Vascular Flora of Powhatan County, Virginia

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Vascular Flora of Powhatan County, Virginia

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ABSTRACT Powhatan County is a largely rural county of the Virginia piedmont currently experiencing exurban development pressure. Commercial pine forests occupy much of the land area; most natural vegetation occurs in various hardwood forests. Plant life is supported largely by soils derived from Proterozoic to Paleozoic metamorphic and igneous rocks, soils developed over Triassic basins, and riparian soils associated with the James and Appomattox Rivers. The annotated checklist is based on new collections gathered between September 2003 and August 2005, supplemented with records from regional herbaria and the Atlas of the Virginia Flora. Field work sampled at least 12 distinct community groups recognized in Virginia. The checklist contains 1020 taxa (1013 species, 515 genera, and 146 families). Twenty-one percent of the species are naturalized introductions. Twenty-five species (2.5% of the total) are of conservation concern, and 118 collections (12% of the total) represent new records for Powhatan County.

INTRODUCTION Powhatan County is a largely rural county in the piedmont region of Virginia that is currently experiencing significant exurban development pressure. Although its plants are reasonably well represented in regional herbarium collections, no previous county-wide floristic inventory exists. There is, however, one published list of plants for the Jones and Mill Creek watershed region (Corcoran 1981). Given its current rapid growth and concomitant loss of habitat and potential loss of biodiversity, we resolved to enumerate a comprehensive and contemporary inventory of the native and naturalized plants of Powhatan County. We accumulated records of plant occurrence in the county by means of three distinct yet mutually supportive strategies: 1) field work and collection of new herbarium specimens, 2) complementary herbarium studies to locate additional records of taxa previously collected by other botanists, and 3) gleaning of further records from the Atlas of Virginia Flora (Harvill et al. 1992, Virginia Botanical Associates 2005).

The past decade and a half has been a vibrant time for systematic botany as molecular data and cladistic analyses have transformed many long-held concepts of the natural relationships among plants (Chase 2005). The impact has been felt at all levels of the taxonomic hierarchy in terms of both taxon composition and nomenclature. Thus, although the flora of eastern North America is, generally, very well known, no published floras and few regional inventories reflect contemporary taxonomic concepts. In our attempt to produce a "modern" inventory reflecting contemporary taxonomic concepts, we relied heavily on the ongoing efforts by Alan Weakley (2002, 2005) to revise the floras of Virginia and the Carolinas. We trust that our inventory of Powhatan County plants will contribute in reciprocal fashion to the documentation of Virginia flora. Further, an ancillary goal of this study is to interpret the plant life of Powhatan County in terms of the vegetation-based ecological communities that have been defined by Fleming et al. (2004).

Geography and Land Use
Powhatan County (Figure 1) is bounded on the north by the James River, on the south by the Appomattox River, on the east by Chesterfield County, and on the west by Cumberland County. The county seat is located approximately 56 km west of the city of Richmond. Although growth is occurring throughout the county, pressure from development is greatest in the eastern portion, reflecting the influence of Richmond, Chesterfield County, and the recent completion of a major new highway (route 288) that passes through the northeastern corner of the county.

Powhatan County has an area of about 438 sq. km, or 71,000 ha (United States Department of Agriculture 1988). Following the classification adopted by Fleming et al. (2004), Powhatan County is part of the southern piedmont physiographic province of Virginia. The county's northern boundary, the James River, is also the boundary between the northern and southern physiographic provinces of the state. Given its near-central position, Powhatan County is reasonably typical of the piedmont region of Virginia which, overall, represents

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approximately 41% of the land area of the commonwealth (Virginia Department of Forestry 2005). Terrain of Powhatan County may be characterized as a gently sloping plateau of modest altitude, dissected by numerous small streams which empty into either the Appomattox River to the south or the James River to the north. The highest point in the county is 150 m above sea level in the north central portion, and the lowest point is about 37 m above sea level in the easternmost section. Commercial forestry and farming have long been the chief land uses in the county but suburban development is an increasingly important economic engine. Cultivated crops cover about 9 percent of the county and pasture, about 10 percent. Commercial forest covers at least three-fourths of the county. The largest tracts of contiguous forest (4,000–20,000 ha) are found in the northwestern portion along the Cumberland County border, in the northern section along the James River, and in the southern section along the Appomattox River. Most of the forested land is mixed hardwood or plantation pine forest (Virginia Department of Forestry 2005).

The main roadways are: US route 60, which in its east-west course bisects the county along the divide between the James and Appomattox watersheds; state route 711, which runs east-west in the northern section; state route 522, which runs north-south between the James River and route 60; and route 288 in the northeast corner of the county (Figure 1).

Geology and Soils
Metamorphic and igneous rocks, including gneiss, schist, and granite underlie about ninety percent of the county (United States Department of Agriculture 1988). Typical of the piedmont, the bedrock is relatively old, having formed in Proterozoic and Paleozoic times. Bedrock for the remaining 10 percent of the county is younger and of sedimentary origin. These sedimentary formations are located in the eastern part of the county and are composed of Triassic shales and sandstones that formed as underlying rocks began to sink with the rifting that opened the Atlantic Ocean basin. Noteworthy granite outcrops exist along Fine Creek near route 711 and near the community of Flatrock (United States Department of Agriculture 1988).
Most of the soils in Powhatan County belong to the ultisol order (Flora of North America Editorial Committee 1993). These soils are characterized by high acidity. The soils that cover the acidic sandstone and shale commonly have a strongly to very strongly acidic subsoil. Basic rocks, like some of the gneiss, commonly support a neutral to slightly acidic subsoil. Seven general soil associations are distinguished in the Soil Survey of Powhatan County (United States Department of Agriculture 1988). These soil types correlate well with landscape features yielding three groups of soil associations: soils of the piedmont plateau, soils of Triassic basin material, and soils of flood plains and river terraces.

Four distinct soil associations characteristic of the piedmont plateau dominate most of the county: Poindexter-Pacolet-Chewacla, Appling-Enon-Cecil, Cecil-Pacolet-Abell, and Cecil-Applying. These soils develop over the granite, gneiss, and schist bedrock common throughout the county.

The soils of Triassic basin regions formed by weathering of the sandstones and shales found in the eastern part of the county. Just one Triassic basin soil association is recognized for Powhatan County, the Mayodan-Creedmor-Parlow. This soil is characterized by clayey to loamy subsoil and an acidic to strongly acidic reaction. About 10 percent of area with this soil is crop or pasture land and the rest support native hardwood forest or residential development.

The soils of flood plains and river terraces are derived from water-deposited sediments of sand, silt, and clay. Two such associations are recognized in Powhatan County: Chenneby-Forestdale-Toccoa and Turbeville-Dogue-Augusta. The Chenneby-Forestdale-Toccoa association formed on recent alluvial deposits and is located along present-day flood plains of the James and Appomattox Rivers. These soils are characterized by a silty or sandy substratum, are poorly drained, and are subject to frequent flooding. They support flood-plain forests or, upon conversion to agriculture, pasture or crop land. The Turbeville-Dogue-Augusta association formed on older alluvial deposits and is located on terraces elevated above the present-day flood plains. These elevated terraces are often dissected by tributary streams. The associated soils are characterized by clayey or loamy subsoil and can be found in the northeastern and north-central sections of the county along route 711 and in one region near the Maidens Bridge. Vegetation for the majority of this soil unit is hardwood forest.

Climate

The climate of Powhatan County is generally mild with warm summers and mild winters. The average temperature in winter is 3.9°C and the average daily low is −2.2°C. The average seasonal snowfall is 40.4 cm and 4 d of the year have at least 2.5 cm of snow on the ground, on average. The average temperature in summer is 24.4°C with an average daily high of 30.6°C. The total annual precipitation is about 109 cm. Fifty-five percent of the precipitation falls between April and September. Thunderstorms occur on about 35 d each year, mostly during the summer. The preceding climate data is summarized from United States Department of Agriculture (1988).

MATERIALS AND METHODS

Field work was conducted from September 2003 through August 2005. Identifications were made by means of the keys found in Weakley (2002, 2005), published volumes of the Flora of North America series, Gleason and Cronquist (1991), and Radford et al. (1968). A complete set of herbarium vouchers collected by both authors in Powhatan County has been deposited at the University of Richmond Herbarium (URV).

Permission was obtained to collect on two very large tracts of land in the county. Belmead Plantation is located just northwest of the junction of routes 609 and 623 and is under private ownership of the Sisters of the Blessed Sacrament. The property encompasses 648 ha of varied habitat, including agricultural land, oak-hickory forest, and riparian wetlands. The northern boundary of the property is a eight-kilometer stretch of the James River. The second large land area is the Powhatan Wildlife Management Area (PWMA) operated by the Virginia Department of Game and Inland Fisheries. PWMA is located in the central-western part of the county, about five kilometers west of the Powhatan County courthouse. The PWMA property, divided approximately in half by route 60, includes 1,805 ha of varied habitat. Notable features include many streams, mature and emerging forests, open fields, four ponds and, prior to June 2004, two lakes. Torrential rains in mid-June of 2004 caused the earthen dams of the two lakes to collapse, leaving the former lake bottoms open for colonization by terrestrial vegetation. The main water drainage of PWMA is Sallee Creek, which flows north to the James River. In addition, Dr. Ellis West granted permission to collect on his property, which is located in the southwestern corner of the county with frontage on the Appomattox River. Other collecting areas included sites accessible to the public, such as the Watkins and Maidens
public boat landings and roadsides in the right-of-way.

Additional records for the inventory were gleaned from regional herbaria. The Atlas of Virginia Flora (Harvill et al. 1992) and the checklist found in Corcoran (1981) yielded a list of taxa recorded for Powhatan County but not appearing among collections held by the URV herbarium. This list was then used to locate specimens from Powhatan County held by Longwood College (FARM), Virginia Commonwealth University (VCU), and the College of William and Mary (WILLI).

RESULTS  The vascular plant inventory for Powhatan County is organized into five major groups: Pteridophytes, Gymnosperms, Basal Angiosperms, Monocots, and Eudicots. Within each of these major groups, families, genera, and species are listed alphabetically. Nomenclature follows Weakley (2005). The list contains 1020 taxa classified in 1013 species, 515 genera, and 146 families.

