common; C = 3; BSUH 13467.

Lauraceae (Laurel Family)

- Lindera benzoin* (L.) Blume; Northern or Hairy Spice Bush; Northern floodplain woods; Infrequent; C = 5; BSUH 13342.

Lemnaceae (Duckweed Family)

- Lemna minor* L.; Lesser, Small, or Common Duckweed; In standing water in wet meadow; Rare; C = 3; BSUH 13510.

Liliaceae (Lily Family)

- Allium burdickii* (Hanes) A.G. Jones; SYN: *Allium tricoccum* Ait. var. *burdickii* Hanes; Narrow-leaf Wild Leek; Hilltop and slope woods; Abundant; C = 6; BSUH 13188, 13363.
- Allium canadense* L.; Wild or Meadow Garlic; Meadows and floodplain woods; Common; C = 1; BSUH 13315.
- (*) *Allium vineale* L.; Field or Wild Garlic, Scallions; Roadside; Infrequent; C = 0; BSUH 13385, 13865.
- Erythronium americanum* Ker-Gawl.; Yellow Trout Lily, Yellow Adder's Tongue, Dog Tooth Violet; Woods; Abundant; C = 5; BSUH 13854.
- Lilium michiganense* Farw.; Michigan Lily; Edge of floodplain woods along Salisbury and Abington Pike; Infrequent to common; C = 5; BSUH 13194, 13383.
- Maianthemum racemosum* (L.) Link; SYN: *Smilacina racemosa* (L.) Desf.; Feathery False Solomon's Seal; Woods; Abundant; C = 4; BSUH 13226.
- (*) *Ornithogalum umbellatum* L.; Common Star-of-Bethlehem; Along Lick Creek; Rare, three small colonies; C = 0; BSUH 13248.
- (#) *Polygonatum biflorum* (Walt.) Elliot var. *commutatum* (Schult. f.) Morong; Smooth Solomon's Seal; Along Lick Creek next to Salisbury Road; Rare, but locally common; C = 4; BSUH 13249.
- Trillium flexipes* Raf.; Bent or Declined Trillium, Nodding Wakerobin; Woods; Common; C = 5; BSUH 13189.
- Trillium grandiflorum* (Michx.) Salisb.; Large White or Large-Flowered Trillium; Woods; Abundant; C = 8; BSUH 13204.
- Trillium nivale* Riddell; Snow Trillium, Dwarf White Wakerobin; Woods on north-facing slope; Common; C = 8; BSUH 13860.
- Trillium sessile* L.; Toadshade, Sessile Trillium; Woods; Abundant; C = 4; BSUH 13269.
- Trillium sessile* L. f. *luteum*; Toadshade, Yellow Form; Woods; Rare; C = 4; BSUH 13850.
- Uvularia grandiflora* Sm.; Large-Flower Bellwort; Woods; Common; C = 7; BSUH 13203.

Limnanthaceae (Meadow-foam Family)

- Floerkea proserpinacoides* Willd.; False Mermaid Weed; Upland woods; Common; C = 5; BSUH 13191.

Magnoliaceae (Magnolia Family)

- Liriodendron tulipifera* L.; Tulip Tree, Tulip Poplar, Yellow Poplar; Woods; Infrequent; C = 4; BSUH 13341.

Malvaceae (Mallow Family)

- (*) *Sida spinosa* L.; Prickly Sida, Prickly Mallow; Roadside along Abington Pike; Rare; C = 0; BSUH 13541.

Menispermaceae (Moonseed Family)

Menispermum canadense L.; Common Moonseed; Woods; Common to abundant; C = 3; BSUH 13241, 13277.

Moraceae (Mulberry Family)

(*) *Maclura pomifera* (Raf.) C.K. Schneid.; Osage Orange, Hedge Apple; Northern floodplain woods; Rare; C = 0; BSUH 13176.

Oleaceae (Olive Family)

Fraxinus americana L.; White Ash; Woods; Common; C = 4; BSUH 13442.

Fraxinus pennsylvanica Marshall var. *subintegerrima* (Vahl) Fernald.; SYN: *Fraxinus pennsylvanica* Marshall var. *lanceolata* (Borkh.) Sarg.; Green Ash; Woods; Common; C = 1; BSUH 13545.

Fraxinus quadrangulata Michx.; Blue Ash; Upland woods, especially around the gravel pit; Common; C = 7; BSUH 13199.

