

FINAL REPORT

Prince William Forest Park 2003-2004 Floristic Survey

by

Dr. Ted R. Bradley, John E. Dodge, and Gaylan G. Meyer

Performed under Cooperative Agreement 1443CA309701200
Task Agreement No. T-3097-02-400

for the

Center for Urban Ecology, National Capital Region
National Park Service

TIC#: D-40

GEORGE MASON UNIVERSITY

Fairfax, Virginia

Corresponding author is J. E. Dodge, 3915 Rose Lane, Annandale, VA, 22003
Telephone number: 703-941-7533; e-mail: jedodge@cox.net

ABSTRACT

The Biology Department of George Mason University conducted a floristic survey in Prince William Forest Park, in Prince William County, Virginia, during the 2003 and 2004 growing seasons. The purpose of the survey was to locate and identify as many of the naturally growing vascular plant species in the Park as possible, with a goal of listing 90 percent of these species. The 90 percent goal was estimated to be 652 species; 743 species were located and identified. With two varieties each found for four of the species, the taxa count was 747. No plants on the Virginia Rare Plant List were found; two Virginia Watch List plants were found. All plant locations were logged with a Global Positioning Receiver, and an indication of the site quality and the abundance of the plant at the site were noted. Many of the species were identified in the field with no voucher being collected. For the 747 taxa, 339 voucher specimens were collected; an additional 229 vouchers were collected and identified as duplicates. All voucher specimens are currently at GMU. It is concluded that most plant species expected at Prince William Forest Park are present, but in many cases they are relatively sparse and difficult to locate.

Key words: floristic survey, vascular plant survey, plant diversity, Prince William Forest Park plants

TABLE OF CONTENTS

Prince William Forest Park 2003-2004 Floristic Survey

1. Introduction.....	1
2. Project Description.....	1
3. Park Description.....	2
4. Survey Method.....	2
4.1 Survey Locations.....	2
4.2 Data Acquisition Procedures.....	4
4.3 The Determination Process.....	5
5. Survey Results.....	6
6. Discussion of Survey Results.....	7
6.1 Species Numbers.....	7
6.2 Introduced Species.....	7
6.3 Species and Genera of Interest.....	8
7. Conclusions and Recommendation.....	10
References.....	12
Appendix A: Acknowledgements.....	A-1
Appendix B: Results of the 2003-2004 PRWI Floristic Survey.....	B-1
Appendix C: Metadata for the Floristic Survey Access 97 Database.....	C-1
Appendix D: Datum and GPS Procedures Changes, and Grouped Plants.....	D-1
Appendix E: Metadata for SSF Files from the Trimble Data Logger.....	E-1
Appendix F: Estimate of Plant Species.....	F-1

Prince William Forest Park 2003-2004 Floristic Survey

1. Introduction

During the plant growing seasons of 2003 and 2004, a floristic survey – an inventory or census of all species of vascular plants growing naturally – was conducted in Prince William Forest Park (hereinafter “PRWI” or “Park”), Prince William County, Virginia, by the Biology Department (now the Environmental Science and Policy Department) of George Mason University (GMU). The survey was performed under Cooperative Agreement 1443CA309701200, Task Agreement No. T-3097-02-400, which was administered by the Center for Urban Ecology (CUE), National Capitol Region, National Park Service. Field work in the Park was under the direction of the PRWI Natural Resources Management Office. Considerable assistance with the field work was furnished to GMU by the CUE staff, Park staff, and others; that assistance is described in Appendix A and is greatly appreciated by GMU.

2. Project Description

The method used to perform this survey was to visit the different park habitats at various times of the year and survey all the naturally-growing vascular plants. Field work started in March 2003 and was completed in October 2004. Each plant species encountered was either identified in the field (observational logging) or a sample (voucher specimen) was obtained for later identification in the GMU herbarium. In either case, the coordinates of the plant location were logged using a Global Positioning System (GPS) receiver for later entry into an Access 97 database, along with other information, to build the database of plant species at PRWI. This general process was followed throughout the project, resulting in the logging of 743 plant species. A list of these species is in Appendix B. Several hundred duplicate specimens and observational loggings are also recorded in the database. The Access 97 plant database for PRWI is delivered with this report; it was developed using the NPS Database Template as developed by CUE. A description of the data elements in this database is provided in Appendix C. All plant voucher specimens collected have been pressed, dried and frozen (temporarily, for pest control), and are now in a herbarium cabinet at GMU. Herbarium labels have been prepared for the specimens.

During the course of the survey, several significant changes in survey procedures were agreed upon by CUE and GMU. Initially, the first year of the survey was to be accomplished without plot studies, so that survey locations and routes were entirely at the discretion of the surveyors. The second year was to be primarily a plot study with eight plots in a variety of habitats having survey priority, with incidental surveying to be accomplished after appropriate attention to the plots. Between the two survey seasons, GMU came to the opinion that the primary goal of the survey, which was to locate and determine as many of the Park species as possible, would be better served if the second year used the same procedure as the first year. A letter proposing this change was sent to CUE on January 5, 2004, and the change was subsequently approved.

Initially, GMU proposed to measure coordinates using a low-cost, handheld GPS receiver. CUE asked GMU to use the more accurate Trimble backpack GPS that CUE would furnish; GMU agreed. Additionally, CUE provided training on the use of the Trimble for GMU personnel. A related change was the method used to log plant locations. GMU proposed to measure the coordinates once for closely-spaced groups of plants, and proceeded during the first year of the survey with this method. In early June, CUE requested separate coordinates for each logged plant; GMU agreed and started this procedure on June 12, 2003. The plants logged in the groups are retained in the database, but are identified as being in such a grouping. Some further details are provided in Appendix D.

3. Park Description

Prince William Forest Park (PRWI) is a 17,000-acre contiguous site of hills, valleys and small streams located primarily in Prince William County, Virginia. With the exception of five cabin camps, plus administrative and campground areas, the Park is, as titled, forest. The forest age varies from greater than 70 years, to younger successional areas. The Park was assembled from marginal and abandoned farm land in the 1930's and has been protected since then. Several recently acquired former homesites are still open, but will presumably succeed into forest. The Park is located with its southeast end along Interstate 95; it extends to the northwest to a point defined by Virginia State Routes (SR) 234, 646, and 619. The northeast boundary is SR 234; the southwest boundary is in part SR 619, but there is a portion of the Park, the Chopawamsic Backcountry Area (CBA), that is to the southwest of SR 619. A small portion of the CBA is located in Stafford County, Virginia. Since I-95 is on the fall line in this area, the Park is at the eastern edge of the piedmont. There are several access roads in the Park, some associated with the cabin camps, and a large system of foot-trails. Three stream valleys are a major feature of the Park: these are, from north to south (and their length in the Park), Quantico Creek (6 miles), the South Fork of Quantico Creek (4 miles), and the North Branch of Chopawamsic Creek (1.5 miles). The latter flows into the Breckenridge Reservoir, whose northern shoreline forms part of the southern boundary of the CBA. Elevation varies from about 50 feet above sea level where Quantico Creek exits the Park to a 394-foot hilltop in the northwest portion of the Park.

4. Survey Method

4.1 Survey Locations

Selection of the survey location for each survey day was a function of the season, the plants being sought, advice from several sources (primarily PRWI staff), whether or not it was appropriate to make a return visit to a location, the desire to visit new locations, accessibility, and the type of habitats being considered. Areas with water were often of interest, because of the generally greater plant diversity associated with stream valleys and ponds, and the consequent potential of finding new species. Brief descriptions of some of the locations surveyed follow.