Entries for species collected by the first author include an abbreviation in capitals of the community type in which the plant was found, and an abbreviation in lower case designating abundance. Community types follow Fleming et al. (2004) and are abbreviated as follows:

- AF - alluvial forest
- AOH - acidic oak-hickory forest
- BOH - basic oak-hickory forest
- FF - floodplain forest
- GF - granite flatrock
- MF - basic mesic forest
- MHF - mixed hardwood forest
- PIP - piedmont prairie
- PP - floodplain ponds and pools
- RD - recently disturbed sites
- SF - swamp forest
- SGMB - sand/gravel/mud bars and shores
- SI - semipermanent impoundment.

Indications of abundance reflect the first author’s subjective impressions based on field experience within Powhatan County. Categories of abundance follow Fleming et al. (2004) and are abbreviated as follows:

- a - abundant; dominant or codominant in one or more common habitats
- la - locally abundant; dominant or codominant in specialized habitats
- c - common; frequent, easily seen or found in one or more common habitats but not dominant in any common habitat
- lc - locally common; easily seen or found in specialized habitats but not dominant
- o - occasional; infrequent, difficult to find with few individuals or colonies but found in several locations
- r - rare; very difficult to find and limited to one or a few locations or uncommon habitats

Entries based on collections made by other botanists bear neither designations of community type nor indications of abundance.

Most entries also include the name of the collector and a collection number corresponding to one voucher specimen for that taxon. Frequently encountered collector’s names are abbreviated as follows, accompanied by the locations of their herbarium vouchers:

- AMH - Alton M. Harvill, vouchers at FARM
- CES - Charles E. Stevens, vouchers at FARM
- CMC - Celeste M. Corcoran, vouchers at WILLI
- MAT - Michael A. Terry, vouchers at URV
- MFJ - Miles F. Johnson, vouchers at VCU
- WJH - W. John Hayden, vouchers at URV

Full names of other collectors are provided, accompanied by collection number and herbarium acronym.

Checklist entries consisting solely of a species name, i.e., entries without collection/voucher data, are based on records for Powhatan County gleaned from the Atlas of the Virginia Flora (Virginia Botanical Associates 2005). Presumably, voucher specimens exist for Atlas-based records but their locations (herbaria) are presently unknown to the authors.

Species names in bold indicate a county record. An asterisk (*) preceding a species name indicates that it is introduced (non-native). Entries for species listed as rare, threatened, or uncertain status by the Virginia Natural Heritage Program (Townsend 2005) terminate with its rank enclosed in brackets; these plants are also listed separately in Table 1.

PTERIDOPHYTES

Aspleniacae

Asplenium platyneuron (L.) Britton, Sterns, & Poggenberg var. platyneuron - MHF, c; MAT 091
Asplenium trichomanes L. ssp. trichomanes - CES 2924

Azollaceae

Azolla caroliniana Willdenow – PP, la; MAT 646
Table 1. Powhatan County plants considered sufficiently rare to merit a state-wide rank in the compilation of Townsend (2005)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Rarity Description</th>
<th>Species</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Extremely rare and critically imperiled, less than 6 occurrences, especially vulnerable to extinction</td>
<td><em>Isoetes piedmontana</em> (N.E. Pfeiffer) C.F. Reed</td>
<td>Ces 5729</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Lechea intermedia</em> Leggett ex Britton var. <em>intermedia</em></td>
<td>Mch 911</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Lysimachia quadrifolia</em> L.</td>
<td>Ces 8838</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Minuartia groenlandica</em> (Retzius) Ostenfeld</td>
<td>CMC 1465</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Quercus prinoides</em> Willdenow</td>
<td>CMC 679</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Scleria ciliata</em> Michaux var. <em>ciliata</em></td>
<td>Ces 2925</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Scutellaria parvula</em> Michaux var. <em>parvula</em></td>
<td>Ces 4518</td>
</tr>
<tr>
<td>S1S2</td>
<td>Intermediate between S1 and S2</td>
<td><em>Carex conoidea</em> Schkuhr ex Willdenow</td>
<td>Ces 4902</td>
</tr>
<tr>
<td>S2</td>
<td>Very rare and imperiled, with 6 to 20 occurrences, vulnerable</td>
<td><em>Eupatoriadelphus maculatus</em> (L.) King &amp; H. E. Robinson var. <em>maculatus</em></td>
<td>Ces 14159</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Scutellaria incana</em> Biehler</td>
<td>CMC 16</td>
</tr>
<tr>
<td>S3</td>
<td>Rare to uncommon, with 20 to 100 occurrences, somewhat vulnerable</td>
<td><em>Acalypha deamii</em> (Weatherby) Ahles</td>
<td>Ces 4900</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Dichanthelium raveneifi</em> (Scribner &amp; Merrill) Gould</td>
<td>Ces 8829</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Euphorbia pubentissima</em> Michaux</td>
<td>Ces 8842</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Euphorbia spathulata</em> Lamark</td>
<td>Ces 8840</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Iresine rhizomatosa</em> Standley</td>
<td>Ces 8840</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Philopsis angulata</em> L. var. <em>angulata</em></td>
<td>Ces 8840</td>
</tr>
<tr>
<td>SE</td>
<td>Exotic</td>
<td><em>Paspalum bifidum</em> (Bertoloni) Nash</td>
<td>Ces 8840</td>
</tr>
<tr>
<td>SU</td>
<td>Status uncertain</td>
<td><em>Agrostis perennans</em> (Walter) Tuckerman</td>
<td>Ces 8840</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Carex brunescens</em> (Persoon) Poiret var. <em>sphaerostachya</em> (Tuckerman) Kükenthal</td>
<td>Ces 8840</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Euphorbia pubentissima</em> Michaux</td>
<td>Ces 8840</td>
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<td><em>Euphorbia spathulata</em> Lamark</td>
<td>Ces 8840</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Iresine rhizomatosa</em> Standley</td>
<td>Ces 8840</td>
</tr>
<tr>
<td>SH</td>
<td>Formerly part of the Virginia biota with expectation it might be recovered</td>
<td><em>Paspalum bifidum</em> (Bertoloni) Nash</td>
<td>Ces 8840</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Physalis angulata</em> L. var. <em>angulata</em></td>
<td>Ces 8840</td>
</tr>
</tbody>
</table>

**Blechnaceae**

- *Woodwardia virginica* (L.) Smith - Ces 5729
- *Woodwardia areolata* (L.) Moore - CMC 911

**Dennstaedtiaceae**

- *Dennstaedtia punctilobula* (Michaux) Moore - Ces 8838
- *Pteridium aquilinum* (L.) Kuhn - Ces 8828

**Dryopteridaceae**

- *Athyrium asplenioideis* (Michaux) A. A. Eaton - BoH, c; Mat 055, Mat 747
- *Cystopteris spiralis* - BoH, r; Mat 090
- *Dryopteris carthusiana* (Villars) H. P. Fuchs - CMC 1465
- *Dryopteris cristata* (L.) Gray - CMC 679
- *Dryopteris marginalis* (L.) Gray - Ces 2925
- *Onoclea sensibilis* L. var. *sensibilis* - BoH, o; Mat 725
- *Pohlychicum acrostichoides* (Michaux) Schott - Mfh, c; Mat 066, Mat 490
- *Woodsia obtusa* (Sprengel) Torrey sp. *obtusa* - Ces 4902

**Equisetaceae**

- *Equisetum arvense* L. - BoH, r; Mat 752

**Isoaceae**

- *Isoetes engelmannii* A. Braun - BoH, r; Mat 527
- *Isoetes piedmontana* (N.E. Pfeiffer) C.F. Reed, Wieboldt 874 (Willi), Knepper & Musselman 159305A (ODU) [S17]

**Lycopodiaceae**

- *Dendrolycopodium hickeyi* (W. H. Wagner, Beitel, & R. C. Moran) A. Haines - Ces 4518 [S32]
- *Diphasiastrum digitatum* (Dillenius ex Braun) Holub - AOh, c; Mat 496
- *Huperzia lucidula* (Michaux) Trevisan - Mfh, r; Mat 602

**Ophioglossaceae**

- *Botrypus virginianus* (L.) Holub - Mfh, o; Mat 318
- *Optglossum pycnostichum* (Fernald) A. & D. Love - Mfh, r; Mat 655
- *Sceptridium bitermatum* (Savigny) Lyon - BoH, o; 1 Mat 54
- *Sceptridium dissectum* (Sprengel) Lyon - CMC 9

**Osmundaceae**

- *Osmunda cinnamomea* L. - Ces 14159
- *Osmunda regalis* L. var. *spectabilis* (Willdenow) Gray - Mfh, o; Mat 344

**Polyodiaceae**

- *Polypodium virginianum* L. - CMC 16

**Pteridaceae**

- *Adiantum pedatum* L. - Ff, o; Mat 633

**Selaginellaceae**

- *Selaginella apoda* (L.) Spring - BoH, o; Mat 611
- *Selaginella rupestris* (L.) Spring - Ces 4900

**Thelypteridaceae**

- *Phegopteris hexagonoptera* (Michaux) Fee - BoH, c; Mat 059
- *Thelypteris noveboracensis* (L.) Nieuwland - Ces 8842
- *Thelypteris palustris* Schott var. *pubescens* (Lawson) Fernald - Ces 8840
GYMNOSPERMS

CUPRESSACEAE

Juniperus virginiana L. var. virginiana – RD, a; MAT 157

PINACEAE

Pinus strobus L. – RD, r; MAT 554
Pinus taeda L. – CES 1597
Pinus virginiana Miller – RD, a; MAT 577

BASAL ANGIOSPERMS

ANNONACEAE

Asimina triloba (L.) Dunal – FF, la; MAT 237

ARISTOLOCHIACEAE

Asarum canadense L. – CES 14126
Endodeca serpentaria (L.) Rafinesque – CMC 239
Hexastylis virginica (L.) Small – MHF, c; MAT 599

LAURACEAE

Lindera benzoin (L.) Blume var. benzoin – AF, la; MAT 162, MAT 411
Sassafras albidum (Nuttall) Nees – RD, o; MAT 409

MAGNOLIACEAE

Liriodendron tulipifera L. – CMC 303
Magnolia virginiana L. – MFJ 3519

NYMPHAEACEAE

Nymphaea odorata Aiton ssp. odorata – MFJ 4791
Nuphar advena (Aiton) R. Brown ex Aiton f. – SI, la; MAT 379

SAURURACEAE

Saururus cernuus L. – SI, ic; MAT 384

MONOCOTS

AGAVACEAE

Yucca filamentosa L. – RD, c; MAT 371

ALISMATACEAE

Alisma subcordatum Rafinesque – SI, c; MAT 441, MAT 623
Sagittaria australis (J. G. Smith) Small
Sagittaria latifolia Willdenow var. pubescens (Muhlenberg ex Nuttall) J. G. Smith – SI, c; MAT 470

ALLIACEAE

Allium canadense L. var. canadense – RD, a; MAT 362, MAT 373
*Allium vineale L.

