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Vascular Flora of Willow Creek Natural Area, Rock Cut State Park, Rockford, Illinois

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Introduction

Rock Cut State Park is one of northern Illinois largest state parks. Located just northeast of Rockford, Illinois and bisected by I-90, the park is easily accessible to urban populations of northern Illinois and southern Wisconsin. The park contains an extensive trail system, which accommodates a variety of recreational activities. Pierce Lake, a 162-acre impoundment, adds to the appeal of Rock Cut State Park making it a popular destination for many outdoor enthusiasts. Currently, Rock Cut houses a number of areas with special biological significance. One such region within the park is the Willow Creek Natural Area (WCNA).

Lying at the western boundary of the Winnebago section of the Northeastern Moranial Division (Schwegman, 1973), the WCNA serves as a remaining example of the ecotone between prairies to the south and east and woodlands to the west. The status of many species within the natural area are threatened by the combined forces of increased recreational pressure and the introduction of exotic, non-native taxa. The data on the floristic diversity of the WCNA remains incomplete (Heim, 2001). The present study was undertaken to document the vascular flora of the natural area, and relocate those rare and endangered species historically known from the site but not observed there in recent years. Results of the survey will provide a database that may lead to the creation of new management strategies for the WCNA.

Study Area

The Willow Creek Natural Area is a 150 acre parcel located adjacent to Harlem Road in the southwest corner of the park (Figure 1.). Situated in the S ¾ SW ¼, W ¼ SE ¼ Sec. 27, S ¼ SE ¼ Sec. 28, N ¼ NE ¼ Sec. 33, N ¼ N ½ NW ¼ Sec. 34, T 45 N, R 2 E(IDC). The natural area is an upland till plain accompanied by a thin horizon of wind-blown sand over Wisconsin aged glacial till, which provided a suitable habitat for the establishment of dry-upland forest and mesic forest plant communities.

The soils in the WCNA can be divided into five types: Sogn, Comfrey, Griswold, Winnebago, and Backbone. Soil evolution depends on several factors including the slope of the land on which the soil formed, climatic conditions, and the native vegetation present during soil development. The soils associated with the north-facing dolomite cliff band (adjacent to Willow Creek) and coupled ravines are dominated by Sogn series. This series consists of shallow, somewhat excessively drained, moderately permeable soils that formed in residuum of dolomite. The Comfrey series is isolated in a narrow band above the west side of the ravine complex connecting Willow Creek to the intermittent stream. This series consists of deep, poorly drained soils that formed from alluvium. The Griswold series is the

dominant soil type of the WCNA, accounting for approximately 50-60% of the area. Occuping much of the upland forest, the Griswold series consists of deep, well-drained, moderately permeable soils that formed in calcareous sandy loam till. Additionally, the Winnebago series is found to flank the Griswold series and the Comfrey series in the south central area of WCNA. This series is characterized by deep, well-drained, moderately permeable soils that formed in a thin mantle of loess and underlying reddish paleosol that formed in the sandy loam glacial drift. The Backbone series consists of moderately deep well drained soils that formed in sand and the underlying glacial drift. Furthermore, the Backbone series is underlain by dolomite. This series can be found above the western portion of Willow Creek (USDA, 1980).

The climate in northern Illinois is continental, with hot summers and cold winters. The average summer temperature is 71° F and the average winter temperature is 23° F. The average annual precipitation is 38 inches, and of this 25 inches usually falls from April through September. The average annual snowfall is 33 inches (USDA, 1980).

Materials and Methods

A systematic survey and collection of the vascular flora within the Willow Creek Natural Area was conducted during the growing seasons of 2001 and 2002. Special attention was given to areas with high species richness such as the ravine slopes, stream edges, and margins of paths. The meander search was conducted several times a month to evaluate the vascular flora in the natural area. Specimens were typically collected in fertile condition and pressed on site or field notes were made about their presence. The fragility of the area was taken into consideration when collecting. Every effort was made to collect a voucher specimen only one time. No roots or plant species known to be rare were collected. Standard taxonomic methods were employed to identify each specimen to genus and species. Identifications were made using Swink and Wilhelm (1979), Gleason and Cronquist (1963), and Newcomb (1977). Nomenclature follows Swink and Wilhelm. Voucher specimens will be deposited at the Rock Valley College Herbarium, 3301 North Mulford Road, Rockford, Illinois 61114.

Results

The results from the current study on the flora of the Willow Creek Natural Area consisted of 226 species and subspecific taxa within 66 families and 156 genera. Of the taxa, 38 (16%) were not native to Illinois.