Both the Quantico Creek and the South Fork of Quantico Creek were visited a number of times; both have good access via road to a number of “starting points” and much continuous access along park trails. For example, from Parking Lot A, the South Valley Trail provides access along the South Fork all the way to the junction of South Fork with Quantico Creek, near where it exits the Park. Along the way are floodplains, sand and gravel bars, steep hillsides, feeder streams, pool areas and small rapids. There is more light along stream valleys than in the forested areas due to the stream itself. This variety of habitats allows for efficient surveying, i.e., the surveyor can cover a lot of potential new plant species habitat in a short time.

Quantico Creek from where it enters the Park until its exit point is somewhat more difficult to access, but offers some additional habitats. There are beaver dam areas along the stream itself as well as along the feeder stream near the north loop of the Farms to Forest Trail Extension. Two interesting marshy areas exist along the north side of Quantico Creek, one just below the Nottingham Drive cul-de-sac and the other further downstream across from the portion of the Farms to Forest Trail Extension that reaches Quantico Creek.

Small marshy areas are below two of the larger pond dams, the upper Lake One dam and the pond dam for Cabin Camps 2 and 5. Additional small marshy areas are around the edges of each of these ponds, and at the upstream ends of Carters Pond and the pond at Cabin Camp 3. Just downstream from the SR 626/MCB1 crossing of the North Branch of the Chopawamsic Creek in the Chopawamsic Backcountry Area (CBA), there is a short section of stream floodplain that has good light, water and abundant plant species.

Also in the CBA and with easy access, is a steep south-facing hillside on the north side of the Breckenridge Reservoir at the dam. At this location both aquatic and hillside species of interest were found. Additional south-facing hillsides are along the north side of the Reservoir; these were visited, but less often, due to the access time required.

Roadsides in the Park and along the Park boundaries were visited several times. Roadsides are often mown once or more during the growing season, resulting in the loss of some potential new species but controlling the woody species in favor of some herbaceous ones. Particularly botanically diverse were sections of the roadside along SR 619 from Liming Lane west and north to SR 646 at the northwest tip of the Park.

Among plant surveyors, powerline cuts are favorite surveying locations because the occasional mowing that is usually done in these cuts enforces the meadow aspect; otherwise the cuts would be wooded like the rest of the hills and valleys. In PRWI, there are two major powerline cuts and several minor ones. At the extreme southeastern corner of the Park, the cut extends for about 700 meters through the Park, with a small hiatus due to private property incursion. Near the northwestern corner of the Park, a second cut extends for about 1 kilometer, extending from SR 619 toward SR 234. Each of these was visited a number of times throughout the seasons. Smaller cuts for power lines in the Park were surveyed occasionally.

Former homesites and other formerly developed locations remain open areas for a varying number of years. PRWI has probably two dozen or more recognizable homesites; many of these were visited, some more than once. Depending on the length of time since they were inhabited, these sites may be meadow-like habitats, or shrubby, or beginning to look woody with perhaps some unusual herbaceous plants. Exotics may also be more prevalent at former homesites. At the northwestern tip of the Park, in a more recently acquired section, is a former industrial site with three or four open areas and two small ponds. Both the open areas and the ponds were visited on several occasions and were sources of a number of plant species. A site along SR 234, just east of Spriggs Road and formerly with two homes, was acquired shortly before the survey and provided several species not found elsewhere. Many of these were introduced species.

4.2 Data Acquisition Procedures

Presuming a plant of interest were found, a field notebook entry would be made. A key was assigned that starts with the Park prefix PRWI, then the number designating the Park District (1–8) where the plant was located, followed by a sequential number one higher than that of the previous plant logged. An example would be PRWI_6_450; 6 indicating the North District of the Park, and 450 indicating the 450th plant in the sequence of the survey. The key was completed by the addition of the date, so the complete key for this example would be PRWI_6_450_070303, which ends with the six-digit date for July 3, 2003. Next the plant species would be entered, if known to the survey team; if not, the plant genus would be entered. The survey team member operating the GPS receiver would verbally tell the notebook keeper the X and Y coordinates in meters. Universal Transverse Mercator (UTM) coordinates using the North American Datum 1927 for the Continental United States (NAD 27 CONUS) were used, so the number of meters north of the equator and the number of meters east of the western edge of UTM Zone 18 would be recorded. Coordinates were recorded to the closest whole meter by rounding the Trimble reading as necessary. Real time correction of the coordinates, a feature of the Trimble GPS receiver, was always used. A Coast Guard station broadcasting from Annapolis, MD, was the correction source. Some variances from this Global Positioning Receiver (GPS) receiver procedure at the beginning of the project and occasionally later are discussed in Appendix D.

If the plant could not be field-identified by observation, a full-plant sample or cutting would be taken, enclosed in a plastic collection bag, marked with its sequential number and returned to GMU for pressing and determination. These two types of plant records are termed Observation and Voucher. The purpose of this approach was to reduce the time required for surveying and to reduce the number of vouchers. Additional vouchers of common plants are of limited value and incur cost to collect, process, and house. For plants not readily identified by the surveyors, the voucher provides a means to identify the species as well as to document its existence in the Park.

Other data recorded included Site Quality and Commonality of the plant. Site Quality was judged by the field data taker as either Excellent, Good, Fair or Poor; the notebook

record for that plant shows the first letter of the Site Quality. Factors considered in judging Site Quality included:

- Physical quality of the site environment – the degree to which it is disturbed, or likely to be disturbed by either natural or man-influenced events such as stream flooding, erosion, mowing, traffic – either vehicles or people on foot or both;
- Soil quality – whether or not the soil type and condition is favorable to the particular plant;
- The amount of light relative to normal light requirements for that species;
- Room to grow – whether or not there is reasonable space to grow;
- Vigor of the plant compared to its neighbors.

The purpose of evaluating Site Quality is to provide an estimate of the probability of success of the plant – its chances to resume growth next season (for perennials) or to reproduce for growth next season (for annuals).

Commonality was judged by the field data taker to be either Uncommon, Occasional, or Common, and was recorded as the first letter of the appropriate descriptor. The primary factor for this evaluation was the number of stems of a species at a given location. If there was only one or a few stems of the species in sight, it was Uncommon. Conversely, if there were obviously many stems, it was Common, and if stems were more sparse, it was termed Occasional. This judgment was for the particular plant at the location where it was found; it should not be interpreted as the commonality of the particular species for the Park.

The last data item recorded in the field was a short note about the habitat type and location. While not nearly as accurate as the coordinates, it was useful for reminding the surveyors of where a particular plant was found during planning for future survey locations, and during resolution of database questions.

As indicated, each logging includes the assigned key, and the plant coordinates. A one-word descriptor was added that would help distinguish the plant from others logged the same day. This information would be entered in a file for that survey day in the Trimble Data Logger. Either that day or within a few days, the Data Logger file would be downloaded into Trimble Pathfinder software and ultimately into the Access 97 database. The set of Data Logger files (as .SSF files) on a compact disc is included with this report; the compact disc is described in Appendix E.

4.3 The Determination Process

Field determinations were based primarily on the sight identification knowledge of the field surveyors. For a number of the plants encountered, on-site determination assistance was obtained from one of the floras used during the project, “Manual of the Vascular Flora of the Carolinas” by Radford et al. (1968). If the species determination was questionable or the process too lengthy, a voucher specimen was collected, pressed and preserved. The determination process then moved to the GMU herbarium. The most

valuable and useful asset in the herbarium was the collection of regional plant specimens, the majority of which are from Northern Virginia. With this “library” of regional plant species, proposed determinations could be immediately compared with actual samples of the particular or related species. As determinations were made, they would be entered in the field notebook, and then into the Access 97 database. There were two collectors on the project, Dr. Ted Bradley, the Principal Investigator, and John Dodge, the Co-Investigator. All determinations by John Dodge were checked and corrected if necessary by Dr. Bradley. All voucher specimens are stored in a herbarium cabinet at GMU.