AMARYLLIDACEAE

*Narcissus pseudonarcissus L. – RD, o; MAT 755

ARACEAE

Arisaema draccontium (L.) Schott – FF, o; MAT 300
Arisaema triphyllum (L.) Schott ssp. triphyllum – MF, c; MAT 288
Leinna minuta Kunth – PP, la; MAT 443, MAT 642 [SU]
Spirodela polyrrhiza (L.) Schleiden – PP, o; MAT 444, MAT 643
Symphoricarpos foetidaus (L.) Salisbury ex W. P. C. Barton – CES 4502
Wolffia borealis (Engelmann ex Helgeman) Landolt ex Wolfland & Willdi – PP, o; MAT 644

ASPARAGACEAE

*Asparagus officinalis L. – RD, o; MAT 502

COLCHICACEAE

Uvularia perfoliata L. – BOH, o; MAT 268

COMMELINACEAE

*Commelina communis L.
Commelina diffusa Burmann f. – RD, o; MAT 011
Commelina erecta L. – CES 5657
Commelina virginica L. – AMH 31390
*Murdannia keisak (Hasskaur) Handel-Mazzetti – BOH, o; MAT 040
Tradescantia virginiana L. – CMC 479

CYPERACEAE

Bulbostylis capillaris (L.) Kunth ex C. B. Clarke – RD, o; MAT 080, MAT 630, MAT 639
Carex abscocinda Mackenzie – BOH, o; MAT 451
Carex albicans Willdenow ex Sprengel – AOH, c; MAT 192
Carex albolutescens Schweinitz – AMH 4969
Carex alburna Sheldon – CMC 232
Carex amphibiola Steudel – CES 4919
Carex bimana Dewey – BOH, o; MAT 190
Carex bromoides Willdenow ssp. bromoides – BOH, o; MAT 392
Carex brunnescens (Persoon) Poirvar sphaerostachya
(Tuckerman) Kükenthal – RD, o; MAT 225 [SU]
Carex caroliniana Schweinitz – BOH, c; MAT 391, MAT 410, MAT 424, MAT 745
Carex cephalophora Muhlenberg ex Willdenow – CMC 490
Carex comosa Boott – PP, o; MAT 440
Carex complanata Torrey & Hooker – CES 4968
Carex conoidea Schkuhr ex Willdenow – BOH, o; MAT 393, MAT 487, MAT 489 [S1S2]
Carex criotta Lamarck var. criotta – SI, c; MAT 473
Carex debilis Michaux – AMH 31339
Carex festucaee Schkuhr ex Willdenow – RD, o; MAT 296, MAT 461
Carex flaccosperma Dewey – CES 4971
Carex frankii Kunth – PP, o; MAT 428
Carex graclescens Steudel – BOH, c; MAT 297, MAT 450, MAT 452, MAT 455
Carex gracilisima Schweinitz – CES 4918
Carex grayi Carey – BOH, c; MAT 415
Carex intumesceus Rudge – CES 4921
Carex laevigatana (Kukenthal) Mackenzie – SI, c; MAT 382
Carex leavenworthii Dewey – BOH, r; MAT 387
Carex lupulina Muhlenberg ex Willdenow – PP, o; MAT 439
Carex lurida Wahlenberg – PP, c; MAT 429
Carex platychyla Carey – CES 14147
Carex prasina Wahlenberg – CMC 591
Carex rosea Schkuhr ex Willdenow – CES 4916
Carex scoparia Schkuhr ex Willdenow var. scoparia – AMH 42110
Carex sparganioides Willdenow
Carex squarrosa L. – CES 4920
Carex stipata Muhlenberg ex Willdenow var. stipata – PP, c; MAT 427
Carex stricta Lamarck – AMH 31340
Carex swanii (Fernald) Mackenzie – RD, o; MAT 485, MAT 486, MAT 499, MAT 517
Carex tribulus Muhlenberg – BOH, o; MAT 390
Carex typhina Michaux – FF, o; MAT 334
Carex vulpinoides Michaux – AMH 4948
Cyperus bipartitus Torrey – AMH 38558
Cyperus croeus Vahl – BOH, o; MAT 400
Cyperus echinatus (L.) Wood – RD, o; MAT 467, MAT 572, MAT 590
Cyperus ehrhythmrizos Muhlenberg – SI, la; MAT 728
Cyperus ficulcims Vahl – RD, o; MAT 651
Cyperus flavescens L. – RD, o; MAT 737
Cyperus hystricinus Fernald – RD, o; MAT 413
*Cyperus iria L. – RD, c; MAT 107
*Cyperus lancastriensis Porter ex A. Gray – RD, c; MAT 608
Carex odoratus L. – CMC 1302
Cyperus pseudovegetus Steudel – CES 5707
*Cyperus retrofractus (L.) Torrey – RD, o; MAT 609
Cyperus squarrosus L. – SGMB, o; MAT 687
Carex strigosus L. – RD, o; MAT 028, MAT 373, MAT 586, MAT 593, MAT 632, MAT 678, MAT 727
Dulichium arundinacemum (L.) Britton var. arundinacemum – Carol A. Kegley 60 (FARM)

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Eleocharis acicularis (L.) Roemer & J.A. Schultes – SI, o; MAT 657, MAT 723
Eleocharis engelmannii Steudel – RD, o; MAT 570, MAT 571
Eleocharis microcarpa Torrey – PP, r; MAT 442
Eleocharis obtusa (Willd.) Schultes – RD, c; MAT 025, MAT 123, MAT 159
Eleocharis tenuis (Willdenow) Schultes
Fimbristylis autumnalis (L.) Roemer & Schultes – RD, c; MAT 044, MAT 613, MAT 633
Fimbristylis dichotoma (L.) Vahl. – RD, o; MAT 079
Killinga pumila Michaux – SI, la; MAT 729
Rhychospora capitellata (Michaux) Vahl. – RD, o; MAT 544, MAT 610, MAT 637
Rhychospora globularis (Chapman) Small var. globularis – RD, t; MAT 739
Scleria pauciflora Muhlenberg ex Willdenow var. pauciflora – RD, o; MAT 079
Dioscorea villosa L. – MFJ 3592
Scleria ciliata Michaux var. ciliata – RD, r; MAT 743, MAT 748
Scleria oligantha Michaux – RD, c; MAT 591
Schoenoplectus purshianus (Fernald) M.T. Strong – WJH 2541
Schoenoplectus tabernaemontani (C. C. Gamelin) Palla – CES 4925
Scirpus cyperinus (L.) Kunth – RD, o; MAT 304, MAT 575
Sisyrinchium fuscatum Bicknell – AOH, r; MAT 366
Sisyrinchium angustifolium Miller – CMC 439
Sisyrinchium mucronatum Michaux – RD, c; MAT 240, MAT 303, MAT 460
Juncaceae

Luzula echinata (Small) Herrmann – BOH, c; MAT 166
Luzula multiflora (Erhart) Lejeune var. multiflora – RD, c; MAT 189
Liliaceae

Erythronium americanum Ker-Gawler spp. americanum – CES 4504
Lilium canadense L. – CMC 593a
Lilium superbum L. – CMC 1005
Medeola virginiana L. – MHF, ic; MAT 673

Meliaceae

Chamaeleurium luteum (L.) A. Gray – MHF, r; MAT 763
Veratum virginicum (L.) Aiton

NAJDACEAE

*Najas minor Allioni – SI, o; MAT 669

Orchidaceae

Aplectrum hyemale (Muhlenberg ex Willdenow) Torrey – BOH, r; MAT 748
Corallorhiza odontorhiza (Willdenow) Poiret – CMC 1459
Cyprigeria acaule Alton – AOH, r; MAT 260
Galaxis spectabilis (L.) Boaf. – RD, r; MAT 210
Goodyera pubescens (Willdenow) R. Brown – MHF, c; MAT 316
Liparis lilliifolia (L.) Richard ex Ker-Gawler – MHF, c; MAT 315
Malaxis unifolia Michaux – MHF, r; MAT 730
Platanthera ciliaris (L.) Lindley – CES 5673
Platanthera clavellata (Michaux) Luer – MHF, c; MAT 663
Platanthera flava (L.) Lindley – CMC 651
Platanthera lacera (Michaux) G. Don – CMC 1476
Spiranthes lacera (Raf.) Raf. var. gracilis (Bigelow) Luer – MHF, r; MAT 749
Spiranthes ovalis Lindley var. erostella Catling – CES 5672
Spiranthes tuberosa Rafinesque – CES 1313
Spiranthes vernalis Engelmann & Gray – MHF 2643
Tipularia discolor (Pusch) Nuttall – RD, o; MAT 325, MAT 607