The fern-allies, ferns and gymnosperms are poorly represented within the Willow Creek Natural Area, accounting for only 13 species (5.8% of all taxa) while the angiosperms accounted for the remainder. Among the angiosperms, the monocots accounted for 46 species in 27 genera of 9 families (20.3%), whereas the dicots accounted for 167 species in 117 genera of 52 families (73.9%). The families with the largest number of species were Asteraceae (31), Cyperaceae (14), Ranunculaceae (13), Lilaceae (12), Poaceae (11), Rosaceae (10), and Caprifoliaaceae (10). The genera with the largest number of species were *Carex* (14), *Aster* (6), *Viburnum* (5), *Ranunculus* (4), *Ribes* (4), and *Viola* (4). Genera with 3 species included *Acer*, *Asclepias*, *Solidago*, *Cornus*, *Quercus*, *Fraxinus*, and *Anemone*. Appendix 1 provides a listing of all species reported from Willow Creek Natural Area.

Discussion

The Willow Creek Natural Area encompasses nearly 150 acres in the northwest section of Rock Cut State Park northwest of Rockford, Illinois. A wide range of natural communities provide habitat for birds, mammals, and amphibians. These habitats include dry-mesic upland forest, mesic upland forest, alluvial woodlands, dolomite cliffs, old-field communities and stream margins. The uniqueness of the dolomite cliffs and the dry-mesic to mesic upland forest combine to create a floristically diverse area which supports a variety of biologically significant habitats unique to northern Illinois. The vascular flora represented in the WCNA may be deciphered by examining the vertical stratification, which includes the upper canopy, shrub layer, and understory.

The prevalent tree species of the upper canopy includes *Quercus rubra* L.(Red Oak), *Quercus alba* L. (White Oak), *Quercus macrocarpa* Michx. (Bur Oak), *Carya cordiformis* (Wang.) K.Koch. (Bitternut Hickory), *Carya ovata* (Mill.) K.Koch. (Shagbark Hickory), *Juglans cinerea* L. (Butternut), *Ulmus americana* L. (American Elm), *Prunus serotina* Ehrh. (Black Cherry), and *Acer saccharum* Marsh. (Sugar Maple). Sugar maple is characterized by its high reproductive rate, tolerance to shade, and long life. This species has the potential for achieving high a level of dominance in the area. Due to the lack of fire these characteristics appear to be shifting the forest dynamics from an oak-hickory dominated forest to a sugar maple dominated forest.

The prevalent native shrub and small tree species which compose the understory within the WCNA include *Carpinus caroliniana* (Marsh.) Fern. (Musclewood), *Cornus alternifolia* L.f. (Alternate-leaved Dogwood), *Cornus racemosa* Lam. (Gray Dogwood), *Prunus virginiana* L. (Chokecherry), *Ostrya virginiana* (Mill.) K.Koch (Ironwood), *Viburnum rafinesquianum* Scultes (Downy Arrowwood), and *Viburnum lentago* L. (Nannyberry). In addition to the native shrub complex, there is also an increasingly dominant invasive, non-native component.

Many of the invasive, non-native taxa encountered throughout the study area where confined to path margins and other disturbed areas of low competition and increased available sunlight. The prevalent non-native shrub species encountered include *Lonicera spp.*, (Honeysuckle), *Lonicera tatarica* L., (Tartarian Honeysuckle), *Rhumnus cathartica* L. (Buckthorn), and *Euonymus alatus* (Thumb.) Sieb.(Burning Bush). In a few areas near the ravine complex the honeysuckle is having a dramatic effect on the available sunlight for many of the spring ephemerals and summer or early autumn flora.

The WCNA has a rich and diverse flora of spring ephemerals. The spring ephemerals are characterized by their short duration of aboveground parts. By the time the upper canopy leaves are fully expanded in early June, the ephemerals are completely dormant. This lifecycle is facilitated by their ability to produce enough food reserves for the duration of the summer and have for emergence again next spring. The prominent members of this group found within the WCNA include *Erythronium albidum* Nutt. (White Trout Lily), *Dicentra cucullaria* (L.) Bernh. (Dutchman's-breeches), *Claytonia virginica* L. (Spring Beauty), *Dentaria laciniata* Muhl. (Toothwort), and *Isopyrum biternatum* (Raf.) T. & G. (False Rue-Anemone).