Onagraceae (Evening Primrose Family)

Circaea lutetiana L. ssp. *canadensis* (L.) Aschers. & Magnus; Broadleaf Enchanter's Nightshade; Woods; Common; C = 2; BSUH 13379.

Oenothera biennis L.; Common Evening Primrose; Roadside; Infrequent; C = 0; BSUH 13540.

Orobanchaceae (Broom-Rape Family)

(#) *Conopholis americana* (L.) Wallr.; Squaw Root, American Cancer Root; Slope woods; Rare; C = 8; BSUH 13411, 13473.

Oxalidaceae (Wood Sorrel Family)

Oxalis stricta L.; SYN: *Oxalis dillenii* Jacq.; Tall or Common Yellow Wood Sorrel; Roadside and open woods; Infrequent; C = 0; BSUH 13336.

Oxalis violacea L.; Violet Wood Sorrel; Open woods on ridgetop near the gravel pit; Rare; C = 7; BSUH 13213

Papaveraceae (Poppy Family)

Sanguinaria canadensis L.; Bloodroot; Woods; Abundant; C = 5; BSUH 13261, 13859.

Phytolaccaceae (Pokeweed Family)

Phytolacca americana L.; American Pokeweed or Pokeberry; Roadside along Abington Pike; Rare; C = 0; BSUH 13333.

Plantaginaceae (Plantain Family)

(*) *Plantago lanceolata* L.; English or Narrow-leaf Plantain; Roadside; Common; C = 0; BSUH 13299.

Plantago rugelii Decne.; American or Red-Stalked Plantain; Roadside; Common; C = 0; BSUH 13386.

(#) *Plantago virginica* L.; Dwarf or Virginia Plantain; Dry field; Rare, but locally abundant; C = 2; BSUH 13237.

Platanaceae (Plane-tree Family)

Platanus occidentalis L.; American Sycamore; Northern floodplain woods; Common; C = 3; BSUH 13295, 13377.

Poaceae (Grass Family)

(* #) *Bromus commutatus* Schrad.; Hairy Chess; Dry field; Rare, but locally abundant; C = 0; BSUH 13433.

(*) *Bromus inermis* Leyss.; Smooth or Hungarian Brome; Roadside along Salisbury Road; Infrequent; C = 0; BSUH 13397.

(#) *Bromus pubescens* Willd.; Hairy Woodland Brome; Woods along Hunt Road; Infrequent; C = 4; BSUH 13435.

(*) *Bromus tectorum* L.; Junegrass, Cheat Grass; Dry field; Rare; C = 0; BSUH 13434.

Cinna arundinacea L.; Common Wood Reed; Woods and moist meadow; Common; C = 4; BSUH 13479.

(*) *Dactylis glomerata* L.; Orchard Grass; Roadside; Common; C = 0; BSUH 13391.

Dichanthelium acuminatum (Sw.) Gould & C.A. Clark var. *fasciculatum* (Torr.) Freckmann; SYN: *Panicum implicatum* Britton, *Panicum lanuginosum* Elliot var. *implicatum* (Scribn.) Fernald; Woolly, Western, or Old-field Panic Grass; Dry field; Rare; C = 2; BSUH 13497.

(#) *Dichanthelium clandestinum* (L.) Gould; SYN: *Panicum clandestinum* L.; Deer Tongue Grass; Woods, especially the tree farm, and edge of moist meadow; Abundant; C = 3; BSUH 13437, 13867.

(*) *Digitaria ischaemum* (Schreb.) Schreb. ex Muhl.; Smooth Crab Grass; Roadside; Abundant; C = 0; BSUH 13492, 13871.

(*) *Echinochloa crusgalli* (L.) P. Beauv.; Barnyard Grass; Roadside; Infrequent; C = 0; BSUH 13440.

(#) *Echinochloa muricata* (P. Beauv.) Fernald var. *muricata*; Rough Barnyard Grass; Roadside; Infrequent; C = 1; BSUH 13981.

(*) *Eleusine indica* (L.) Gaertn.; Yard Grass; Indian Goosegrass; Crowfoot Grass; Roadside along Abington Pike; Abundant at this site; C = 0; BSUH 13465, 13493.

Elymus hystrix L.; Eastern Bottlebrush Grass; Woods; Abundant; C = 5; BSUH 13398.

(*) *Elymus repens* (L.) Gould; SYN: *Elytrigia repens* (L.) Nevski; Quack Grass; Roadside along Salisbury Road; Infrequent; C = 0; BSUH 13868.