POACEAE

*Agrostis capillaris L. – RD, c; MAT 304, MAT 738
*Agrostis eliotiana Schultes – CES 4908
*Agrostis hyemalis (Walter) Britton, Sterns, & Poggenborg – AMH 37113
*Agrostis perennans (Walter) Tuckerman – MHF, o; MAT 675 [SU]
*Agrostis stolonifera L. – CMC 593a
Alopecurus geniculatus L.
*Alopecurus myosurales Hudson
Andropogon eliotii Chapman – RD, c; MAT 101
Andropogon ternarius Michaux var. ternarius – CES 1521
Andropogon virginicus L. var. virginicus – RD, c; MAT 098
*Anthoxanthum odoratum L. – RD, c; MAT 185
*Aristida dichotoma Michaux – AMH 38448
Aristida oligantha Michaux – RD, c; MAT 706
*Arthraxon hispidus (Thunberg) Makino var. hispidus – RD, c; MAT 103, MAT 575
Brachyelytrum erectum (Schreber ex Sprengel) Pallisot de Beauvois – RD, c; MAT 575
*Bromus catharticus Vahl – RD, c; MAT 231
*Bromus commutatus Schrader – RD, c; MAT 336
*Bromus japonicus Thunberg ex Murray – MFJ 2382
Bromus latifolius (Shear) Hitchcock – BOH, r; MAT 414
Bromus mollis (Shear) Hitchcock – AF, r; MAT 394
*Bromus tectorum L.
Calamagrostis coarctata (Torrey) Eaton – CES 5673
Chasmanthium latifolium (Michaux) Yate – FF, n; MAT 004
Chasmanthium laxum (L.) Yates – RD, o; MAT 594
Typha angustifolia L. – Lane Smith 14699 (VCU)
Typha latifolia L. – RD, c; MAT 581

XYRIDACEAE

Xyris torta Smith – CMC 1620

EUDICOTS

ACANTHACEAE

Justice americana (L.) Vahl – SGMB, la; MAT 692
Ruellia carolinensis (Gmelin) Steudel – RD, c; MAT 402
Ruellia purshiana Fernald
Ruellia strepens L. – AMH 415

ADOXACEAE

Viburnum acerifolium L. – AOI, c; MAT 769
Viburnum dentatum L. var. dentatum – BOH, c; MAT 338
Viburnum nudum L. – CMC 737
Viburnum prunifolium L. – SF, r; MAT 472

ALTINGIACEAE

Liquidambar styraciflua L. – CMC 1431

AMARANTHACEAE

*Annanthus hybridus L. – RD, c; MAT 129
*Amaranthus spinosus L. – SGMB, o; MAT 685
Iresine rhizomatosa Standley – FF, lc; MAT 001 [S3]

ANACARDIACEAE

Rhus copallina L. var. latifolia Engler – BOH, r; MAT 372
Rhus glabra L. – RD, c; MAT 372
Toxicodendron radicans (L.) Kuntze – CMC 515
Toxicodendron vernix (L.) Kuntze – CMC 710

APIACEAE

Angelica venenosa (Greenway) Fernald – RD, o; MAT 510
Chaerophyllum procumbens (L.) Crantz var. procumbens – AF, c; MAT 233
Chaerophyllum tainturieri Hooker var. tainturieri – RD, c; MAT 244
Cicuta maculata L. var. maculata – SF, lc; MAT 425
*Cicuta maculata L. – RD, c; MAT 403
Cryptotaenia canadensis (L.) DC – BOH, lc; MAT 521
*Daucus carota L. – RD, o; MAT 145
Eryngium prostratum Nuttall ex Augustin de Candolle

APOCYNACEAE

Apocynum cannabinum L. – RD, c; MAT 375
Asclepias amplexicaulis Smith – RD, o; MAT 361
Asclepias incarnata L. – RD, c; MAT 402
Asclepias variegata L. – MHF, r; MAT 324
Asclepias viridiflora Rafinesque – RD, o; MAT 562
Chrysogonum virginianum L. var. virginianum – MHF, c; MAT 106

ARALIACEAE

*Aralia spinosa L. – RD, o; MAT 656
Hydrocotyle ranunculoides L. f. – PP, c; MAT 549, MAT 751

ASTERACEAE

*Achillea millefolium L. var. occidentalis Augustin de Candolle – RD, a; MAT 050
Ageratina altissima King & H. E. Robinson var. altissima – FF, c; MAT 122
Ageratina aromatica (L.) Spach – MHF, c; MAT 086
Ambrosia artemisiifolia L. – RD, a; MAT 027, MAT 146
Ambrosia bidentata Michaux – RD, r; MAT 111
Ambrosia trifida L. var. trifida – RD, o; MAT 022
Antennaria plantaginifolia (L.) Richardson – RD, a; MAT 212
Antennaria solitaria Rydberg – CMC 204

*Anthemis cotula L. – RD, a; MAT 312
*Arcium minus Bernh. – CMC 758

Arnica acuella (Walter) Britton, Sterns, & Poppenberg – CES 3367
Arnoglossus atriplicifolius L. (Robinson) – RD, o; MAT 464
*Artemisia vulgaris L. – WJH 2424
*Artemisia annua L. – RD, o; MAT 128
*Aster tataricus L. f. – RD, r; MAT 026
Baccharis halimifolia L. – RD, o; MAT 155
Bidens aristosa (Michaux) Britton – CMC 1029
Bidens bipinnata (L.) – RD, c; MAT 635
Bidens frondosa L. – AMH 38578

Bidens laevis (L.) Britton, Sterns, & Poppenberg – FF, ic; MAT 628
Bidens polylepis Blake – RD, c; MAT 109
*Bidens tripartita L. – Christina McGregor 47 (VCU)
Brickellia eugaptoroides (L.) Shimmers
*Cordia nutans L. – MFJ 4290
*Centaura biebersteinii D.C. – RD, r; MAT 505
*Centaura cyanus L. – RD, c; MAT 310
Chrysogyron virginianum L. var. virginianum – MHF, c; MAT 106
Chrysopsis mariana (L.) Elliot – RD, c; MAT 037
*Cichorium intybus L. – MFJ 2644
Cirsium discolor (Muhlenberg ex Willdenow) Sprengel – RD, c; MAT 025
Cirsium pumilum (Nutall) Sprengel – RD, o; MAT 475, MAT 714
*Cirsium vulgare (Savi) Tenore – RD, c; MAT 476, MAT 715
Conoclinium coelestinum (L.) Augustin de Candolle – RD, c; MAT 024, MAT 094

Corynactis candida L. (Cronquist) – RD, o; MAT 009
Coreopsis auriculata L. – BOH, r; MAT 417
Coreopsis lanceolata L. – John D. Reynolds 58 (VCU)
Coreopsis verticillata L. – BOH, r; MAT 357

Conoclinium coelestinum (L.) Augustin de Candolle – RD, c; MAT 024, MAT 094

Corynactis candida L. (Cronquist) – RD, o; MAT 009
Coreopsis auriculata L. – BOH, r; MAT 417
Coreopsis lanceolata L. – John D. Reynolds 58 (VCU)
Coreopsis verticillata L. – BOH, r; MAT 357

Conoclinium coelestinum (L.) Augustin de Candolle – RD, c; MAT 024, MAT 094

Coreopsis lanceolata L. – John D. Reynolds 58 (VCU)
Coreopsis verticillata L. – BOH, r; MAT 357

Conoclinium coelestinum (L.) Augustin de Candolle – RD, c; MAT 024, MAT 094
Eurybia divaricata (L.) Nesom – MHF, c; MAT 085
Euthamia graminifolia (L.) Nuttall – AMH 38580
Eutrochium fistulosum (Barratt) E. E. Lamont – MFJ 4049
Eutrochium micranthum (L.) E. E. Lamont var. micranthum – FF, r; MAT 020 [S2]
Eutrochium purpureum (L.) E. E. Lamont var. purpureum
*Galinsoga quadriradiata Ruiz & Pavon – CES 14127
Gamochaeta purpurea (L.) Cabrera – RD, o; MAT 305
Helenium flexuosum Rafinesque – CMC 1636
Helenium venosum L. – AOH, c; MAT 282
*Hypochaeris radicata L. RD, c; MAT 406
Krigia virginica (L.) Willdenow – CES 4905
Lactuca floridana (L.) Gaertner – MHF, c; MAT 67
Lactuca canadensis L. – RD, c; MAT 533
Lactuca hirsuta Muhlenberg ex Nuttall – RD, o; MAT 358
*Lactuca serriola L. – CMC 1024
Latis pilosa (Alton) Wildenow – RD, c; MAT 115
Latis squarrosa (L.) Michaux var. squarrosa – RD; MAT 056, MAO 153
Mikania scandens (L.) Willdenow – RD, o; MAT 580
Packera anoma (Wood) A. & D. Love – RD, o; MAT 698
Packera aurea (L.) A. & D. Love – FF, r; MAT 254
Packera obovata (Muhlenberg ex Willdenow) W.A. Weber & A. Love – RD, o; MAT 253
Prenanthes alpina (L.) E. E. Lamont – AMH 42944
Prenanthes altaissima L. – CMC 598
Prenanthes serpentina Parsh
Pseudognaphalium obvallatum (L.) Hilliard & Burtt – RD, c; MAT 081
Pyrrhopappus carolinianus (Walter) DC – RD, o; MAT 082
Rudbeckia fulgida Alton – Sussanah L. von Oettingen 309 (WILLI)
Rudbeckia hirta L. – RD, o; MAT 142
Rudbeckia laciniata L. – CMC 1499
Rudbeckia triloba L. – CMC 943
Ruthus flexuosum (Willdenow) Nesom var. flexuosum – RD, c; MAT 172, MAT 200
*Salvia arvensis (L.) Johnston ssp. arvensis – RD, c; MAT 172, MAT 200
Silybum marianum L. var. marianum – BOH, r; MAT 764
Symphyotrichum dumosum (L.) Nesom var. dumosum – RD, c; MAT 742
Symphyotrichum grandiflorum (L. Nesom – AMH 38580
Symphyotrichum lanceolatum (Willdenow) Nesom ssp. lanceolatum – MHH, c; MAT 089
Symphyotrichum lateriflorum (L.) Love & Love – CMC 1610
Symphyotrichum patens (Alton) Nesom – CMC 1592
Symphyotrichum pilosum (Willdenow) Nesom var. pilosum – BOH, o; MAT 064
Symphyotrichum pumicrum (L.) Love & Love – CMC 1499
Symphyotrichum undulatum (L.) Nesom – BOH, o; MAT 077, MAT 108
*Taraxacum officinale G. H. Weber ex Wiggers ssp. officinale – RD, o; MAT 738
*Tragopogon dubius Scopoli – RD, r; MAT 558
*Tussilago farfara L. – AMH 38577
Verbesina alternifolia (Britton ex Kearney – FF, r; MAT 023
Vernonia glauca (L.) Willdenow – RD, o; MAT 480, MAT 750
Vernonia noveboracensis (L.) Michaux – BOH, o; MAT 658
*Xanthium strumarium L. – SGMB, o; MAT 684