There are many other well-known species which reach anthesis during spring, but differ from the spring ephemerals in that they retain their aboveground structures for most, if not all of the summer. The flora of this group found within the WCNA included *Sanguinaria canadensis* L. (Bloodroot), *Arisaema triphyllum* Ait. (Jack-in-the-pulpit), *Symplocarpus foetidus* (L.) Nutt. (Skunk cabbage), *Podophyllum peltatum* L. (Mayapple), *Asarum canadense* L. (Wild Ginger), *Hepatica acutiloba* DC (Acute-lobed Hepatica), *Trillium flexipes* Raf. (Declined

Trillium), *Trillium recurvatum* Beck (Red Trillium), *Dodecatheon media* L. (Shooting Star), and *Anemone quinquefolia interior* Fern. (Wood Anemone).

In addition to the early spring flora, many other understory plants representative of the dry-mesic to mesic continuum were identified. Several of these plants are true shade plants, since they can grow under the very low light intensities characteristic of a mesic forest community. Some of the most noteworthy taxa include *Aralia racemosa* L. (Spikenard), *Asclepias exaltata* L. (Poke Milkweed), *Aster furcatus* Burgess (Forked Aster), *Hydrophyllum appendiculatum* Michx. (Great Waterleaf), *Scutellaria ovata versicolor* (Nutt.) Fern (Heart-leaved Skullcap), *Mainanthemum canadense* Desf. (Canada Mayflower), and *Mitella diphylla* L. (Bishop's Cap).

The north-facing, dolomite bluffs and adjacent ravine furnish suitable habitat for a number of uncommon species such as *Crytogramma stelleri* (Gmel.) (Slender Cliff-Brake Fern), *Camptosorus rhizophyllus* L. (Walking Fern), *Mitella diphylla* L. (Bishop's Cap) , *Taxus canadensis* Marsh. (Canadian Yew) , *Dirca palustris* L. (Leatherwood), and *Carpinus caroliniana* Walt. (Ironwood).

Most of the communities have been influenced in the past by various disturbances such grazing and past logging practices. The threat to the structural integrity of this fragile and fragmented ecosystem remains high. Recreational pressures from mountain biking and poor trail designation have created a spider web of disturbance within the area. Combined, these events facilitate the spread of invasive, non-native taxa to the interior of the forest.

Due to scheduling constraints and relocation, a thorough examination of the fall flora was not possible. Further study should be conducted to evaluate the fall flora.

Conclusion

The historic combination of biological and physical events which gave rise to the plant communities at the WCNA are no longer present. An absence of landscape fire, destructive recreational use, and the introduction of aggressive non-native taxa have impacted the integrity of the natural area in a negative way.

The removal of fire has allowed the stand of native sugar maple to invade the surrounding oak-hickory woodlands. In addition, the rapid invasion of buckthorn, honeysuckle, and burning bush serve to block available sunlight to the forest floor. These events serve to reduce in number all but the most shade tolerant herbaceous species. Oak regeneration is also reduced due to the low levels of light reaching the forest floor. In short, WCNA is undergoing a secondary succession to a more closed woodland and one might expect species diversity to be reduced as a result. An aggressive program of removing non-native shrubs and the reintroduction of fire would serve to open the forest canopy.

The effort that is underway to reduce off-road mountain biking needs to be vigorously continued. Bike trails cause erosion on steep slopes. The resulting bare soils provide the disturbance which non-native taxa are particularly suited to colonize.

With the introduction of these management strategies future generations will continue to enjoy the rich biota of the WCNA.

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UTM 16 335688E 4690721N (WGS84/NAD83)
USGS **Caledonia** Quad