(#) *Elymus riparius* Wieg.; Streambank Wild Rye; Northern floodplain woods; Infrequent; C = 5; BSUH 13491.

Elymus villosus Muhl. ex Willd.; Downy or Hairy Wild Rye; Woods; Infrequent, but locally abundant; C = 4; BSUH 13388.

Elymus virginicus L.; Virginia Wild Rye; Northern floodplain woods and tree farm; Abundant; C = 3; BSUH 13371.

(*) *Eragrostis cilianensis* (All.) Janchen; Stink Grass; Roadside along Abington Pike; Infrequent; C = 0; BSUH 13439.

Festuca subverticillata (Pers.) E. Alexeev; SYN: *Festuca obtusa* Biehler; Nodding Fescue; Woods; Frequent; C = 4; BSUH 13404.

Glyceria striata (Lam.) Hitchc.; Fowl Manna Grass; Moist meadows; Common; C = 4; BSUH 13399.

Leersia virginica Willd.; White Grass; Woods and meadow at corner of Salisbury Road and Abington Pike; Rare but locally common; C = 4; BSUH 13490.

Muhlenbergia frondosa (Poir.) Fernald; Common Satan Grass, Wirestem Muhly; Roadside along Abington Pike; Abundant locally; C = 3; BSUH 13167.

Muhlenbergia schreberi J.F. Gmel.; Nimblewill; Roadside, open woods, and meadows; Abundant; C = 0; BSUH 13523.

Panicum dichotomiflorum Michx.; Knee Grass, Fall Panic Grass; Roadside; Rare; C = 0; BSUH 13158.

(#) *Panicum philadelphicum* Bernh.; Philadelphia Panic Grass; Roadside; Common; C = 4; BSUH 13436.

(*) *Phalaris arundinacea* L.; Reed Canary Grass; Wet meadow; Rare, but locally common; C = 0; BSUH 13403.

(*) *Phleum pratense* L.; Timothy Grass; Roadside and dry field; Infrequent; C = 0; BSUH 13374.

(*) *Poa annua* L.; Speargrass, Annual Blue Grass; Roadside; Common; C = 0; BSUH 13394.

(*) *Poa pratensis* L.; Kentucky Blue Grass; Roadside; Abundant; C = 0; BSUH 13395.

Poa sylvestris A. Gray; Forest or Woodland Blue Grass; Woods; Abundant; C = 5; BSUH 13396.

(*) *Poa trivialis* L.; Rough Blue Grass; Tree farm; Abundant locally; C = 0; BSUH 13438.

(*) *Schedonorus phoenix* (Scop.) Holub; SYN: *Lolium arundinaceum* (Schreb.) S.J. Darbyshire, *Festuca arundinacea* Schreb., *Festuca elatior* L. var. *arundinacea* (Schreb.) C.F.H. Wimmer; Tall Fescue; Roadside along Hunt Road; Infrequent, but locally common; C = 0; BSUH 13401.

(*) *Setaria faberi* R. Herrm.; Nodding or Giant Foxtail Grass; Roadside; Infrequent; C = 0; BSUH 13494.

(*) *Setaria pumila* (Poir.) Roem. & Schult. ssp. *pallidifusca* (Schumacher) B.K. Simon; SYN: *Setaria glauca* (L.) Beauv.; Pigeon Grass, Yellow Foxtail Grass; Roadside; Common; C = 0; BSUH 13539.

Tridens flavus (L.) Hitchc.; Common Purpletop, Purpletop Tridens; Dry field and roadside; Common; C = 1; BSUH 13535.

(*) *Zea mays* L.; Volunteer Corn; Roadside along Salisbury Road; Rare; C = 0; BSUH 13159.

Polemoniaceae (Phlox Family)

Phlox divaricata L.; Forest or Wild Blue Phlox; Woods; Abundant; C = 5; BSUH 13263.

Phlox paniculata L.; Summer or Garden Phlox; Roadside along Salisbury Road; Rare; C = 3; BSUH 13353.

Polemonium reptans L.; Spreading Jacob's Ladder, Greek Valerian; Woods; Common; C = 5; BSUH 13206.

Polygonaceae (Smartweed Family)

(*) *Polygonum aviculare* L.; Doorweed, Common or Prostrate Knotweed; Roadside along Abington Pike; Common; C = 0; BSUH 13506.

(*) *Polygonum cespitosum* Blume var. *longisetum* (de Bruyn) Stewart; SYN: *Persicaria caespitosa*; Creeping Smartweed, Oriental Lady's Thumb; Roadside along Hunt Road; Infrequent but locally abundant; C = 0; BSUH 13376.