BALSAMINACEAE
Impatiens capensis Meerburb – AF, c; MAT 070
Impatiens pallida Nuttall

BERBERIDACEAE
Jeffersonia diphylla (L.) Persoon – CMC 293
Podophyllum peltatum L. – D. Donuille 095 (FARM)

BETULACEAE
Alnus serrulata (Alton) Wildenow – BOH, c; MAT 075
Betula nigra L. – CMC 1071

BIGNONIACEAE
Campsis radicans (L.) Seemann ex Burcdn – RD, c; MAT 533
Catalpa speciosa (Warder) Wurder ex Engelmann

BORAGINACEAE
*Bugloosoides arvensis (L.) Johnston ssp. arvensis – RD, c; MAT 172, MAT 200
*Cynoglossum virginianum L. var. virginianum – BOH, r; MAT 764
*Echium vulgare L. – MFJ 2535
Hackelia virginiana (L.) Johnston – CMC 1274
Myosotis macra (Draba) Engelmann – CMC 217, MAT 252b

BRASSICACEAE
*Allaria petiolata (Bieberstein) Cavar & Grande – MDF, a; MAT 216
*Anissothria thaliana (L.) Heynhold – WJH 4780
*Barbarea verna (P. Miller) Ascherson – RD, r; MAT 194
*Barbarea vulgaris Brown – CMC 170
Bochera canadensis (L.) Al-Shehbaz – BOH, r; MAT 766
Bochera leucophylla (Muhlenberg ex Wildenow) Al-Shehbaz – CMC 118
*Brassica juncea (L.) Czem. – RD, r; MAT 348
*Brassica napus L. – RD, r; MAT 559
*Calepa irregularis (Asso) Thellung – WJH 4819
*Camelina sativa (L.) Crantz – RD, r; MAT 227
*Capsella bursa-pastoris (L.) Medius – RD, c; MAT 131
Cardamine bulbosa (Schreber ex Muhlenberg) Britton, Sterns & Poggenbog – BOH, r; MAT 246
Cardamine concatenata (Michaux) Schwartz – BOH, c; MAT 211
*Cardamine hirsuta L. – RD, o; MAT 168, MAT 265
*Cardamine parviflora L. – CMC 160
*Diplotaxis muralis (L.) Augustin de Candolle – RD, r; MAT 588
*Draba verna L. – RD, c; MAT 171

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*Erysimum cheiranthoides L. – Tabby Henderson 8 (VCU)
*Lepidium campestre (L.) Brown – MFJ 3315
*Lepidium virginicum L. var. virginicum – RD, a; MAT 241, MAT 330
*Lunaria rediviva L. – RD, r; MAT 196
*Lepidium virginicum L. var. virginicum – RD, a; MAT 330
*Lunaria rediviva L. – RD, r; MAT 196
*Microthlaspi perfoliatum (L.) F.K. Meyer – SGMB, r; MAT 689
*Microthlaspi perfoliatum (L.) F.K. Meyer – SGMB, r; MAT 689
*Nasturtium officinale (L.) Brown – AOH, r; MAT 459
*Raphanus raphanistrum L. – MFJ 2563
*Rorippa palustris (L.) Besser var. palustris – SGMB, r; MAT 686
*Sisymbrium officinale (L.) Scopoli – RD, o; MAT 322
*Teesdalia nudicaulis (L.) Aiton f. – RD, o; MAT 258
*Tissop kielljovis (L.) W. J. H. – WJH 4824
*Tissop kielljovis (L.) W. J. H. – WJH 4824
*Thlaspi arvense L. – CMC 391

CABOMBACEAE
Brasenia schreberi Gmelin – MFJ 4747

CACTACEAE
Opuntia humifusa (Rafinesque) Rafinesque – CMC 1373

CAMPANULACEAE
*Lobelia cardinalis L. – MHF, o; MAT 664
*Lobelia glandulosa Walter – BOH, r; MAT 700 [SU]
*Lobelia inflata L. – RD, c; MAT 147, MAT 518, MAT 600
*Lobelia puberula Michaux – RD, o; MAT 736
*Lobelia siphilitica L. – CES 14134
*Lobelia spicata Lamarck – RD, o; MAT 736

CANNABACEAE
*Humulus japonicus Siebold & Zuccarini – FF, la; MAT 002
*Humulus lupulus L.

CAPPARIDACEAE
*Lonicera japonica Thunberg – Louise Miles 6 (VCU)
*Lonicera sempervirens L. – Merilynn M. Flynn 150 (FARM)

CAMPYLLUMACEAE
*Agrostemma githago L. – CMC 478

CARYOPHYLLACEAE
*Agrostemma githago L. – CMC 478

CEBOPHIACEAE
*Elymus angustissimus Thunberg – Louise Miles 6 (VCU)

CERCOPHYLLACEAE

CORNACEAE
Cornus amomum Miller – SI, c; MAT 376
Cornus florida L. – MHF, c; MAT 405

CORVOLVULACEAE
*Sedum sarmentosum Bunge – CMC 3500
*Sedum sarmentosum Bunge – CMC 3500

CUCURBITACEAE
Melothria pendula L. – CES 5641
Sicyos angustulus L. – CMC 1411

CURCUTACEAE
Cuscuta compacta Antoine Laurent de Jussieu ex Choisy var. compacta – CMC 1485
Cuscuta gronovii Willdenow ex J. A. Schultes – AMH 38582

CURNACEAE

CUPRACEAE

ELAEAGNACEAE
*Elaeagnus umbellata Thunberg var. parviflora (Royle) Schneider – RD, o; MAT 029

ERICACEAE
Chimaphila maculata (L.) Pursh – MHF, c; MAT 342
Chimaphila umbellata (L.) Barton var. cisatlantica Blake – CES 4511

EUPHORBIEAE
Acalypha deamif (Weatherby) Ahles – WJH 3577 [S3]
Acalypha gracilens Gray – RD, c; MAT 063, MAT 746
Acalypha rhomboidea Rafinesque – RD, c; MAT 062, MAT 134
Acalypha virginica L.
Chamaesyce humistrata (Engelmann) Small – WJH 4052
Chamaesyce maculata (L.) Small – AMH 38586
Chamaesyce nutans (Lagasca y Segura) Small – RD, c; MAT 069, MAT 702
Croton glandulosus L. var. septentrionalis Mueller of Aargau – RD, c; MAT 063, MAT 746
Croton wildenowii Webster – GF, o; MAT 640
Euphorbia cyparissias L. – RD, r; MAT 180
Euphorbia pulentissima Michaux – AOH, o; MAT 504, MAT 539
Euphorbia spathulata Lamarck – WJH 4821 [SU]
FABACEAE
Albizia julibrissin Durazzini – RD, a; MAT 532
Amphicarpaea bracteata (L.) Fernald var. bracteata – RD, o; MAT 062
Apis americana Medikus – CMC 1074
Baptisia tinctoria (L.) Ventenat – RD, c; MAT 356
Baptisia tinctoria (L.) Bentham – CMC 771
Centrosema virginianum (L.) Bentham – CMC 1267
Chamaecrista fasciculata (Michaux) Greene var. fasciculata – RD, c; MAT 053
Chamaecrista nictitans (L.) Moench var. nictitans – RD, o; MAT 038
Clitoria mariana L. var. mariana – AOH, o; MAT 536
Crotalaria sagittalis L. – RD, c; MAT 578
Desmodium glabellum (Michaux) DC – MHF, c; MAT 026
Desmodium canescens (L.) Augustin de Candolle – CMC 900
Desmodium glutinosum (Muhlenberg ex Willdenow) Wood – CES 5686
*Desmodium obtusum (Muhlenberg ex Willdenow) Augustin de Candolle – WJH 2418
Desmodium paniculatum (L.) Augustin de Candolle – CMC 1321
Desmodium rotundifolium Augustin de Candolle – CES 5683
Galactia volubilis (L.) Britton var. volubilis – AOH, c; MAT 548
Gleditsia triacanthos L. – RD, o; MAT 552
*Hypericum canadense (Maximowicz) Makino – CMC 1429
*Hypericum helvola (L.) Elliott – BOH, o; MAT 604
*Hypericum mandevillae (L.) Elliott – BOH, o; MAT 606
*Hypericum pubescens (L.) Elliott – BOH, o; MAT 608
*Hypericum cylindricum (L.) Elliott – BOH, o; MAT 610
*Hypericum pubescens (L.) Elliott – BOH, o; MAT 612
*Hypericum pendulum (L.) Elliott – BOH, o; MAT 614
*Hypericum sepium (L.) Elliott – BOH, o; MAT 616
*Hypericum umbellatum (L.) Elliott – BOH, o; MAT 618
*Hypericum virginianum (L.) Persoon – AOH, c; MAT 578
*Hypericum arvense L. – Elsie Borich 26 (VCU)
*Hypericum dubium Sibthorp – CMC 253
*Hypericum hybridum L. – AMH 42116
*Hypericum pratense L. – RD, c; MAT 143
*Hypericum repens L. – RD, c; MAT 144
Vicia caroliniana Walter
*Vicia hirsuta (L.) S. F. Gray – AMH 37119
*Vicia sativa L.ssp. nigra (L.) Erhart – RD, c; MAT 280
*Vicia tetrasperma (L.) Schreber – WJH 4822
*Vicia villosa Roth spp. varia (Host) Corbiere – RD, c; MAT 503
*Vicia villosa Roth spp. villosa – RD, c; MAT 377
*Wisteria sinensis (Sims) de Candolle – RD, c; MAT 289

FAGACEAE
Castanea dentata (Marshall) Borkhausen – CMC 841
Castanea pumila (L.) Miller – RD, c; MAT 448
Fagus grandifolia Erhardt var. caroliniana (Loudon) Fernald & Rehder – MHF, c; MAT 076
Quercus alba L. – RD, o; MAT 713
Quercus coccinea Muenchhausen – CMC 1429
Quercus falcata Michaux – JRT Moore 21 (VCU)
Quercus imbricaria Michaux – Robert A. S. Wright, no # (FARM)
Quercus lyrata Walter – CES 4942
Quercus marilandica Muenchhausen var. marilandica – CES 4934
Quercus michauxii Nuttall – CES 4941
Quercus montana Willdenow – CMC 1403
Quercus palustris Muenchhausen – AMH 31398
Quercus phellos L. – MFJ 3470
Quercus prinoides Willdenow – Robert A. S. Wright 2715 (FARM)
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Quercus rubra L. – CMC 1553
Quercus stellata Wangenheim – MFJ 3577
Quercus velutina Lamarck – MFJ 3571

FUMARIACEAE
Corydalis flavula (Rafinesque) de Candolle – RD, o; MAT 177
Dentaria canadensis (Goldie) Walpers – CMC 51
Dentaria cicutaria (L.) Bernhardi

GENTIANACEAE
Barthonia virginica (L.) Britton, Sterns, & Poggenberg – CMC 5674
Oboaria virginica L. – MHF, r; MAT 179
Sabatia angularis (L.) Pursh – RD, c; MAT 606

GERANIACEAE
Geranium carolinianum var. carolinianum – BOH, c; MAT 292
Geranium carolinianum var. confertiflorum Fernald – RD, c; MAT 249
Geranium maculatum L. – CMC 384
*Geranium molle L. – CMC 64

HALORAGACEAE
Myriophyllum aquaticum (Vell.) Verdc. – MFJ 4782
Prosperinaca palustris L. – CES 5728

HAMAMELIDACEAE
Hamamelis virginiana L.