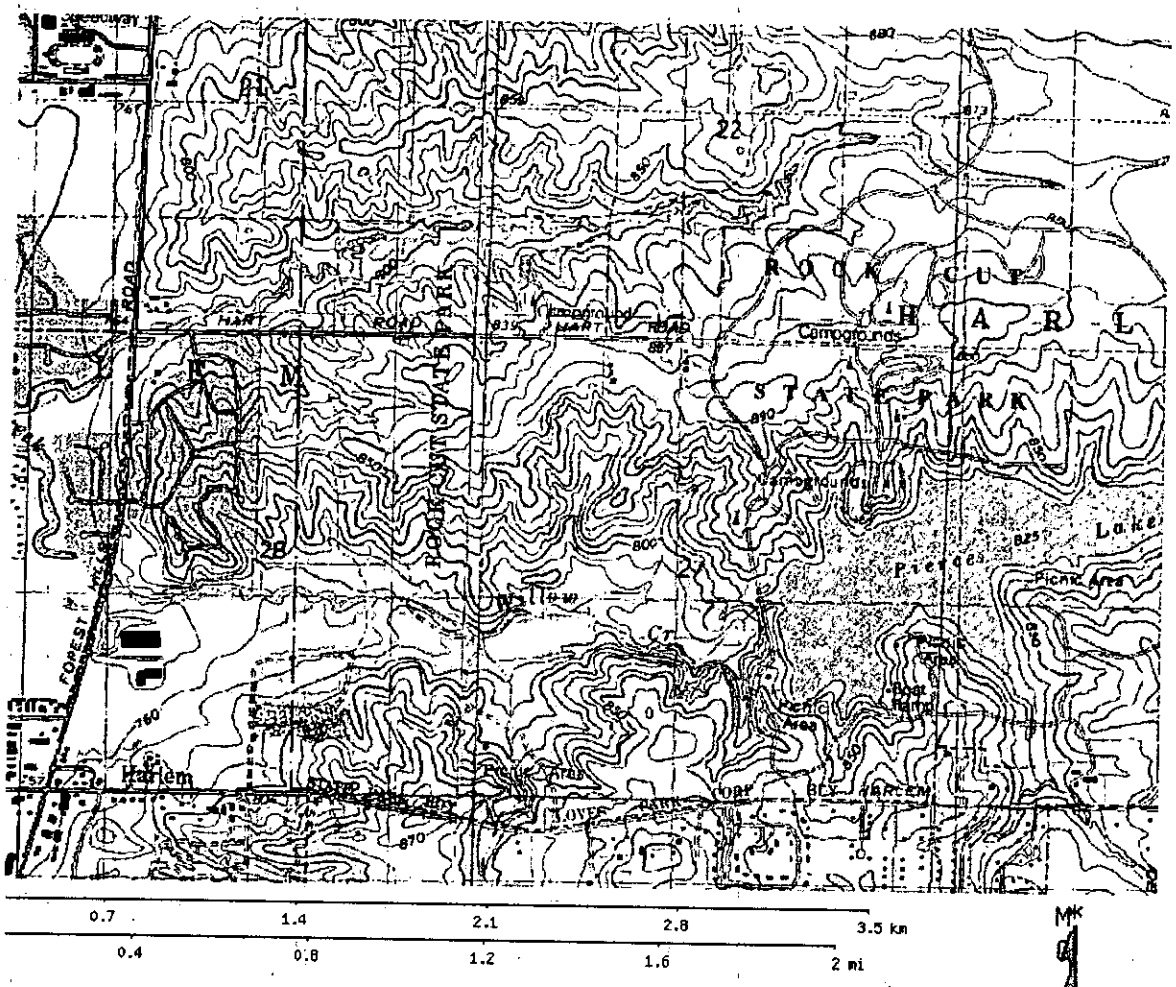

Figure 1. Topographic map of Willow Creek Natural Area and surrounding region.

APPENDIX 1
Vascular Plants of Willow Creek Natural Area, Rockford Illinois

The vascular taxa encountered and collected at the Willow Creek Natural Area during the growing seasons of 2001 and 2002 are listed in the following pages. All species are arranged into their appropriate divisions which include: Pteridophta, Sphenophyta, Coniferophyta, and Anthophyta which are divided into Monocotyledoneae and Dicotyledoneae. The families, genera, and species are arranged alphabetically within each group. After the binomial and the authority, the collection numbers or observation (Ob) precede (e.g. *Arabis laevigata* (Muhl.) Poir., Smooth Rock Cress: 16, 62). An asterisk followed by the binomial indicates non-native taxa.

PHYLUM PTERIDOPHYTA

POLYPODIACEAE—POLYPODY FAMILY

Adiantum pedatum L., Maiden Hair Fern: 75
Asplenium platyneuron (L.) Oakes, Ebony Spleenwort: Ob.
Athyrium filix-femina (Spreng.) Farw., Lady Fern: 69
Camptosorus rhizophyllus (L.) Link, Walking Fern: Ob.
Cyrptogramma stelleri (Gmel.), Slender Cliffbrake Fern: Ob.
Cystopteris bulbifera (L.) Bernh., Bulblet Fern: 203
Cystopteris fragilis (L.) Bernh., Fragile Fern: 162, 204
Onoclea sensibilis L., Sensitive Fern: Ob.
Pellaea atropurpurea Mett., Purple-stemmed Cliffbrake: Ob.