In addition to the Carolinas flora mentioned, several other floras were used. These include the “Manual of Vascular Plants of Northeastern United States and Adjacent Canada, Second Edition” by Gleason and Cronquist (1991); the “Flora of the Carolinas and Virginia, working draft of May 15, 2000” by Weakley; and for several of the horticultural plants collected, the “Manual of Cultivated Plants, Revised Edition” by Bailey (1949). Frequently used to check on the likelihood of a particular species growing in PRWI was the “Atlas of the Virginia Flora, Third Edition” by Harvill et al. (1992).

The taxonomy of these regional plants is still a work in progress, which results in problems with species nomenclature. No single reference for species nomenclature was followed exclusively, but the taxonomy and nomenclature in “A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, Second Edition, Volume 2 – Thesaurus” by Kartesz (1994) will verify the great majority of the plant names used. Changes in nomenclatures used in these references were made when it seemed to be in the best interests of good communication among those interested in the PRWI plants, with some attention paid to recent plant name changes, but not necessarily to all those at the cutting edge of taxonomic changes.

5. Survey Results

Since the goal of a floristic survey is an inventory of plant species, the result is necessarily a list of species. Such a list is provided in Appendix B. This list includes all 743 species plus two varieties for each of four species resulting in a total of 747 taxa. Information provided in the table in Appendix B includes the key for each plant, family name, species, whether it is native or introduced according to Gleason and Cronquist (1991), whether the sampling was an observation or resulted in a voucher specimen, and the voucher number. Not shown in the table are the coordinates (UTMX and UTM Y), horizontal error, site quality, commonality, and the short note that describes habitat and location; this data is in the database for each plant. By using the key, each of the plants can be located in the database when this additional information is needed.

In addition to the plants in Appendix B, there are 293 plants entered into the database as duplicate observations or specimens. These duplicates occur in several ways: the surveyor may not have sight identification of a particular species and so may collect it more than once; plants collected one day may not be determined and listed by the time of the next outing and may be recollected by the same surveyor, or may be recollected by another surveyor who also does not have sight identification of that plant. A fourth

possibility is that the surveyor may have some sight recognition of the species but is hopeful that the plant is a different species and so collects it again.

All voucher specimens are stored in the herbarium at GMU; there are 339 vouchers of plant species included in the 747 taxa total for the Park, 229 vouchers of duplicate species, 20 vouchers of undeterminable species, and 2 vouchers unaccounted for or lost. The total number of useful vouchers (the sum of the duplicates and “originals”) is 568. Undeterminable vouchers result when plants are collected at the wrong stage of maturity to display the characters for determination; i.e., they are too young or too old. Occasionally, the specimen may be incomplete. Lost specimens can occur when a bagged sample goes astray somewhere between collection and processing in the herbarium.

6. Discussion of Results

6.1 Species Numbers

One goal of the project was to locate and identify 90 percent of the vascular plants growing in the Park; this goal implies some estimate of the number of vascular plants growing in PRWI. As one subtask GMU was to develop and furnish such an estimate; this was furnished to CUE on September 2, 2003 in a short article that is included as Appendix E. The empirically derived estimate is 724 species, so the 90 percent goal is 652 species.

The survey taxa count, which includes varieties in four cases, is 747. Subtracting the 4 cases where two varieties of one species have been logged leaves a species count of 743 for the survey. This species count then exceeds the 100 percent estimate by 19 species or about 3 percent, or exceeds the 90 percent estimate by 91 species or about 14 percent; both comparisons indicate that the estimate is too conservative. Presuming that the survey did find 90 percent of the species present would imply that PRWI is home to 826 plant species. As the Park continues its active Natural Resource Program, additional species will likely be found and can be added to the results of this survey.

6.2 Introduced Species

As mentioned earlier, the nativity of each plant is entered in the database, and also on the species listing in Appendix B. The source of the nativity information is Gleason and Cronquist (1991). For a number of the plants, interpretation of the nativity material in Reference 2 is required; i.e., some of the statements in the reference are equivocal. Of the 743 species listed for the survey, the nativity of 8 plants is interpreted as unknown, 152 are introduced, and 583 are native. This results in 20.7% of the species with known nativity being introduced species. Other floristic surveys in nearby Virginia have comparable numbers:

Survey Location	Percentage of Introduced Species
Prince William Forest Park	20.7
King George Co., VA, Potomac River Watershed (Simmons et al., 1995)	21.7
Westmoreland Co., VA, part of the Potomac River Watershed (Dodge, 2000)	26.3
Lancaster Co., VA, Corrotoman River Watershed (Weldy, 1995)	23.4

The four listed surveys were similar in purpose: to provide an inventory of species in their respective areas. The Lancaster (1993 and 1994) and Westmoreland surveys (1998 and 1999) were done as master theses projects by graduate students with an interest in field botany who made many visits to their survey area over two growing seasons. The King George survey was accomplished by several highly qualified professional field botanists. It started in 1983 with a two-season survey of the Caledon Natural Area, a 2,500-acre preserve along the Potomac River. The survey resumed in 1991 and 1992, covering other parts of the survey area.

A significant difference between the PRWI survey and the other three are the physiographic provinces involved; PRWI is in the piedmont and the other three are in the coastal plain. Also, the three coastal plain locations have more human-oriented development (roads, farms, buildings) than does the PRWI location, perhaps a factor in the higher percentage of introduced species in these surveys. Considering these and other factors that vary among the four survey areas, it is remarkable that the percentage of introduced species for all four surveys falls in the one-fifth to one-fourth range.

6.3 Species and Genera of Interest

In June 2003 several of the PRWI Natural Resources summer staff were searching, under the direction of Dr. Donna Ware from the College of William and Mary, for the rare plant *Isotria medeoloides*, the small whorled pogonia orchid. Dr. Ware has monitored the status of this plant in PRWI for several years, and the search's purpose was to determine its status in 2003. Unfortunately, no plants were found (nor were any found during the GMU two-season survey). But, during the June 2003 orchid search, an uncommon pine tree was found, *Pinus pungens*, the table mountain pine. This finding resulted from a combination of alertness on the part of the summer staff and good fortune. There are many thousands of pine trees in the Park, with the vast majority being *Pinus virginiana*, Virginia pine or scrub pine. Typically the pine tree foliage is quite high, out of easy view, so that what is on the ground (branches and cones) must be examined to verify the species. The larger cone and longer needles must be noticed or the "new species" will be passed by. Only one other *Pinus pungens* was noticed later during the survey, so it is not common in the Park.

Two specimens of another unexpected species were found in the shallow waters of the Park, one in Lake 5, and the other in South Fork. This plant is the golden club, *Orontium aquaticum*, a welcome but uncommon find. Based on what is shown in Harvill et al.

(1992), this is the first time this plant has been found and reported in Prince William County; i.e., it is a potential county record.

The second-most difficult genus of plants for the field botanist in this region to survey is the sedge *Carex*. Its taxonomic status is a classical “work in progress”, with occasional articles appearing in the literature dealing with new species and new information on species distribution. Again referring to Harvill et al. (1992), there are about 65 species of *Carex* that could be expected in the Park. On this two-season survey, 44 species were found and determined, certainly a good representation for the genus.