HYDANGEACEAE
Hydrangea arborescens L. – CMC 14153
Hydrangea serrata L. – CMC 14154

HYDROPHYLLACEAE
Ellisia nympha L. – FF, r; MAT 236
Hydrophyllum canadense L. – CMC 797

HYPERICACEAE
Hypericum canadense L. – CES 5710

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Hypericum gentianoides (L.) Britton, Sterns, & Poggenberg – SI, r; MAT 149
Hypericum hypericoides (L.) Crantz – RD, c; MAT 100, MAT 525
Hypericum mutilum L. var. mutilum – RD, c; MAT 161
*Hypericum perforatum L. – RD, o; MAT 508
Hypericum prolificum L. – BOH, o; MAT 537
Hypericum punctatum Lamorex – RD, o; MAT 488
Hypericum setosum L. CES 5695 [S1S2]
Hypericum crux-andreae (L.) Crantz – CES 5702
Triadenum virginicum (L.) Rafinesque – CMC 1136
Triadenum walteri (Gmelin) Gleason – Brad Meredith 7575 (VCU)

ITEACEAE
Itea virginica L.

JUGLANDACEAE
Carya alba (L.) Nuttall ex Elliot – WJH 3342
Carya cordiformis (Wangenheim) K. Koch – CMC 1456
Carya ovalis (Wangenheim) Sargent – CMC 1591
Carya ovata (Miller) Koch – AMH 31397
Juglans nigra L. – Rick Thomas 43 (VCU)

LAMIACEAE
Agastache nepetoides (L.) Kuntze – CMC 1426
*Ajuga reptans L. – CMC 161
Blephilia ciliata (L.) Bentham – BOH, r; MAT 457
*Clinopodium amomum L. var. amomum RD, c; MAT 163
*Clinopodium vulgare L. – RD, c; MAT 160
Collinsonia canadensis L. – WJH 4214
*Cuminum cyminum L. – AOH, o; MAT 119
*Culex hederacea L. – BOH, a; MAT 163
Hedeoma pulegioides (L.) Persoon – CMC 1040
*Lamiun amplexicaule L. var. amplexicaule RD, a; MAT 193
*Lamiun purpureum L. var. purpureum – RD, o; MAT 188
*Leontodon cardio L.
Lycopus americanus Muhlenberg ex W. Barton – CMC 966
Lycopus virginicus L. – SI, c; MAT 674
*Marrubium vulgare L. – RD, c; MAT 348
*Mentha x piperita L. var. piperita – RD, o; MAT 042
Monarda fistulosa L. – CMC 904
*Perilla frutescens(L.) Britton – RD, c; MAT 015
Punarnella vulgaris L. var. lanceolata (W. Barton) Fernald – RD, o; MAT 056
Pyrenanthemum incanum (L.) Michaux var. incanum – RD, c; MAT 087
Pyrenanthemum tenuifolium Schrader – RD, o; MAT 341
Salvia lyrata L. – BOH, o; MAT 230
Salvia officinalis L.
Scutellaria elliptica Muhlenberg ex Sprengel var. elliptica – MHF, c; MAT 343, MAT 350
Scutellaria incana Biehler ined. var. nov.? (stems canescent, bracts and calyces glandular) – RD, r; MAT 595 [S2]
Scutellaria integrifolia L. – RD, c; MAT 340, MAT 398
Scutellaria lateriflora L. – FF, o; MAT 625, MAT 696
Scutellaria nervosa Pursh – BOH, r; MAT 767
Scutellaria parvula Michaux – BOH, r; MAT 458 [S1]
Stachys tenuifolia Willdenow – BOH, r; MAT 770
Teucrium canadense L. – RD, o; MAT 530, MAT 693
Trichostema brachiatum L.
Trichostema dichotomum L. – RD, c; MAT 078

LYTHRACEAE
Cuphea viscosissima Jacquin
*Rotala ramosior (L.) Koehne – RD, o; MAT 574

MELASTOMATACEAE
Rhexia mariana L. – CES 5690
Rhexia virginica L. – CES 5689

MENISPERMACEAE
Menispermum canadense L. – MHF, o; MAT 621

MOLLUGINACEAE
*Mollugo verticillata L. – RD, c; MAT 127

NYSSACEAE
Nyssa sylvatica Marshall – CMC 736

OLEACEAE
Chionanthus virginicus L. – RD, o; MAT 225, MAT 622
Fraxinus americana L. – MFJ 3482
Fraxinus pennsylvanica Marshall – CMC 450
*Ligustrum sinense Loureiro – RD, c; MAT 156, MAT 329

ONAGRACEAE
Circaea canadensis (L.) Hill – AF, la; MAT 422
Gaura lindheimeri L. – RD, r; MAT 701
Ludwigia alterniflora L. – SI, c; MAT 634
Ludwigia decurrens Walter – SI, c; MAT 071
*Ludwigia palustris (L.) Elliott – RD, c; MAT 046
Oenothera biennis L. – RD, c; MAT 141
Oenothera laciniata Hill – RD, o; MAT 668
Oenothera speciosa Nuttall – MFJ 2396
Oenothera tetragona Roth var. tetragona – BOH, MAT 471, MAT 522

OXALIDACEAE
Oxalis dillenii Jacquin – AMH 37205

ORYBLANCHACEAE
Agalinis decemloba (Greene) Pennell – RD, c; MAT 095
Aureolaria pectinata (Nuttall) Pennell – BOH, o; MAT 707
Aureolaria pedunculata (L.) Rafinesque – CMC 1179
Aureolaria virginica (L.) Pennell – BOH, o; MAT 466
Conopholis americana (L.) W. guttulat – BOH, o; MAT 244
Epilobius virginianus (L.) W. Barton – BOH, c; MAT 068
Oreobanche uniflora L. – CMC 223

OXALIDACEAE
Oxalis dillenii Jacquin – AMH 37205
Oxalis florida Salisbury – CMC 670
Oxalis stricta L. – CMC 993
Oxalis violacea L. – BOH, c; MAT 248

PAPAVERACEAE
*Papaver dubium L. – CMC 402
Sanguinaria canadensis L. – BOH, o; MAT 757

PASSIFLORACEAE
Passiflora incarnata L. – Dennis Gottlieb 3367 (VCU)

PAULOWNIACEAE
*Paulownia tomentosa (Thunberg) Stendel – RD, o; MAT 309

PENTHORACEAE
Penthorum sedoides L. – PP, c; MAT 604, MAT 672

PHRYMACEAE
Lindernia dubia (L.) Pennell var. anagallidea – CES 5643
Lindernia dubia (L.) Pennell var. dubia – RD, c; MAT 132
Mimulus alatus Aiton – SI, o; MAT 731
*Mimulus ringens L. var. ringens – PP, Ic; MAT 629
Phryma leptostachya L. var. leptostachya – MHF, c; MAT 511, MAT 523

PHYLLANTHACEAE
Phyllanthus caroliniensis Walter ssp. caroliniensis – RD, o; MAT 703

PHYTOLACCACEAE
Phytolacca americana L. – RD, a; MAT 374

PLANTAGINACEAE
Callitriche heterophylla Pursh ssp. heterophylla – BOH, o; MAT 645
Chelone glabra L. – CMC 1526
Gratiola neglecta Torrey – RD, o; MAT 614
Gratiola pilosa Michaux – CES 5696
Gratiola virginiana L. – CMC 421
Gratiola vasicula Pennell – SL, o; MAT 671
*Kickxia elatine (L.) Dumortier – CMC 805
Mecardonia acuminata (Walter) Small var. acuminata – RD, o; MAT 579
Nuttalanthus canadensis (L.) D. A. Sutton – RD, c; MAT 279, MAT 740

POLYGALACEAE
Polygala cruciata L. – CES 5694
Polygala incarnata L. – RD, o; MAT 584
Polygala mariana Miller – CMC 1447
Polygala nuttallii Torrey & Gray – RD, o; MAT 114
Polygala verticillata L. var. verticillata – RD, o; MAT 583, MAT 617

POLYGONACEAE
*Fallopia convolvulus (L.) A. Love – RD, o; MAT 665
Persicaria amphibia L. – S.F. Gray – PP, o; MAT 627
Persicaria arifolia (L.) Haraldson – J. Richardson 36 (VCU)
*Persicaria hydropiperoides (Michaux) Small – Allan Carter 4 (VCU)
Persicaria lapathifolia (L.) S. F. Gray – Gary Fleming 7657 (WILLI)
*Persicaria longiseta (de Brujn) Kitagawa – RD, o; MAT 019, MAT 030
*Persicaria maculata (Rafinesque) S.F. Gray – PP, o; MAT 434
Persicaria pensylvanica (L.) Gomez de la Maza – RD, c; MAT 113, MAT 699
Persicaria punctata(Elliot) Smoll – RD, o; MAT 016
Persicaria sagittata (L.) Gross ex Nokul – SI, Ia; MAT 041
Persicaria setacea (Baldwin) Small – Lane Smith 52 (VCU)
Persicaria virginiana (L.) Gaertner – FF, c; MAT 151
*Polygonum aviculare L. – RD, o; MAT 213
*Rumex acetosella L. – RD, o; MAT 654
*Rumex conglomeratus Murray – PP, o; MAT 430
*Rumex crispus L. var. crispus – RD, o; MAT 314
*Rumex obtusifolius L. – RD, o; MAT 654
*Rumex pulcher L. – RD, o; MAT 323
Rumex verticillatus L. – PP, o; MAT 438