OPHIOGLOSSACEAE—ADDER'S TONGUE FAMILY

Botrychium virginianum (L.) Sw., Rattlesnake Fern: 161

PHYLUM SPHENOPHYTA

EQUISETACEAE

Equisetum hyemale intermedium A.A.Eat, Tall Scouring Rush: 228

PHYLUM CONIFEROPHYTA

PINACEAE

**Pinus strobus* L., White Pine: Ob.

TAXACEAE

Taxus canadensis Marsh., Canada Yew: Ob.

PHYLUM ANTHOPHYTA

MONOCOTYLEDONAE

AMARYLLIDACEAE—AMARYLLIS FAMILY

Hypoxis hirsuta (L.) Coville, Yellow-star grass: 60

ARACEAE—ARUM FAMILY
Acors calamus L., Sweet flag: Ob.
Arisaema dracontium L., Green Dragon: 67
Arisaema triphyllum Ait., Jack-in-the-pulpit: Ob.
Symplocarpus foetidus (L.) Nutt., Skunk Cabbage: Ob.

COMMELINACEAE—SPIDERWORT FAMILY
**Commelina communis* L., Common Dayflower: 199

CYPERACEAE—SEDGE FAMILY
Carex cephalophora Muhl., Woodbank Sedge: 88, 167
Carex davisii Schwein. & Torr.: 168
Carex festucacea Schkuhr.: 175
Carex gravida Bailey:: 47, 219
Carex hirtifolia Mackenz., Hairy Sedge: 40
Carex jamesii Schwein., Grass sedge: 180
Carex laxiflora Lam., Wood Sedge: 154
Carex oligocarpa Schkuhr.: 170
Carex pensylvanica Lam., Pennsylvania Sedge: 39
Carex rosea Schkuhr.: 42, 173, 262
Carex sparganiodes Muhl.: 218
Carex sprengelii Dew., Long-beaked Sedge: 38, 119
Carex stipata Muhl.: 193
Carex vulpinoidea Michx., Fox Sedge: 169, 206

JUNCACEAE—RUSH FAMILY
Juncus tenuis Willd., Poverty Rush: 194

LEMNACEAE—DUCKWEED FAMILY
Lemna spp., Duckweed: Ob.

LILIACEAE—LILY FAMILY
Allium cernum Roth., Nodding Wild Onion: Ob.
Allium tricoccum Ait., Wild Leek: 93
Erythronium albidum Nutt., White Trout Lily: 2
Maianthemum canadense interius Fern., Canada Mayflower: 73
Polygonatum canaliculutum (Muhl.) Pursh, Smooth Soloman's Seal: 61
Smilacina racemosa (L.) Desf., False Solomon's Seal: 17
Smilacina stellata (L.) Desf., Starry Solomon's Seal: 18
Smilax lasioneura Hook., Carrion Flower: 134
Smilax tamnoides hispida (Muhl.) Fern., Bristly Green Brier: Ob.
Trillium flexipes Raf., Declined Trillium: 54
Trillium recurvatum Beck, Red Trillium: 19
Uvularia grandiflora Sm., Bellwort/Wild Oats: 12

ORCHIDACEAE—ORCHID FAMILY
Liparis liliifolia L., Purple Twayblade Orchid: Ob.

POACEAE—GRASS FAMILY
Agropyron smithii Rydb., Western Wheat Grass: 226
**Dactylis glomerata* L., Orchard Grass: 46, 71
Elymus canadensis L., Canada Wild Rye: 261
Elymus villosus Muhl., Downy Wild Rye: 87
Hystrix patula Moench, Bottlebrush Grass: 263
Muhlenbergia schreberi J.F.Gmel, Niblewill: 90
Panicum spp.: 68
**Phalaris arundinaceae* L., Reed Canary Grass: 78, 225
**Phleum pratense* L., Timothy: 227
**Poa pratensis* L., Kentucky Blue Grass: 48
Oryzopsis racemosa (Sm.) Ricker, Black-seeded Rice Grass: Ob.

DICOTYLEDONAE
ACERACEAE—MAPLE FAMILY
Acer negundo L., Box Elder: 94, 115
Acer saccharinum L., Silver Maple: Ob.
Acer saccharum Marsh., Sugar Maple: 148

ANACARDIACEAE—CASHEW FAMILY
Toxicodendron radicans (L.) Kuntze, Poison Ivy: Ob.