(*) *Polygonum persicaria* L.; SYN: *Persicaria vulgaris* Webb & Moq.; Spotted Lady's Thumb; Woods along woodland road and moist meadow; Infrequent; C = 0; BSUH 13469.

Polygonum punctatum Elliot var. *confertiflorum* (Meisn.) Fasset; SYN: *Persicaria punctata* (Elliot) Small; Dotted Smartweed; Wet meadow; Infrequent; C = 3; BSUH 13457.

Polygonum scandens L.; SYN: *Fallopia scandens* (L.) Holub; Climbing False Buckwheat; Edge of woods, meadows, and open woods; Common; C = 0; BSUH 13515.

Polygonum virginianum L.; SYN: *Tovara virginiana* (L.) Raf.; Jumpseed, Virginia Knotweed; Woods; Infrequent; C = 3; BSUH 13483.

(*) *Rumex crispus* L.; Curly Dock; Dry field; Infrequent; C = 0; BSUH 13303.

(*) *Rumex obtusifolius* L.; Bitter Dock; Tree farm; Infrequent; C = 0; BSUH 13338.

Portulacaceae (Purslane Family)

Claytonia virginica L.; Virginia Spring Beauty; Woods; Abundant; C = 2; BSUH 13217, 13862.

Primulaceae (Primrose Family)

Lysimachia ciliata L.; Fringed Loosestrife; Northern floodplain woods near Salisbury Road; Rare, but locally common; C = 4; BSUH 13384.

(*) *Lysimachia nummularia* L.; Moneywort; Creeping Jenny; Moist meadow; Abundant; C = 0; BSUH 13280.

Ranunculaceae (Buttercup Family)

Actaea pachypoda Elliot; SYN: *Actaea alba* (L.) Miller; Doll's eyes, White Baneberry; Woods; Infrequent; C = 7; BSUH 13366.

Anemone virginiana L.; Tall Anemone, Tall Thimbleweed; Roadside and open woods; Infrequent; C = 4; BSUH 13351.

(#) *Clematis viorna* L.; Leather Flower, Vase Vine; Edge of woods along Abington Pike; Rare; C = 8; BSUH 13287.

Enemion biternatum Raf.; SYN: *Isoopyrum biternatum* Torr. & A. Gray; Eastern False Rue Anemone; Southern floodplain woods; Infrequent; C = 5; BSUH 13197.

Hepatica nobilis Schreb. var. *acuta* (Pursh) Steyerl.; SYN: *Hepatica acutiloba* DC., *Anemone acutiloba* (DC.) G. Lawson; Sharp-lobed Hepatica; Slope woods; Infrequent, but locally common; C = 8; BSUH 13856.

Ranunculus abortivus L.; Small-Flowering Crowfoot; Little-Leaf Buttercup; Southern floodplain woods; Infrequent; C = 0; BSUH 13192.

Ranunculus hispidus Michx. var. *hispidus*; Hispid or Hairy Buttercup; Woods along woodland road; Rare; C = 7; BSUH 13186.

Thalictrum dasycarpum Fisch. & Avé-Lall.; Purple Meadow Rue; Meadow at corner of Abington Pike and Salisbury Road; Rare; C = 4; BSUH 13389.

Thalictrum dioicum L.; Early Meadow Rue; Woods; Infrequent; C = 7; BSUH 13202.

Thalictrum thalictroides (L.) Eames & Boivin; SYN: *Anemonella thalictroides* (L.) Spach.; Rue Anemone; Floodplain woods; Infrequent; C = 7; BSUH 13193.

Rosaceae (Rose Family)

Agrimonia parviflora Ait.; Southern or Swamp Agrimony; Moist meadow; Infrequent; C = 4; BSUH 13532.

Agrimonia pubescens Wallr.; Downy Agrimony; Woods; Common; C = 5; BSUH 13543.

Agrimonia rostellata Wallr.; Woodland Agrimony, Beaked Agrimony; Woods; Common; C = 5; BSUH 13471, 13482.

Crataegus punctata Jacq.; Dotted Hawthorn; Woods; Infrequent; C = 2; BSUH 15823.

Geum canadense Jacq.; White Avens; Woods; Common; C = 1; BSUH 13291.

Geum vernum (Raf.) Torr. & A. Gray; Spring Avens; Woods; Abundant; C = 1; BSUH 13214.