PORTULACACEAE
Claytonia virginica (L.) var. acutiflora de Candolle – BOH, o; MAT 164
Phemeranthus tereifolius (Pursh) Rafinesque – GF, Ia; MAT 641
*Portulaca oleracea L. – RD, c; MAT 711

RANUNCULACEAE
Aconitum uncinatum L. – CES 31335
Actaea racemosa L. – MF, o; MAT 088
Anemone americana (Augustin de Candolle) H. Raja – BOH, o; MAT 756
Anemone virginiana L. var. virginiana – RD, c; MAT 072
Anemonella thalictroides (L.) Spach – BOH, o; MAT 165
Clematis ochroleuca Aiton – BOH, r; MAT 389
Clematis virginiana L. – SI, o; MAT 726
*Consolida ajacis (L.) Schur – MFJ 2397
Rununculus abortivus L. – BOH, o; MAT 207, MAT 420
*Ranunculus bulbosus L. – RD, c; MAT 198, MAT 218, MAT 219
Ranunculus hispidus Michaux – CMC 171
Ranunculus micranthus Nuttall – CMC 229
*Ranunculus parviflorus L. – CMC 163
Ranunculus pusillus Poiret – CMC 505
*Ranunculus sardous Crantz – RD, o; MAT 277
Ranunculus sceleratus L. – WHJ 4823
Thalictrum dasycarpum Fischer & Ave-Lallemant – MFJ 2553
Thalictrum dioicum L. – CMC 52
Thalictrum pubescens Pursh var. pubescens – GF, o; MAT 631
Thalictrum revolutum DC – MFF, o; MAT 615

RHAMNACEAE
Ceanothus americanus L. var. americanus – BOH, o; MAT 399

ROSACEAE
Agrimonia parviflora Aiton – RD, c; MAT 150
Agrimonia pubescens Wallroth – John Meyer 167 (VCU)
Agrimonia rostellata Wallroth – MFJ 4055
Amelanchier arborea (Michaux f.) Fernald var. arborea – RD, o; MAT 182, MAT 203
Amelanchier canadensis (L.) Medikus – CES 4939
Amelanchier stolonifera Wieagand – James Gardner 11 (URV)

Aronia arbutifolia (L.) Persoon

Aronia prunifolia (Marshall) Rehder – CES 4944

Aruncus dioicus (Walter) Fernald var. dioicus – BOH, o; MAT 083

Craega microphylla uniflora Muenchhausen

Craeaeus vitidos L. – BOH, r; MAT 768

Fragaria virginiana Miller – RD, c; MAT 195

Geum canadense Jacquin – BOH, c; MAT 462

Geum virginianum L. – CMC 778

Glenia trifoliata (L.) Moench – CES 4937

Potentilla canadensis L. var. canadensis – RD, c; MAT 214

*Potentilla indica (Andrews) T. Wolf – RD, c; MAT 339

Potentilla norvegica L. – CMC 701

*Potentilla recta L. – SI, lc; MAT 378

Prunus alleghaniensis Porter var. alleghaniensis – PP, o; MAT 431 [S3]

*Prunus avium L. – CMC 116

Prunus serotina Ehhrart var. serotina – RD, c; MAT 294

*Prunus communis L. – CMC 68

*Rosa bracteata Wendel – RD, o; MAT 290, MAT 295

Rosa carolina L. – BOH, c; MAT 148

Rosa virginiana Miller – CMC 460

*Rosa wichuraiana Crepin – RD, o; MAT 327

Rubus allegheniensis Porter – Louise Miles 48 (VCU)

Rubus argutus Link – RD, o; MAT 271

Rubus flagellaris Willdenow – AOH, c; MAT 269, MAT 383

Rubus occidentalis L. – J. R. T. Moore 27 (VCU)

RUBIACEAE

Cephalanthus occidentalis L. – PP, c; MAT 432, MAT 524

*Cruciata pedemontana (Belardi) Ehrand – RD, o; MAT 242

Diodia teres Walter – RD, o; MAT 112

Diodia virginiana L. – BOH, o; MAT 039

Galium aparine L. – RD, o; MAT 545, MAT 563

Galium cinereum Michaux var. hypomalacum Fernald – BOH, c; MAT 331

Galium obtusum Bigelow var. filifolium – MHF, o; MAT 317

Galium pilosum Aiton var. puncticulosum (Michaux) Torrey & Gray – AOH, c; MAT 377

Houstonia purpurea L. var. purpurea – AOH, c; MAT 262, MAT 308, MAT 616

Houstonia pusilla Schoepf – RD, r; MAT 759

Mitchella repens L. – MHF, c; MAT 724

*Sherardia arvensis L. – RD, o; MAT 313

SALICACEAE

*Populus alba L. – CMC 516

Populus deltoides Bartram ex Marshall var. deltoides

Populus grandidentata Michaux – CES 5687

Salix nigra Marshall – PP, c; MAT 264, MAT 435, MAT 436

SAMOACEAE

Samolus parviflorus Rafinesque – RD, o; MAT 135, MAT 287, MAT 529

SANALACEAE

Comandra umbellata (L.) Nuttall var. umbellata– CES 4928

SAPINDACEAE

Acer negundo L. – FF, c; MAT 178

Acer rubrum L. – M4T 3484

Acer saccharinum L. – CMC 560

SAXIFRAGACEAE

Chrysosplenium americanum Schweiniitz ex Hooker – CMC 82

Heuchera americana L. – BOH, o; MAT 299, MAT 416

Saxifraga virginissima Michaux – BOH, c; MAT 202, MAT 301

SCROPHULARIACEAE

Serrularia marilandica L. – CMC 1580

*Verbascum blattaria L. – RD, o; MAT 647

*Verbascum thapsus L. – RD, c; MAT 447

SIMAROBACEAE

*Ailanthus altissima (Miller) Swingle – CMC 1430

SOLANACEAE

*Datura stramonium L. – RD, o; MAT 661

*Lycium barbarum L. – CMC 1506

Physalis angulata L. var. angulata – RD, o; MAT 710 [SE?]

Physalis longifolia Nuttall var. subglabra (Mackenzie & Bush) Cronquist

Physalis virginiana Miller var. virginiana – CMC 427

Solanum carolinense L. var. carolinense – RD, o; MAT 363

Solanum ptychanthum Dunal – SL, o; MAT 722

STAPHYLEACEAE

Staphylea trifoliata L. – FF, MAT 235, MAT 709

TETRACHONDRAEACE

Polypremum procumbens L. – FF, o; MAT 603

ULMACEAE

Ulmus alata Michaux – RD, o; MAT 187

Ulmus americana L. – CMC 56

Ulmus rubra Muhlenberg – M4T 3496

URTIACEAE

Boehmeria cathartica (L.) Swartz – FF, lc; MAT 061

Laportea canadensis (L.) Weddell – CES 14132

Pilea pumila (L.) Gray – FF, o; MAT 018

VALERIANACEAE

*Valerianella locusta (L.) Lat. – RD, c; MAT 199, MAT 223

Vallerianella umbilicata (Sullivant) Wood – CMC 252a

VERBENACEAE

Phyla lanceolata (Michaux) Greene – RD, o; MAT 463

Verbena urticifolia L. – FF, o; MAT 509

VIOLACEAE

*Viola arvensis Murray

*Viola bicolor Pursh – RD, c; MAT 173

Viola cucullata Aiton – BOH, o; MAT 284

Viola palmastrata L. var. palmastrata – BOH, o; MAT 191, MAT 209, MAT 259

Viola primulifolia L. – CES 4935

Viola pubescens Aiton var. scabriuscula Schweinitz ex Torrey – FF, r; MAT 174

*Verbena urticifolia L. – FF, o; MAT 509

VISCACEAE

Phoradendron serotinum (Rafinesque) M. C. Johnston var. serotinum

VITACEAE

Parthenocissus quinquefolia (L.) Planchon – RD, c; MAT 500

Vitis aestivalis Michaux – M4T 3715

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DISCUSSION

Noteworthy Collections

A total of 118 taxa collected during the current study represent records for Powhatan County. In addition, 16 collected during the current study are listed on Virginia’s rare plants lists (Townsend 2005); these plants plus nine additional records of rare plants from other herbaria are summarized in Table 1. Lobelia glandulosa is particularly noteworthy. This plant was known in Virginia only from a historical record in the Dismal Swamp dating from 1901 (Virginia Botanical Associates 2005). It was found in a boggy habitat of basic oak-hickory forest in central Powhatan County.

Phytogeography

The species comprising the Powhatan County flora checklist were analyzed in terms of distributional patterns within the state of Virginia. In the first geographic analysis, the Atlas of the Virginia Flora (Virginia Botanical Associates 2005) was consulted as a source of distributional data for each species in the Powhatan County inventory. For convenience, the high elevation physiographic provinces west of the piedmont, i.e., the Blue Ridge, Ridge and Valley, and Appalachian Plateaus, were combined, yielding a total of three regions: coastal plain, piedmont, and mountains. Figure 2 illustrates the results. Notably, most Powhatan County species, 772 species (76 percent), are distributed throughout the state. Relatively few, 38 species (about four percent), are restricted to the Piedmont province. It is interesting to note that more Powhatan County species can be characterized as having a Piedmont + Coastal Plain distribution than a Piedmont + Mountain distribution.