APIACEAE—CARROT FAMILY
**Daucus carota* L., Queen-Anne's-Lace: Ob.
Osmorhiza claytonii (Michx.) C.B.Clarke, Hairy Sweet Cicely: 49
Sanicula gregaria Bickn., Clustered Black Snakeroot: 44

AQUIFOLIAACEAE—HOLLY FAMILY
Ilex verticillata (L.) Gary, Winterberry: 118

ARALIACEAE—GINSENG FAMILY
Aralia racemosa L., Spikenard: 244

ARISTOLOCHIACEAE—BIRTHWORT FAMILY
Asarum canadense L., Wild Ginger: 6

ASCLEPIADACEAE—MILKWEED FAMILY
Asclepias exaltata L., Poke Milkweed: 176
Asclepias sullivantii Engelm., Prairie Milkweed: 210
Asclepias syriaca L., Common Milkweed: Ob.

ASTERACEAE—SUNFLOWER FAMILY

**Achillea millefolium* L., Yarrow: 84

Ambrosia trifida L., Giant Ragweed: 256

Antennaria neglecta Greene, Pussytoes: 25

**Arctium tomentosum* Mill., Common Burdock: Ob.

Aster cordifolius L., Heart-leaved Aster: 252

Aster furcatus Burgess, Forked Aster: 253

Aster lateriflorus (L.) Britt., Side-flowering Aster: 240, 251

Aster ontarionis Wieg., Ontario Aster: 250

Aster pilosus Willd., Hairy Aster: Ob.

Aster sagittifolius Wedmeyer, Arrow-leaved Aster: 258

**Chrysanthemum leucanthemum pinnatifidum* Lecoq & Lamotte, Ox-eye Daisy: 82, 221

**Cichorium intybus* L., Chicory: Ob.

**Cirsium vulgare* (Savi) Tenore, Bull Thistle: 79

Erigeron philadelphicus L., Marsh Fleabane: 50

Erigeron strigosus Muhl., Daisy Fleabane: 238

Eupatorium purpureum L., Purple Joe-pye-weed: Ob.

Eupatorium rugosum Houtt, White Snakeroot: 260

Helianthus divaricatus L., Woodland Sunflower: Ob.

Heliopsis helanthoides (L.) Sweet, False Sunflower: 254

Hieracium spp.: Ob.

Lactuca canadensis L., Wild Lettuce: 242

Prenanthes spp.: 236

Ratibida pinnata (Vent.) Barnh, Yellow Coneflower: 231

Rudbeckia laciniata L., Wild Golden Glow: 259

Rudbeckia triloba L., Brown-eyed Susan: 245

Senecio pauperculus balsamitae (Muhl.) Fern., Balsam Ragwort: 59

Silphium perfoliatum L., Cup Plant: Ob.

Solidago altissima L., Tall Goldenrod: 257

Solidago canadensis L., Tall Goldenrod: 249

Solidago flexicaulis L., Broad-leaved Goldenrod: 239

**Tragopgon pratensis* L., Common Goat's Beard: 65

BALSAMINACEAE—BALSAM FAMILY

Impatiens capensis Meerb., Spotted Touch-me-not: Ob.

BERBERIDACEAE—BARBERRY FAMILY

**Berberis thunbergii* DC., Japanese barberry: 13, 126

Caulophyllum thalictroides (L.) Michx., Blue Cohosh: Ob.

Podophyllum peltatum L., Mayapple: 15

BETULACEAE—BIRCH FAMILY

Carpinus caroliniana (Marsh.) Fern., Musclewood: Ob.

Corylus americana Walt., American Hazelnut: 144

Ostrya virginiana (Mill.) K.Koch, Ironwood/Hop-hornbeam: 106, 113

BRASSIACEAE—MUSTARD FAMILY
**Alliaria officinalis* Andrz., Garlic mustard: Ob.
Arabis laevigata (Muhl.) Poir., Smoot Rockcress: 16, 62
**Barbarea vulgaris* L., Common Wintercress: 43
Cardamine bulbosa (Schreb.) BSP., Bulbous Cress: 31
Dentaria laciniata Muhl., Toothwort/Pepper Root: 4, 101
**Hesperis matronalis* L., Dame's Rocket: 171

CAMPANULACEAE—BELLFLOWER FAMILY
Campanula americana L., Tall Bellflower: 201, 224

CAPRIFOLIACEAE—HONEYSUCKLE FAMILY
Lonicera prolifera (Kirchn.) Rehd., Yellow Honeysuckle: 166
**Lonicera spp.*, Honeysuckle: 137, 246
**Lonicera tatarica* L., Tartarian Honeysuckle: 35, 129
Sambucus canadensis L., Elderberry: 139, 185
Triosteum perfoliatum L., Wild Coffee: 237
Viburnum lentago L., Nannyberry: 123, 145, 149
**Viburnum opulus* L., European Highbush Cranberry: 187
Viburnum prunifolium L., Black Haw: Ob.
Viburnum rafinesquianum Schultes, Downy Arrowwood: 142
Viburnum trilobum Marsh., High-bush Cranberry: 108, 114