While on the search for *Carex*, one of the surveyors collected and recorded a sedge that was initially judged a *Carex*. Upon examination in the herbarium, however, small pearl-like shiny white fruits were evident, a sure sign of the genus *Scleria*, another sedge. This was only one of two loggings of *Scleria oligantha*, the few-flowered nutrush.

Two members of the lily family not often seen in this region were found in the Park. *Aletris farinosa*, colicroot, was found in a small grouping on the roadside in one location, while *Melanthium virginicum*, bunchflower, was found in one marshy location not far from Quantico Creek. This grouping included 20-30 plants, but it was not evident how many had flowered.

Orchids are sometimes viewed as the jewels of the plant world, partly because of their appearance, but surely in part due to their scarcity. The Park has little-disturbed habitats that suit some orchids, and several were found during the survey. It is noted, however, that they were not common anywhere, and their loggings were uncommon. Of the roughly 20 species that could be in the Park according to Harvill et al. (1992), 13 species were logged. Perhaps the most spectacular was the *Cypripedium acaule*, the pink lady slipper, seen at one location in a relatively healthy grouping. There were 30-40 stems, and at least a dozen in flower at the time of the survey visit. The plant was also seen at a second location, with only a few stems.

The grass family is not the most exciting plant family for most Park visitors. But it is an important component of the plant diversity and provides a good percentage of the meadow flora. According to Harvill et al. (1992) roughly 100 species of Poaceae could be in the Park; this survey logged and determined 86 species, two of which are potential county records. *Paspalum pubiflorum* and *Eragrostis poaeoides* were logged here; the first is a native, the second introduced.

A particular grass genus is probably the most difficult regional plant genus for the field botanist to survey; that is the *Dichanthelium* sp., at one time included with the genus *Panicum* and often termed panic grass. There are about 12 species of *Dichanthelium* that might be in the Park based on Harvill et al. (1992), but these are difficult to identify, in part because they have important characters that tend to grade into one another in many cases. There also has been much splitting into new species and varieties in this genus, further obscuring the species status. Still, of the possible 12 species cited, 9 have been logged and identified. Surveying for this genus usually results in a number of duplicates

being collected; to achieve the 9 species, a total of 31 *Dichanthelium* specimens were collected and determined.

While surveying on the small but diverse floodplain of the North Branch of the Chopawamsic Creek, an unusual delicate scrambling plant with small bell-like flowers was logged and collected. A welcome find for this region and a potential county record is the native *Campanula aparinoides*, the marsh-bellflower.

Desmodium sp., tick-trefoils, are the fall-blooming plants that use the clothes of visitors as well as the fur of animals for seed dispersal. Their flowers are typical pea-like pinkish-purple blossoms; their fruits are the flat green triangular “stick-me-tights” on our clothes. Some of the several species of this genus exhibit vertical growth, others are obvious vines, and some are inbetween. Of the possible 12 species that might be in the Park according to Harvill et al. (1992), 9 were logged and determined.

In several cases described above, the phrase “potential county record” is used. The phrase is used because the particular plant being discussed does not appear in Harvill et al. (1992) as having been found and reported for Prince William County, but this does not mean that the survey’s logging and determination will necessarily be accepted as a county record. There is an informal review process by the group that maintains these records that considers the likelihood of the plant being truly established in the county, rather than the plant just appearing and then disappearing. The review process may also include having the determination checked by another botanist familiar with the particular species.

No species on the Virginia Rare Vascular Plant List, Townsend (2005), was found. Two plants on the Virginia Vascular Plant Watchlist were found; information on these plants has been given to the Park staff.

7. Conclusions and Recommendation

Early in the survey, the opinion of the GMU team was that PRWI was less botanically diverse than other conserved areas of similar circumstances. This opinion was based on the rate at which new species were being logged and on a few missing species that were expected but had not been found. An example of the latter was *Mertensia virginiana*, Virginia bluebells, a relatively common floodplain spring wildflower that was searched for but never found. As the season progressed through the summer, this opinion became modified to this: substantial botanical diversity was present, but was not as easy to find as might be expected, nor were the expected species found in many locations. Rather, a number of expected species were found at only a few locations. For example, only two or three *Rhododendron periclymenoides*, wild azaleas, and only one *Amelanchier arborea*, common serviceberry, were found during the two-year survey.

One reason for this less-than-expected plant diversity could be predation; evidence of browsing by deer was widely and frequently observed. There was little evidence of disturbance by Park visitors, and there seemed to be ample suitable habitat. The Park has

some areas of significant incursion by exotic invasives. *Microstegium vimineum*, Japanese stiltgrass, and *Lonicera japonica*, Japanese honeysuckle, are widespread. More limited but still serious are *Wisteria sinensis*, Chinese wisteria, and *Polygonum cuspidatum*, Japanese knotweed. It did not appear, however, that these or other exotics were widespread enough to have a major effect on the overall plant diversity at PRWI. Therefore deer browsing and perhaps other unrecognized natural reasons are the causes for the less-than-expected plant diversity.

For the future benefit of managing the plant resources at PRWI, it is recommended that the list of plant species be kept current. The database can have a version to which potential new species can be easily added. The new species could be changed from potential to verified when a credible species determination has been made. In this way, the species list could be maintained current and available for resource management purposes.

REFERENCES

- Bailey, L. H., 1949; "Manual of Cultivated Plants", revised edition; The MacMillan Co., New York, NY; 1116 pages.
- Dodge, John E., 2000; "A Floristic Survey of the Potomac River Watershed in Westmoreland County, Virginia, from Bridges Creek to Currioman Bay"; Master's thesis, Department of Biology, George Mason University, Fairfax, VA; 127 pages.
- Gleason, H. A., A. Cronquist, 1991; "Manual of Vascular Plants of Northeastern United States and Adjacent Canada", second edition; the New York Botanical Garden, Bronx, NY; 910 pages.
- Harvill, A. M., T. R. Bradley, C. E. Stevens, T. F. Wieboldt, D. M. E. Ware, D. W. Ogle, G. W. Ramsey, G. P. Fleming, 1992; "Atlas of the Virginia Flora", third edition; A. M. Harville, Jr., Burkeville, VA; 144 pages.
- Kartesz, J. T., 1994; "A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, Volume II - Thesaurus", second edition; Timber Press, Portland, OR; 816 pages.
- Radford, A. E., H. E. Ahles, C. R. Bell, 1968; "Manual of the Vascular Flora of the Carolinas"; University of NC Press, Chapel Hill, NC; 1183 pages.
- Simmons, M. P., D. M. E. Ware, W. J. Hayden, 1995; "The Vascular Flora of the Potomac River Watershed of King George County, Virginia"; *Castanea* 60(3):pages 179-209.
- Townsend, John F., 2005; "Natural Heritage Resources of Virginia: Rare Plants"; Natural Heritage Technical Report 05-08, Virginia Department of Conservation and Recreation, Division of Natural Heritage; Richmond, VA; 54 pages.
- Weakley, A. S.; "Flora of the Carolinas and Virginia, Working Draft of May 15, 2000"; Durham, NC; 898 pages.
- Weldy, Troy W., 1995; "The Vascular Flora of the Corrotoman River Watershed, Lancaster County, Virginia"; Master's thesis, Department of Biology, College of William and Mary, Williamsburg, VA; 140 pages.