(*) *Potentilla recta* L.; Sulphur Five-fingers or Cinquefoil; Roadside and dry field; Common; C = 0; BSUH 13282.

Prunus serotina Ehrh.; Wild Black Cherry; Woods; Infrequent; C = 1; BSUH 13441.

(*) *Rosa multiflora* Thunb.; Multiflora or Japanese Rose; Woods; Common; C = 0; BSUH 13327.

Rosa setigera Michx.; Climbing Prairie Rose, Illinois Rose; Edge of moist meadow and dry field; Common; C = 4; BSUH 13373.

Rubus allegheniensis T.C. Porter; Common or Allegheny Blackberry; Edge of woods and gravel

pit along Abington Pike; Infrequent; C = 2; BSUH 13221.

Rubus flagellaris Willd.; Common or Northern Dewberry; Dry field; Rare; C = 2; BSUH 13234.

Rubus occidentalis L.; Black Raspberry; Roadside and dry field; Infrequent; C = 1; BSUH 13235.

Rubus pensilvanicus Poir.; SYN: *Rubus abactus* Bailey; Pennsylvania or Yankee Blackberry; Moist meadow; Infrequent; C = 5; BSUH 13314.

Rubiaceae (Madder Family)

Galium aparine L.; Cleavers, Annual Bedstraw; Northern floodplain woods and tree farm; Common; C = 1; BSUH 13244.

Galium circaeazans Michx.; Forest Bedstraw, Smooth Wild Licorice, Licorice Bedstraw; Woods; Abundant; C = 7; BSUH 13323.

Galium concinnum Torr. & A. Gray; Shining Bedstraw; Woods; Common; C = 5; BSUH 13285.

Galium triflorum Michx.; Sweet-scented or Fragrant Bedstraw; Northern floodplain woods and moist meadow; Infrequent but locally common; C = 5; BSUH 13345.

Rutaceae (Rue Family)

Ptelea trifoliata L.; Common Hop Tree, Smooth Wafer Ash; Tree farm; C = 4; BSUH 13310.

Zanthoxylum americanum Mill.; Common Prickly Ash; Edge of moist meadow; Infrequent; C = 3; BSUH 13229, 13344.

Salicaceae (Willow Family)

Populus deltoides Marshall; Eastern Cottonwood; Northern floodplain woods; Common; C = 1; BSUH 13456.

Salix eriocephala Michx.; Diamond or Heart-Leaved Willow; Bank of Lick Creek near Abington Pike; Rare; C = 4; BSUH 13181.

Saxifragaceae (Saxifrage Family)

Heuchera americana L.; American, Common, or Tall Alumroot; Woods around the gravel pit; Common at this location; C = 7; BSUH 13223.

Mitella diphylla L.; Two-leaved Mitrewort; North-facing woodland slope and along Lick Creek; Infrequent but locally abundant; C = 7; BSUH 13228.

Scrophulariaceae (Figwort Family)

Aureolaria virginica (L.) Pennell; Downy False Foxglove; Hilltop forest near gravel pit; C = 8; BSUH 15825.

(#) *Mimulus alatus* Ait.; Sharpwing Monkey Flower; Northern floodplain woods and moist meadow; C = 4; BSUH 13495.

Penstemon calycosus Small; SYN: *Penstemon laevigatus* Ait. ssp. *calycosus* (Small) Bennett; Eastern

- Smooth Beard Tongue; Edge of woods along Abington Pike; Infrequent; C = 4; BSUH 13290.
- Scrophularia marilandica* L.; Eastern or Late Figwort; Edge of woods and along Lick Creek; Infrequent; C = 5; BSUH 13501.
- (*) *Verbascum blattaria* L.; Moth Mullein; Dry field; Rare but locally common; C = 0; BSUH 13372.
- (*) *Verbascum thapsus* L.; Common or Woolly Mullein; Roadside along Salisbury Road; Rare; C = 0; BSUH 13387.
- Veronica anagallis-aquatica* L.; SYN: *Veronica catenata* Pennell; Water Speedwell; Wet meadow; Infrequent; C = 5; BSUH 13459. [Threatened]
- (*) *Veronica arvensis* L.; Corn Speedwell; Dry ridge around gravel pit and roadside; Infrequent but locally common; C = 0; BSUH 13211.
- Veronica peregrina* L.; Purslane Speedwell, Smooth Purslane; Bank of Lick Creek; Rare; C = 0; BSUH 13245.