CARYOPHYLLACEAE—PINK FAMILY
**Carastium vulgatum* L., Mouse-ear Chickweed: 52
**Dianthus armeria* L., Deptford Pink: 89
**Dianthus barbatus* L., Sweet William: 77
**Lychnis alba* Mill., White Campion: 63
Silene cucubalus Wibel, Bladder Campion: 233
**Stellaria media* (L.) Cyrillo, Common Chickweed: 183

CELASTRACEAE—BITTERSWEET FAMILY
**Euonymus alatus* (Thumb.) Sieb., Burning Bush: 102

CONVOLVULACEAE—MORNING-GLORY FAMILY
Convolvulus sepium L., Hedge Bindweed: 200

CORNACEAE—DOGWOOD FAMILY
Cornus alternifolia L.f., Alternate Leaved Dogwood: 141
Cornus racemosa Lam., Gray Dogwood: 130
Cornus stolonifera Michx., Red-osier Dogwood: Ob.

CUCURBITACEAE—GOURD FAMILY
Echinocysitis lobata (Michx.) T. & G., Wild Cucumber: 153

FABACEAE—BEAN FAMILY
Desmodium glutinosum (Muhl.) Pointed Tick Trefoil: Ob.
Gleditsia triacanthos L., Honey Locust: 234
**Melilotus alba* Desr., White Sweet Clover: 85
**Trifolium pratense* L., Red Clover: Ob.
**Trifolium repens* L., White Clover: Ob.
**Vicia villosa* Roth, Hairy Vetch: 182

FAGACEAE—BEECH FAMILY
Quercus alba L., White Oak: Ob.
Quercus macrocarpa Michx., Bur Oak: Ob.
Quercus rubra L., Red Oak: 105

FUMARIACEAE—FUMITORY FAMILY
Dicentra cucullaria (L.) Bernh, Dutchman's Breeches: Ob.

GERANIACEAE—GERANIUM FAMILY
Geranium maculatum L., Wild Geranium: 30, 156

HYDROPHYLLACEAE—WATERLEAF FAMILY
Hydrophyllum appediculatum Michx., Great Waterleaf: 56
Hydrophyllum virginianum L., Virginia Waterleaf: 57

HYPERICACEAE—ST. JOHN'S WORT FAMILY
Hypericum perforatum L., Common St. Johnswort: 222

JUGLANDACEAE—WALNUT FAMILY
Carya cordiformis (Wang.) K.Koch, Bitternut Hickory: Ob.
Carya ovata (Mill.) K.Koch, Shagbark Hickory: Ob.
Juglans cinerea L., Butternut: Ob.
Juglans nigra L., Black Walnut: Ob.

LAMIACEAE—MINT FAMILY
Blephilia ciliata (L.) Benth, Ohio Horse Mint: 66
**Leonurus cardiaca* L., Motherwort: Ob.
Monarda fistulosa L., Wild Bergamont: 80, 202
Scutellaria ovata versicolor (Nutt.) Fern., Heart-leaved Skullcap: 189

MORACEAE—MULBERRY FAMILY
**Morus alba* L., Mulberry: 131

OLEACEAE—ASH FAMILY
Fraxinus americana L., White Ash: 138, 151
Fraxinus pennsylvanica subintegerrima (Vahl) Fern., Green Ash: 116
Fraxinus quadrangulata Michx., Blue Ash: 124, 243

ONAGRACEAE—EVENING PRIMROSE FAMILY
Circaea quadrisulcata canadensis (L.) Hara, Enchanter's Nightshade: 86, 186

OXALIDACEAE—OXALIS FAMILY
**Oxalis europaea* Jord., Tall Wood Sorrel: Ob.
**Oxalis stricta* L., Common Wood Sorrel: Ob.

PAPAVERACEAE—POPPY FAMILY
Sanguinaria canadensis L., Bloodroot: Ob.

PLANTAGINACEAE—PLANTAIN FAMILY
**Plantago lanceolata* L., English Plantain: 216
**Plantago major* L., Common Plantain: 230

POLEMONIACEAE—PHLOX FAMILY
Polemonium reptans L., Jacobs Ladder: 26
Phlox divaricata L., Woodland Phlox: Ob.