APPENDIX A: Acknowledgements

George Mason University acknowledges the considerable cooperation and assistance received during the two-year survey period. John Sinclair, CUE manager for the first year, arranged for the Trimble equipment and for a two-day in-house Trimble GPS/GIS training session, arranged for assistance in the database setup procedure, and provided rapid and helpful response to all other requests. The database setup assistance was provided by Christina Wright at CUE; after several sessions, a conveniently structured Access 97 database was developed.

In-house GPS/GIS training was led by Sean Denniston from the National Capital Region. Sean also solved the problem of why GMU could not tape together two USGS quads and obtain a usable UTM grid for the Park – the two quads used different datums. Sean soon after provided a single map of the Park with a proper UTM grid for GMU's use.

Marcus Koenan, CUE manager for the second year of the survey, also provided rapid and helpful response to all requests for guidance and assistance. Also during the second year, Mikaila Milton of CUE provided assistance in the field on 10 occasions. Mikaila found a number of plants for the survey, proving again that an extra pair of eyes on a plant survey is invaluable.

At the Park, the Natural Resources Management staff was always most helpful and supportive of the project. Brian Carlstrom and Jennifer Lee provided coordination, equipment, suggestions of habitats to visit, access to all appropriate park areas, and arranged for assistance from their summer staff of interns on an almost weekly basis while the interns were in the park. Interns who helped during the 2003 season were Patrick Donovan, Ben Stoerger, Jeanine Nelson, Paul Petersen, and Jim Pieper. During the 2004 season, helpers were Jim Pieper, Patrick Donovan, Catherine Johnson, Barton Holcomb, and Erica Kilgo.

Also at the Park, George Liefert, Law Enforcement Ranger, directed GMU to several good habitats, including our only one for *Magnolia virginiana*, the sweet bay.

Coincidentally the Virginia Division of Natural Heritage (DNH) was doing a vegetation delineation survey during the 2004 season and provided invaluable assistance by sharing their plant findings with GMU. Gary Fleming and Kristin Taverna of DNH also provided other assistance, Gary by assisting with some difficult plant determinations, and Kristin by helping on one survey day in June.

Two others provided additional field assistance. On three occasions, Mary Dodge, sister of one of the GMU surveyors and an experienced horticulturist, provided those needed extra eyes. On one occasion, Amy Brisendine, biologist for the U. S. Fish and Wildlife Service, provided extra eyes and also operated the Trimble GPS receiver and Data Logger.

For all of this assistance, GMU is most appreciative and is consequently delivering a greatly improved survey.

APPENDIX B: Results of the 2003-2004 PRWI Floristic Survey

The following table lists species located and identified in Prince William Forest Park during the 2003-2004 floristic survey. This table is a subset of the larger Access 97 database delivered with this report; the subset is an Excel spreadsheet. It is not readily inserted into this Microsoft Word document with desired type size, font, and gridlines, so is produced from a separate Excel file and physically inserted. Each species is listed with the appropriate key (explained in section 4.2 of the main report), plant family, species with an occasional variety, whether the plant is native or introduced, whether or not there was a voucher collected, and that voucher number. The list is ordered by plant group (ferns and fern allies, gymnosperms, monocots, and dicots), and then alphabetically by plant families, genera, and species.

Key	Family	Species	Nativity	Sam.	Vou. No.
PRWI_1_69_042803	1_Equisetaceae	Equisetum arvense	Native	Obs	
PRWI_3_5_032203	1_Equisetaceae	Equisetum hyemale	Native	Obs	
PRWI_7_33_041203	1_Lycopodiaceae	Lycopodium clavatum	Native	Vou	D2270
PRWI_3_4_032203	1_Lycopodiaceae	Lycopodium digitatum	Native	Obs	
PRWI_6_297_062603	1_Lycopodiaceae	Lycopodium obscurum	Native	Vou	D2388
PRWI_1_605_092503	1_Ophioglossaceae	Botrychium bitermum	Native	Vou	B32559
PRWI_8_1139_071504	1_Ophioglossaceae	Botrychium dissectum	Native	Obs	
PRWI_3_126_052203	1_Ophioglossaceae	Botrychium virginianum	Native	Obs	
PRWI_3_1041_060304	1_Ophioglossaceae	Ophioglossum vulgatum	Native	Obs	
PRWI_1_1076_062404	1_Osmundaceae	Osmunda cinnamomea	Native	Obs	
PRWI_2_157_061203	1_Osmundaceae	Osmunda claytoniana	Native	Obs	
PRWI_6_86_051303	1_Osmundaceae	Osmunda regalis	Native	Obs	
PRWI_3_1092_062404	1_Polypodiaceae	Adiantum pedatum	Native	Obs	
PRWI_7_1073_061704	1_Polypodiaceae	Asplenium platyneuron	Native	Obs	
PRWI_1_684_102203	1_Polypodiaceae	Athyrium asplenoides	Native	Vou	D2520
PRWI_3_1179_081904	1_Polypodiaceae	Cystopteris protrusa	Native	Obs	
PRWI_7_377_071703	1_Polypodiaceae	Dennstaedtia punctilobula	Native	Vou	B32420
PRWI_6_561_090503	1_Polypodiaceae	Dryopteris cristata	Native	Vou	D2482
PRWI_2_1027_052004	1_Polypodiaceae	Onoclea sensibilis	Native	Obs	
PRWI_1_611_092503	1_Polypodiaceae	Phegopteris hexagonoptera	Native	Obs	
PRWI_3_160_051303	1_Polypodiaceae	Polypodium virginianum	Native	Vou	B32281
PRWI_2_1052_061704	1_Polypodiaceae	Polystichum acrostichoides	Native	Obs	
PRWI_3_259_062103	1_Polypodiaceae	Pteridium aquilinum	Native	Vou	D2376
PRWI_3_1087_062404	1_Polypodiaceae	Thelypteris noveboracensis	Native	Obs	
PRWI_6_654_100203	1_Polypodiaceae	Thelypteris palustris	Native	Vou	B32581
PRWI_1_1080_062404	1_Polypodiaceae	Woodwardia areolata	Native	Obs	
PRWI_2_1021_052004	1_Selaginellaceae	Selaginella apoda	Native	Vou	B32618
PRWI_3_246_062103	2_Cupressaceae	Juniperus virginiana	Native	Obs	
PRWI_3_1236_102804	2_Pinaceae	Pinus echinata	Native	Obs	
PRWI_1_237_061903	2_Pinaceae	Pinus pungens	Native	Vou	D2357
PRWI_4_1103_070104	2_Pinaceae	Pinus rigida	Native	Vou	B32704
PRWI_7_34_041203	2_Pinaceae	Pinus strobus	Native	Vou	D2271
PRWI_6_294_062403	2_Pinaceae	Pinus virginiana	Native	Obs	
PRWI_2_46_041603	2_Pinaceae	Tsuga canadensis	Native	Obs	
PRWI_3_41_041203	3_Agavaceae	Yucca filamentosa	Native	Obs	
PRWI_4_387_072403	3_Alismataceae	Alisma subcordatum	Native	Vou	D2439
PRWI_3_528_082103	3_Alismataceae	Sagittaria australis	Native	Vou	B32556
PRWI_3_95_051303	3_Amaryllidaceae	Hypoxis hirsuta	Native	Obs	
PRWI_3_61_042803	3_Amaryllidaceae	Narcissus biflorus	Introduced	Vou	D2291
PRWI_3_29_040503	3_Amaryllidaceae	Narcissus pseudonarcissus	Introduced	Vou	B32242
PRWI_3_15_040503	3_Amaryllidaceae	Narcissus x incomparabilis	Introduced	Vou	B32248
PRWI_3_120_052203	3_Araceae	Arisaema dracontium	Native	Obs	
PRWI_8_50_042303	3_Araceae	Arisaema triphyllum	Native	Obs	
PRWI_2_1132_071504	3_Araceae	Orontium aquaticum	Native	Obs	
PRWI_7_338_071003	3_Araceae	Symplocarpus foetidus	Native	Obs	
PRWI_3_452_073103	3_Commelinaceae	Commelina communis	Introduced	Obs	
PRWI_3_523_082103	3_Commelinaceae	Murdannia keisak	Introduced	Obs	
PRWI_3_214_061703	3_Cyperaceae	Carex aggregata	Native	Vou	B32387
PRWI_3_163_051303	3_Cyperaceae	Carex albicans var. australis	Native	Vou	B32271