A second type of geographic analysis was based on pair-wise comparisons of selected regionally-defined floras. The Sorenson Index of Similarity (Sorenson 1948) was used to assess similarity between the Powhatan County flora and inventories of several comparable areas conducted within the state of Virginia. This pair-wise comparison method takes into account not only shared taxa, but also the presence of unique taxa in each region under comparison. The index value is derived from the equation: $SI = 2A/(B + C)$, where $A =$ the number of shared values (taxa) common to both lists, $B =$ the total number of values in one list, and $C =$ the total number of values in the other. The results are summarized in Table 2. Of the floras compared, the greatest difference in floristic composition lies between Powhatan County and Isle of Wight County, a coastal plain location. In comparison, similarities between Powhatan County and
Table 2. Sorenson Index values for the Powhatan County flora in comparison with selected regional floras of Virginia

<table>
<thead>
<tr>
<th>Flora</th>
<th>Floristic Region</th>
<th>Reference</th>
<th>Index of Similarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kent Branch, Fluvanna County</td>
<td>piedmont</td>
<td>Diggs and Hall 1981</td>
<td>0.68</td>
</tr>
<tr>
<td>James River Gorge</td>
<td>mountains</td>
<td>Ramsey et al. 1993</td>
<td>0.65</td>
</tr>
<tr>
<td>Richmond National Battlefield Park</td>
<td>upper coastal plain</td>
<td>Hayden et al. 1989</td>
<td>0.64</td>
</tr>
<tr>
<td>Western Isle of Wight County</td>
<td>coastal plain</td>
<td>Plunkett and Hall 1995</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Table 3. List of Powhatan County plants included in the Virginia Department of Conservation and Recreation’s (2005) list of Invasive Alien Plant Species of Virginia

HI = highly invasive, may disrupt ecosystem processes

- Ailanthus altissima (Miller) Swingle
- Alliaria petiolata (Bieberstein) Cavar & Grande
- Centaurea biebersteinii D.C.
- Elaeagnus umbellata Thunberg
- Lespedeza cuneata (Dumont-Cours) G. Don
- Ligustrum sinense Louriero
- Lonicera japonica Thunberg
- Microstegium vimineum (Trinibus) A. Camus
- Mandaniana keisak (Hasskarl) Handel-Mazzetti
- Myrtiphyllum aquaticum (Vell.) Verdc.
- Pueraria montana (Loureiro) Merritt var. lobata (Willd.) Maesen & Alm.
- Rosa multiflora Thunberg ex Murray
- Sorghum halepense (L.) Persoon

MI = moderately invasive, minor influence on ecosystem processes

- Agrostis capillaris L.
- Artemisia vulgaris L.
- Arthraxon hispidus (Thunberg) Makino
- Carduus nutans L.
- Cirsium vulgare (Sovi) Tenore
- Dactylis glomerata L.
- Egeria densa Planchon
- Glechoma hederacea L.
- Holcus lanatus L.
- Humulus japonicus Siebold & Zuccarini
- Ipomoea hederacea Jacquin
- Ipomoea purpurea L.
- Paulownia tomentosa (Thunberg) Stendel
- Persicaria longiseta (de Brujn) Moldenke
- Phleum pratense L.
- Poa compressa L.
- Poa trivialis L.
- Populus alba L.
- Rumex acetosella L.
- Rumex crispus L.
- Schedonorus arundinaceus (Schreber) Dumontier
- Setaria faber W. Herrmann
- Stellaria media (L.) Villars
- Veronica hederifolia L.
- Wisteria sinensis (Sims) de Candolle

OI = occasionally invasive, does not affect ecosystem processes, but may alter community composition

- Ajuga reptans L.
- Arrhenatherum elatius (L.) Presl
- Conium maculatum L.
- Eragrostis curvula (Schrader) Nees
- Lespedeza bicolor Turczaninow
- Lotus corniculatus L.
- Melilotus albus Medikus
- Melilotus officinalis (L.) Pallas
- Perilla frutescens (L.) Britton
- Securigera varia (L.) Lassen
Of the taxa in the checklist, 216 or 21 percent are Arthraxon hispidus, Microstegium vimineum, Rosa multiflora, and to a lesser extent, Poa compressa, based on the first author’s experience in the field.

Recently Disturbed Sites. Included here are communities characterized by a wide range of species and abiotic factors found throughout the county wherever there is habitat disturbance. Examples include roadsides, agricultural areas, lawns, and commercial forests, under varying levels of management. Approximately 325 taxa were collected from recently disturbed sites.


This is probably the most common natural community group found in Powhatan County. An interesting subcategory of this group, growing over mafic rocks, supports less common species, such as Clematis ochroleuca and Carex conoidea. Approximately 80 taxa collected are classified under this group. Representative types within this group include:

- Quercus alba – Quercus rubra – Carya alba/Carya caroliniana/Desmodium nudiflorum – Maianthemum racemosum Forest (Submesic Piedmont Type)
- Quercus alba – Carya alba – Carya ovata/Cercis canadensis Forest (Southern Piedmont Type)

Mesic Mixed Hardwood Forest Group. Overstory elements include Fagus grandifolia, Quercus spp., Liriodendron tulipifera, and Carya spp. Understory elements include Carpinus caroliniana, Cornus florida, and Ilex opaca. Herbaceous elements include Polystichum acrostichoides, Thelypteris novoboracensis, Eurybia divaricata, Mitchellella repens, Hexastylis virginica, and Goodyera pubescens. These are mostly mesic upland forests on nutrient-poor soils. The vegetation is not as diverse as that of the basic oak-hickory forest, and is one of the communities most diminished by commercial logging, both in terms of area and species diversity. Approximately 45 taxa collected are classified under this group. Representative types include:

- Fagus grandifolia – Liriodendron tulipifera – Quercus/Polythichum acrostichoides Forest (Piedmont/Northern Coastal Plain Type)
Acidic Oak-Hickory Forest Group. Dominant overstories include Quercus spp. and Carya spp. Cornus florida is a dominant understory and the shrub layer is often composed of Vaccinium pallidum, V. stamineum, and Viburnum acerifolium. Typical herbs are: Antennaria plantaginifolia, Carex albicans, Coreopsis verticillata, Danthonia spicata, Cunila origanoides, Hieracium venosum, Houstonia purpurea, Oxalis violacea, Penstemon canescens, Polygonatum biflorum, Solidago bicolor, and Symphyotrichum undulatum. Hickories are less abundant in this group than in the basic oak-hickory forests and may occupy primarily the understory. In Powhatan County, this group is well represented in uplands of the eastern section of the county, presumably supported by the acidic shale and sandstone of the Triassic basin. Approximately 35 taxa collected are classified under this group. Representative types include:

- *Quercus alba* – *Quercus coccinea* – *Carya glabra* – *Cornus florida* – *Viburnum acerifolium* Forest (Northeastern Acidic Oak-Hickory Forest)
- *Quercus alba* – *Quercus rubra* – *Carya glabra* – *Cornus florida* – *Vaccinium stamineum* Forest (Piedmont Acidic Oak-Hickory Forest)

Semipermanent Impoundments Group. These are mostly marshes which accompany man-made ponds or beaver dams. Representative herbaceous elements include Persicaria spp., Pontederia cordata, Peltandra virginica, Juncus effusus, Sparganium americanum, Carex spp., Saururus cernus, Ludwigia spp., Typha latifolia, Alisma subcordatum, and Leersia ozyroides. Because of their highly variable composition and seminatural status, no types have been established for this group. The position of this community type in this list ordered by frequency may reflect a bias from frequent collecting at the Powhatan Lakes Wildlife Management Area, which contains many man-made ponds. Approximately 20 taxa collected are classified under this group. The representative type is:

- *Eragrostis hypnoides* – *Lindernia dubia* – *Ludwigia palustris* – *Cyperus squarrosus* Herbaceous Vegetation (Piedmont/Mountain Sand Bar/Rivershore)

Sand/Gravel/Mud Bars and Shores Group. Portions of the James River and its banks and shores support taxa from this group, including: Cyperus erythrorhizos, Justicia americana, Ludwigia spp., Panicum dichotomiflorum, and Cyperus squarrosus. Two of these taxa, *Panicum dichotomiflorum* and *C. squarrosus*, as well as *Hibiscus laevis, Heteranthera dubia*, and the state-listed *Paspalum bifidum* were encountered only along such mud bars and shores of the James, emphasizing the floristic distinctness of such communities. Approximately 10 taxa collected are classified under this group. The representative type is:

- *Eragrostis hypnoides* – *Lindernia dubia* – *Ludwigia palustris* – *Cyperus squarrosus* Herbaceous Vegetation (Piedmont/Mountain Sand Bar/Rivershore)

Granitic Flatrocks Group. These communities are characterized by exposed, flat, or gently sloping granitic rocks that are sparsely vegetated and often occupy less than an acre. These communities support a distinctive flora and are endemic to the southeastern United States from Alabama to Virginia. This study sampled the granite outcrops located along Fine Creek. Characteristic taxa include: *Talinum teretifolium*, *Croton willdenowii*, *Selaginella rupestris*, and *Bulbosyliis capillaris*. Further, the only known collections of *Isoetes pinnatifidum* from Virginia are from this location (Musselman and Knepper 1994, 156 Castanea Volume 72
Brunton et al. 1996). Five species were collected from this site. The representative type is:

- *Talinum teretifolium* - *Minuartia glabra* - *Diodia teres* - *Croton willdenowii* Herbaceous Vegetation (Piedmont Granitic Flatrock Barren)

The following four community groups are included here based largely on the occurrence of the dominant species in the community type names. These communities were not frequently encountered in the course of field work and only a few specimens representative of each were collected:

**Swamp Forest Group:**
- *Quercus palustris* - *Quercus bicolor* - *Ulmus americana*/*Carex tribuloides* - *Carex squarrosa* Forest (Piedmont/Central Appalachian Floodplain Swamp)

**Alluvial Forest Group:**

**Basic Mesic Forest Group:**
- *Liriodendron tulipifera* - *Quercus rubra* - *Fraxinus americana*/*Asimina triloba*/*Cimicifuga racemosa* - *Uvularia perfoliata* Forest (Inner Piedmont/Lower Blue Ridge Basic Mesic Forest)

**Piedmont Prairie Group:** This group is semi-natural and maintained by disturbance such as periodic mowing of power line right-of-way.
- *Schizachyrium scoparium* - *Sorghastrum nutans* - *Solidago juncea* - *Pycnanthemum tenuifolium* Herbaceous Vegetation (Little Bluestem - Indian Grass Piedmont Grassland)

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**LITERATURE CITED**