Smilacaceae (Catbrier Family)

- (#) *Smilax ecirrhata* (Engelm.) S. Wats.; Upright Carrion Flower; Woods; Infrequent; C = 5; BSUH 13879.
- Smilax hispida* Muhl.; SYN: *Smilax tamnoides* L., *Smilax tamnoides* L. var. *hispida* (Muhl. ex Torr.) Fernald; Bristly Greenbrier or Catbrier; Woods; Common to abundant; C = 3; BSUH 13349.

Solanaceae (Nightshade Family)

- (#) *Physalis heterophylla* Nees; Clammy Ground Cherry; Dry field; Common at this site; C = 3; BSUH 13864.
- Physalis longifolia* Nutt. var. *subglabrata* (Mack. & Bush) Cronq.; Longleaf or Smooth Ground Cherry; On woodland road; Rare; C = 0; BSUH 13875.

Staphyleaceae (Bladdernut Family)

- Staphylea trifolia* L.; American Bladdernut; Ridgeway woods; Abundant; C = 5; BSUH 13190.

Tiliaceae (Linden Family)

- Tilia americana* L.; American Basswood, American Linden; Floodplain woods; Infrequent; C = 5; BSUH 13350, 15826.

Ulmaceae (Elm Family)

- Celtis occidentalis* L.; Northern or Common Hackberry; Woods; Common; C = 3; BSUH 13157, 13446.
- Ulmus americana* L.; White or American Elm; Woods; Common; C = 3; BSUH 13460.
- Ulmus rubra* Muhl.; Slippery or Red Elm; Woods; Common; C = 3; BSUH 13296.

Urticaceae (Nettle Family)

- Boehmeria cylindrica* (L.) Sw.; Small-spike False Nettle; Wet meadow; Common at this site; C = 3; BSUH 13458.

Laportea canadensis (L.) Wedd.; Canadian Wood Nettle; Floodplain woods; Abundant; C = 2; BSUH 13487.

Pilea fontana (Lunell) Rydb.; Bog Clearweed; Northern floodplain woods; Infrequent; C = 5; BSUH 13174.

Pilea pumila (L.) A. Gray; Canadian Clearweed; Floodplain woods and moist meadow; Common to abundant; C = 2; BSUH 13526.

(#) *Urtica dioica* L. ssp. *gracilis* (Ait.) Seland.; SYN: *Urtica dioica* L. var. *procera* (Muhl.) Wedd., *Urtica procera* Willd.; Tall Nettle, California Nettle; Roadside meadow and edge of woods along Abington Pike; Infrequent but locally common; C = 1; BSUH 13332.

Valerianaceae (Valerian Family)

Valeriana pauciflora Michx.; Long-tube Valerian, Large Flower Valerian; Floodplain woods, especially along creeks, and moist meadow; Abundant; C = 7; BSUH 13242.

Valerianella umbilicata (Sull.) A. Wood; Corn Salad; Floodplain woods and moist meadow; Abundant; C = 5; BSUH 13265.

Verbenaceae (Vervain Family)

Phryma leptostachya L.; American Lopseed; Woods; Common; C = 4; BSUH 13472.

Verbena urticifolia L.; White Vervain; Meadows, fields, and roadside; Infrequent; C = 3; BSUH 13347.

Violaceae (Violet Family)

Hybanthus concolor (T. Forst.) Spreng.; Eastern Green Violet; Dry open ridgetop woods near gravel pit; Infrequent but locally abundant; C = 6; BSUH 13225.

(#) *Viola palmata* L. var. *palmata*; Wood Violet, Early Blue Violet; South-facing woodland slope; Infrequent; C = 5; BSUH 13293.

Viola pubescens Ait.; Yellow Forest Violet, Downy Yellow Violet; Woods; Abundant; C = 5; BSUH 13210.

Viola sororia Willd.; Dooryard Violet, Common Blue Violet; Woods; Abundant; C = 1; BSUH 13216.

Viola striata Ait.; Striped Creamy Violet, Common White Violet; Woods; Abundant; C = 4; BSUH 13220, 13512.

Vitaceae (Grape Family)

Parthenocissus quinquefolia (L.) Planch.; Virginia Creeper, Woodbine; Woods; Abundant; C = 2; BSUH 13370.

Vitis riparia Michx.; Riverbank Grape; Woods and along creeks; Infrequent; C = 1; BSUH 13455.

Vitis vulpina L.; Frost Grape; Dry field; Rare; C = 3; BSUH 13297.

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