PRWI_6_282_062403	3_Cyperaceae	Carex albolutescens	Native	Vou	B32403
PRWI_2_900_061203	3_Cyperaceae	Carex allegheniensis	Native	Vou	B32370
PRWI_3_167_051303	3_Cyperaceae	Carex amphibola	Native	Vou	B32276
PRWI_6_170_060203	3_Cyperaceae	Carex atlantica	Native	Vou	B32348
PRWI_5_207_061703	3_Cyperaceae	Carex baileyi	Native	Vou	B32382
PRWI_3_257_062103	3_Cyperaceae	Carex blanda	Native	Vou	D2374
PRWI_6_274_062403	3_Cyperaceae	Carex bushii	Native	Vou	B32397
PRWI_2_173_061203	3_Cyperaceae	Carex caroliniana	Native	Vou	B32356
PRWI_6_953_060503	3_Cyperaceae	Carex cephalophora	Native	Vou	D2348
PRWI_6_944_060503	3_Cyperaceae	Carex complanata	Native	Vou	D2338
PRWI_6_178_060203	3_Cyperaceae	Carex crinita	Native	Obs	
PRWI_3_179_052203	3_Cyperaceae	Carex debilis var. debilis	Native	Vou	B32306
PRWI_3_181_051303	3_Cyperaceae	Carex digitalis	Native	Vou	B32280
PRWI_5_271_062103	3_Cyperaceae	Carex festucacea	Native	Vou	D2387
PRWI_1_623_092503	3_Cyperaceae	Carex frankii	Native	Obs	
PRWI_6_942_060503	3_Cyperaceae	Carex glaucoidea	Native	Vou	D2336
PRWI_3_183_060203	3_Cyperaceae	Carex gracilescens	Native	Vou	B32333
PRWI_3_184_051303	3_Cyperaceae	Carex gracillima	Native	Vou	B32277
PRWI_3_186_052203	3_Cyperaceae	Carex grisea	Native	Vou	B32308
PRWI_3_188_052203	3_Cyperaceae	Carex hirtifolia	Native	Vou	B32304
PRWI_6_190_051303	3_Cyperaceae	Carex howei	Native	Vou	B32286
PRWI_8_1155_081204	3_Cyperaceae	Carex intumescens	Native	Vou	B32720
PRWI_3_192_051303	3_Cyperaceae	Carex kraliana	Native	Vou	B32272
PRWI_2_898_061203	3_Cyperaceae	Carex laevivaginata	Native	Vou	B32363B
PRWI_3_196_051303	3_Cyperaceae	Carex laxiculmis var. laxiculmis	Native	Vou	B32274
PRWI_3_199_060203	3_Cyperaceae	Carex laxiflora	Native	Vou	B32326
PRWI_7_369_071703	3_Cyperaceae	Carex leptalea	Native	Vou	B32419
PRWI_2_801_061203	3_Cyperaceae	Carex lupulina	Native	Vou	B32372
PRWI_1_1077_062404	3_Cyperaceae	Carex lurida	Native	Obs	
PRWI_3_802_052203	3_Cyperaceae	Carex pensylvanica	Native	Vou	B32300
PRWI_3_803_051303	3_Cyperaceae	Carex prasina	Native	Vou	B32283
PRWI_3_805_051303	3_Cyperaceae	Carex radiata	Native	Vou	B32275
PRWI_2_1128_071504	3_Cyperaceae	Carex rosea	Native	Obs	
PRWI_2_811_061203	3_Cyperaceae	Carex scoparia	Native	Vou	B32366
PRWI_6_812_060203	3_Cyperaceae	Carex squarrosa	Native	Vou	B32346
PRWI_6_813_051303	3_Cyperaceae	Carex stricta	Native	Vou	B32287
PRWI_6_815_051303	3_Cyperaceae	Carex styloflexa	Native	Vou	B32288
PRWI_6_280_062403	3_Cyperaceae	Carex swanii	Native	Vou	B32401
PRWI_2_819_061203	3_Cyperaceae	Carex tribuloides	Native	Vou	B32357
PRWI_5_820_052203	3_Cyperaceae	Carex umbellata	Native	Vou	B32315
PRWI_2_821_061203	3_Cyperaceae	Carex vulpinoidea	Native	Vou	B32363A
PRWI_3_822_051303	3_Cyperaceae	Carex willdenowii	Native	Vou	B32282
PRWI_1_421_073103	3_Cyperaceae	Cyperus echinatus	Native	Vou	B32427
PRWI_1_428_073103	3_Cyperaceae	Cyperus esculentus	Native	Vou	B32431
PRWI_5_508_081403	3_Cyperaceae	Cyperus flavescens	Native	Vou	B32537
PRWI_1_431_073103	3_Cyperaceae	Cyperus iria	Introduced	Obs	
PRWI_6_472_080703	3_Cyperaceae	Cyperus lancastricensis	Native	Vou	B32517
PRWI_3_487_081403	3_Cyperaceae	Cyperus lupulinus	Native	Vou	B32523
PRWI_3_601_092503	3_Cyperaceae	Cyperus strigosus	Native	Obs	
PRWI_5_206_061703	3_Cyperaceae	Dulichium arundinaceum	Native	Obs	