PORTULACEAE—PURSLANE FAMILY
Claytonia virginica L., Spring Beauty: Ob.

PRIMULACEAE—PRIMROSE FAMILY
Dodecatheon meadia L., Shooting Star: 24

RANUNCULACEAE—BUTTERCUP FAMILY
Actaea pachypoda Ell., White Baneberry: Ob.
Anemone canadensis Walt., Meadow Anemone: 214
Anemone quinquefolia interior Fern., Wood Anemone: 5, 23, 95, 100
Anemone virginiana L., Thimbleweed/Tall Anemone: 76
Aquilegia canadensis L., Wild Columbine: 55
Caltha palustris L., Marsh Marigold: 111
Isopyrum biternatum (Raf.) T. & G., False Rue Anemone: Ob.
Hepatica acutiloba DC., Acute-lobed Hepatica: 3
Ranunculus abortivus L., Small Flowering Buttercup: 9
Ranunculus fascicularis Muhl., Early Buttercup: 21, 28, 96
Ranunculus hispidus Michx., Hispid Buttercup: 45
Ranunculus recurvatus Poir., Hooked Buttercup: 58, 112
Thalictrum dioicum L., Early Meadow Rue: 181

RHAMNACEAE—BUCKTHORN FAMILY
**Rhamnus cathartica* L., Common Buckthorn: 36, 125, 184, 205

ROSACEAE—ROSE FAMILY
Agrimonia gryposepala Wallr., Tall Agrimony: 229, 247
Agrimonia parviflora Ait., Swamp Agrimony: 158
Crataegus punctata Jacq., Dotted Hawthorn: 121
Fragaria virginiana Duschesne, Wild Strawberry: 27
Potentilla recta L., Sulfur Cinquefoil: 83, 188
Potentilla simplex Michx., Common Cinquefoil: 51
Prunus serotina Ehrh., Black Cherry: 14, 122, 196
Prunus virginiana L., Chokecherry: 32, 104, 136, 143
**Rosa multiflora* Thumb., Multiflora Rose: 164
Rubus occidentalis L., Black Raspberry: 53, 147, 163

RUBIACEAE—MADDER FAMILY
Galium aparine L., Bedstraw: 11

RUTACEAE—RUE FAMILY
Ptelea trifoliate L., wafer ash/hoptree: 132, 165
Zanthoxylum americanum Mill., Prickly Ash: 103, 178, 232

SALICACEAE—WILLOW FAMILY
Populus deltoides Marsh., Cottonwood: Ob.
Salix nigra Marsh., Black Willow: Ob.

SAXIFRAGACEAE—SAXIFRAGE FAMILY
Mitella diphylla L., Miterwort/Bishops Cap: 74, 120
Ribes americanum Mill., Wild Black Currant: 33, 248
Ribes cynosbati L., Prickly Gooseberry: 172
Ribes hirtellum Michx., Northern Gooseberry: 117
Ribes missouriense Nutt., Wild Gooseberry: 10, 146

SCROPHULARIACEAE—FIGWORT FAMILY
Penstemon pallidus Small, Pale Beard Tongue: 64

SOLANACEAE—NIGHTSHADE FAMILY
Physalis heterophylla Nees, Clammy Ground Cherry: 215
Solanum americanum Mill., Bittersweet Nightshade: 177
Solaunum carolinense L., Horse Nettle: 220

STAPHYLEACEAE—BLADDER-NUT FAMILY
Staphylea trifolia L., Bladdernut/Rattlebox: 135

THYMELAEACEAE—MEZEREUM FAMILY
Dirca palustris L., Leatherwood: 1

TILIACEAE—BASSWOOD FAMILY
Tillia americana L., Basswood: 128

ULMACEAE—ELM FAMILY
Ulmus americana L., American Elm: 127, 150
Ulmus rubra Muhl., Slippery Elm: Ob

VERBENACEAE—VERBENA FAMILY
Verbena stricta Vent., Hoary Vervain: 81, 223, 241

VIOLACEAE—VIOLET FAMILY
Viola pappilionaceae Pursh, Common Blue Violet: Ob.
Viola pensylvanica Michx., Smoothe Yellow Violet: 99
Viola sororia Willd., Hairy Wood Violet: 97, 98
Viola spp.: 8, 235

VITACEAE—GRAPE FAMILY
Parthenocissus inserta (Kerner) K.Fritsch, Thicket Creeper: Ob.
Parthenocissus quiquefolia (L.) Planch, Virginia Creeper: 159, 160
Vitis riparia Michx., Riverbank Grape: 133