PRWI_1_224_061703	3_Cyperaceae	Eleocharis obtusa	Native	Obs	
PRWI_4_1148_080504	3_Cyperaceae	Eleocharis tenuis	Native	Vou	D2535
PRWI_5_504_081403	3_Cyperaceae	Kyllinga gracillima	Unknown	Vou	B32534
PRWI_3_1200_090904	3_Cyperaceae	Kyllinga pumila	Native	Vou	B32747
PRWI_7_496_081403	3_Cyperaceae	Rhynchospora capitellata	Native	Vou	B32530
PRWI_2_591_091103	3_Cyperaceae	Schoenoplectus purshianus	Native	Vou	D2509
PRWI_4_388_072403	3_Cyperaceae	Scirpus atrovirens	Native	Vou	D2440
PRWI_1_429_073103	3_Cyperaceae	Scirpus cyperinus	Native	Obs	
PRWI_1_315_070303	3_Cyperaceae	Scirpus georgianus	Native	Vou	B32415
PRWI_7_340_071003	3_Cyperaceae	Scirpus polyphyllus	Native	Vou	D2411
PRWI_3_366_071203	3_Cyperaceae	Scleria oligantha	Native	Vou	D2431
PRWI_5_823_052203	3_Cyperaceae	Trichophorum planifolium	Native	Vou	B32317
PRWI_2_1164_081204	3_Dioscoreaceae	Dioscorea batatas	Introduced	Obs	
PRWI_2_1133_071504	3_Dioscoreaceae	Dioscorea quaternata	Native	Obs	
PRWI_6_273_062403	3_Dioscoreaceae	Dioscorea villosa var. villosa	Native	Vou	B32396
PRWI_3_670_100903	3_Iridaceae	Belamcanda chinensis	Introduced	Obs	
PRWI_1_1042_060304	3_Iridaceae	Iris germanica	Introduced	Obs	
PRWI_6_948_060503	3_Iridaceae	Sisyrinchium angustifolium	Native	Vou	D2341
PRWI_6_291_062403	3_Juncaceae	Juncus acuminatus	Native	Vou	B32409
PRWI_6_462_080703	3_Juncaceae	Juncus biflorus	Native	Vou	B32511
PRWI_6_475_080703	3_Juncaceae	Juncus coriaceous	Native	Obs	
PRWI_6_288_062403	3_Juncaceae	Juncus dichotomus	Native	Vou	B32407
PRWI_6_80_051303	3_Juncaceae	Juncus effusus	Native	Obs	
PRWI_6_276_062403	3_Juncaceae	Juncus marginatus	Native	Vou	B32399
PRWI_1_221_061703	3_Juncaceae	Juncus secundus	Native	Obs	
PRWI_6_286_062403	3_Juncaceae	Juncus tenuis	Native	Vou	B32405
PRWI_6_1002_042904	3_Juncaceae	Luzula echinata	Native	Vou	D2526
PRWI_6_479_080703	3_Lemnaceae	Lemna minor	Native	Vou	B32520
PRWI_6_476_080703	3_Lemnaceae	Wolffia brasiliensis	Native	Vou	B32519
PRWI_4_1050_061004	3_Liliaceae	Alettris farinosa	Native	Obs	
PRWI_3_213_061703	3_Liliaceae	Allium vineale	Introduced	Obs	
PRWI_7_1071_061704	3_Liliaceae	Asparagus officinalis	Introduced	Obs	
PRWI_7_1036_040804	3_Liliaceae	Erythronium americanum	Native	Obs	
PRWI_7_1097_061704	3_Liliaceae	Hemerocallis fulva	Introduced	Obs	
PRWI_7_1007_050604	3_Liliaceae	Maianthemum racemosum	Native	Obs	
PRWI_6_410_073103	3_Liliaceae	Melanthium virginicum	Native	Vou	B32423
PRWI_3_97_051303	3_Liliaceae	Polygonatum biflorum	Native	Obs	
PRWI_1_607_092503	3_Liliaceae	Smilax glauca	Native	Obs	
PRWI_8_1153_081204	3_Liliaceae	Smilax herbacea	Native	Obs	
PRWI_2_1134_071504	3_Liliaceae	Smilax pulverulenta	Native	Obs	
PRWI_3_93_051303	3_Liliaceae	Smilax rotundifolia	Native	Obs	
PRWI_3_1088_062404	3_Liliaceae	Uvularia perfoliata	Native	Obs	
PRWI_6_278_062403	3_Liliaceae	Uvularia sessilifolia	Native	Vou	B32400
PRWI_4_1207_090904	3_Najadaceae	Najas minor	Introduced	Vou	B32749
PRWI_4_1212_090904	3_Orchidaceae	Corallorhiza odontorhiza	Native	Obs	
PRWI_1_109_051703	3_Orchidaceae	Cypripedium acaule	Native	Obs	
PRWI_2_1127_071504	3_Orchidaceae	Galearis spectabilis	Native	Obs	
PRWI_3_27_040503	3_Orchidaceae	Goodyera pubescens	Native	Obs	
PRWI_1_231_061903	3_Orchidaceae	Isotria verticillata	Native	Obs	
PRWI_5_118_052203	3_Orchidaceae	Liparis lilifolia	Native	Vou	B32321

PRWI_6_1229_100704	3_Orchidaceae	Platanthera clavellata	Native	Obs	
PRWI_6_289_062403	3_Orchidaceae	Platanthera lacera	Native	Vou	B32408
PRWI_7_491_081403	3_Orchidaceae	Spiranthes lacera var. gracilis	Native	Vou	B32527
PRWI_4_1211_090904	3_Orchidaceae	Spiranthes ovalis	Native	Obs	
PRWI_6_465_080703	3_Orchidaceae	Spiranthes tuberosa	Native	Vou	B32512
PRWI_6_466_080703	3_Orchidaceae	Spiranthes vernalis	Native	Vou	B32513
PRWI_3_1123_071504	3_Orchidaceae	Tipularia discolor	Native	Obs	
PRWI_7_498_081403	3_Poaceae	Agrostis hyemalis	Native	Vou	B32532
PRWI_4_390_072403	3_Poaceae	Agrostis perennans	Native	Vou	D2442
PRWI_1_436_073103	3_Poaceae	Agrostis stolonifera	Introduced	Obs	
PRWI_1_433_073103	3_Poaceae	Andropogon gerardii	Native	Obs	
PRWI_1_661_100903	3_Poaceae	Andropogon virginicus	Native	Vou	B32585
PRWI_6_132_060203	3_Poaceae	Anthoxanthum odoratum	Introduced	Obs	
PRWI_1_663_100903	3_Poaceae	Aristida dichotoma	Native	Vou	B32587
PRWI_1_657_100903	3_Poaceae	Aristida oligantha	Native	Obs	
PRWI_8_600_092503	3_Poaceae	Arthraxon hispidus	Introduced	Obs	
PRWI_1_312_070303	3_Poaceae	Brachyelytrum erectum	Native	Vou	B32412
PRWI_6_921_060503	3_Poaceae	Bromus japonicus	Introduced	Vou	D2344
PRWI_5_268_062103	3_Poaceae	Bromus pubescens	Native	Vou	D2384
PRWI_7_497_081403	3_Poaceae	Calamagrostis coarctata	Native	Vou	B32531
PRWI_7_494_081403	3_Poaceae	Chasmanthium laxum	Native	Obs	
PRWI_2_512_082103	3_Poaceae	Cinna arundinacea	Native	Obs	
PRWI_3_405_073103	3_Poaceae	Cynodon dactylon	Introduced	Obs	
PRWI_1_106_051703	3_Poaceae	Dactylis glomerata	Introduced	Obs	
PRWI_1_238_061903	3_Poaceae	Danthonia spicata	Native	Vou	D2358
PRWI_5_210_061703	3_Poaceae	Dichanthelium acuminatum var. fasciculatum	Native	Vou	B32385
PRWI_2_897_061203	3_Poaceae	Dichanthelium boscii	Native	Vou	B32355
PRWI_6_300_062603	3_Poaceae	Dichanthelium clandestinum	Native	Vou	D2391
PRWI_2_829_061203	3_Poaceae	Dichanthelium commutatum	Native	Vou	B32359
PRWI_2_832_061203	3_Poaceae	Dichanthelium depauperatum	Native	Vou	B32369
PRWI_2_833_061203	3_Poaceae	Dichanthelium dichotomum	Native	Vou	B32376
PRWI_1_665_100903	3_Poaceae	Dichanthelium scoparium	Native	Vou	B32589
PRWI_6_303_062603	3_Poaceae	Dichanthelium sphaerocarpon var. isophyllum	Native	Vou	D2394
PRWI_6_275_062403	3_Poaceae	Dichanthelium strigosum	Native	Vou	B32398
PRWI_1_420_073103	3_Poaceae	Digitaria ischaemum	Introduced	Obs	
PRWI_1_404_073103	3_Poaceae	Digitaria sanguinalis	Introduced	Obs	
PRWI_5_505_081403	3_Poaceae	Echinochloa crusgalli	Introduced	Vou	B32535
PRWI_1_437_073103	3_Poaceae	Echinochloa muricata var. microstachya	Native	Vou	B32434
PRWI_4_1187_090204	3_Poaceae	Echinochloa muricata var. muricata	Native	Vou	B32738
PRWI_3_406_073103	3_Poaceae	Eleusine indica	Introduced	Obs	
PRWI_1_325_070303	3_Poaceae	Elymus hystrix	Native	Obs	
PRWI_3_451_073103	3_Poaceae	Elymus villosus	Native	Vou	B32439
PRWI_1_424_073103	3_Poaceae	Elytrigia repens	Introduced	Obs	
PRWI_1_323_070303	3_Poaceae	Eragrostis curvula	Introduced	Obs	
PRWI_1_419_073103	3_Poaceae	Eragrostis pilosa	Native	Obs	
PRWI_3_1118_071504	3_Poaceae	Eragrostis poaeoides	Introduced	Vou	B32707
PRWI_5_509_081403	3_Poaceae	Eragrostis spectabilis	Native	Obs	
PRWI_1_669_100903	3_Poaceae	Festuca arundinacea	Introduced	Obs	
PRWI_1_931_051703	3_Poaceae	Festuca pratensis	Introduced	Vou	D2315

PRWI_3_215_061703	3_Poaceae	Festuca rubra	Native	Vou	B32388
PRWI_2_835_061203	3_Poaceae	Festuca subverticillata	Native	Obs	
PRWI_6_135_060203	3_Poaceae	Glyceria striata	Native	Obs	
PRWI_3_1040_060304	3_Poaceae	Holcus lanatus	Introduced	Obs	
PRWI_6_572_090503	3_Poaceae	Leersia oryzoides	Native	Vou	D2492
PRWI_1_413_073103	3_Poaceae	Leersia virginica	Native	Obs	
PRWI_1_219_061703	3_Poaceae	Lolium perenne var. aristatum	Introduced	Obs	
PRWI_3_92_051303	3_Poaceae	Melica mutica	Native	Vou	B32279
PRWI_1_664_100903	3_Poaceae	Microstegium vimineum	Introduced	Vou	B32588
PRWI_3_1029_052004	3_Poaceae	Miscanthus sinensis	Introduced	Obs	
PRWI_1_604_092593	3_Poaceae	Muhlenbergia schreberei	Native	Obs	
PRWI_5_1214_091604	3_Poaceae	Muhlenbergia sobolifera	Native	Vou	B32752
PRWI_3_525_082103	3_Poaceae	Muhlenbergia sylvatica	Native	Vou	B32555
PRWI_2_1135_071504	3_Poaceae	Muhlenbergia tenuiflora	Native	Vou	B32709
PRWI_4_391_072403	3_Poaceae	Panicum anceps	Native	Vou	D2443
PRWI_1_558_090503	3_Poaceae	Panicum dichotomiflorum	Native	Obs	
PRWI_1_616_092503	3_Poaceae	Panicum rigidulum	Native	Obs	
PRWI_2_595_091103	3_Poaceae	Panicum verrucosum	Native	Vou	D2512
PRWI_1_434_073103	3_Poaceae	Panicum virgatum	Native	Obs	
PRWI_3_408_073103	3_Poaceae	Paspalum laeve	Native	Vou	B32421
PRWI_1_628_092503	3_Poaceae	Paspalum pubiflorum	Native	Vou	B32569
PRWI_3_486_081403	3_Poaceae	Paspalum setaceum	Native	Obs	
PRWI_4_384_072403	3_Poaceae	Phleum pratensis	Introduced	Obs	
PRWI_2_836_061203	3_Poaceae	Piptochaetium avenaceum	Native	Obs	
PRWI_8_43_041203	3_Poaceae	Poa annua	Introduced	Vou	D2272
PRWI_3_837_040503	3_Poaceae	Poa autumnalis	Native	Vou	B32243
PRWI_7_330_071003	3_Poaceae	Poa compressa	Introduced	Vou	D2403
PRWI_6_838_060203	3_Poaceae	Poa cuspidata	Native	Vou	B32342
PRWI_5_98_051303	3_Poaceae	Poa pratensis	Introduced	Vou	B32285
PRWI_3_893_050803	3_Poaceae	Poa sylvestris	Native	Vou	D2302
PRWI_1_662_100903	3_Poaceae	Schizachyrium scoparium	Native	Vou	B32586
PRWI_1_416_073103	3_Poaceae	Setaria faberi	Introduced	Obs	
PRWI_1_442_073103	3_Poaceae	Setaria geniculata	Native	Vou	B32436
PRWI_3_396_072403	3_Poaceae	Setaria glauca	Introduced	Vou	D2448
PRWI_1_438_073103	3_Poaceae	Setaria viridis	Native	Vou	B32435
PRWI_1_435_073103	3_Poaceae	Sorghastrum nutans	Native	Obs	
PRWI_3_839_051303	3_Poaceae	Sphenopholis nitida	Native	Vou	B32273
PRWI_3_840_060203	3_Poaceae	Sphenopholis obtusata	Native	Vou	B32330
PRWI_6_841_051303	3_Poaceae	Sphenopholis pensylvanica	Native	Vou	B32289
PRWI_1_658_100903	3_Poaceae	Sporobolus vaginiflorus	Native	Vou	B32584
PRWI_4_395_072403	3_Poaceae	Tridens flavus	Native	Vou	D2447
PRWI_3_1119_071504	3_Poaceae	Tripsacum dactyloides	Native	Obs	
PRWI_2_842_061203	3_Poaceae	Vulpia myuros	Introduced	Vou	B32362
PRWI_2_843_061203	3_Poaceae	Vulpia octoflora	Native	Vou	B32371
PRWI_2_592_091103	3_Pontederiaceae	Heteranthera reniformis	Native	Vou	D2510
PRWI_3_357_071203	3_Potamogetonaceae	Potamogeton diversifolius	Native	Vou	D2423
PRWI_4_1039_052704	3_Potamogetonaceae	Potamogeton epihydrus	Native	Vou	B32619
PRWI_6_867_060203	3_Potamogetonaceae	Potamogeton foliosus	Native	Vou	B32352
PRWI_6_304_062603	3_Sparganiaceae	Sparganium americanum	Native	Vou	D2395
PRWI_1_667_100903	3_Typhaceae	Typha latifolia	Native	Obs	

PRWI_3_1083_062404	4_Acanthaceae	Justicia americana	Native	Obs	
PRWI_6_454_080703	4_Acanthaceae	Ruellia caroliniensis	Native	Obs	
PRWI_1_1226_100704	4_Aceraceae	Acer platanoides	Introduced	Obs	
PRWI_6_75_050803	4_Aceraceae	Acer rubrum	Native	Obs	
PRWI_3_484_081403	4_Aizoaceae	Mollugo verticillata	Introduced	Obs	
PRWI_3_256_062103	4_Anacardiaceae	Rhus copallinum	Native	Obs	
PRWI_1_1015_051304	4_Anacardiaceae	Rhus glabra	Native	Obs	
PRWI_6_145_060503	4_Anacardiaceae	Rhus radicans	Native	Obs	
PRWI_3_24_040503	4_Annonaceae	Asimina triloba	Native	Obs	
PRWI_3_1031_052004	4_Apiaceae	Angelica venenosa	Native	Obs	
PRWI_4_1098_070104	4_Apiaceae	Cicuta maculata	Native	Vou	B32701
PRWI_1_318_070303	4_Apiaceae	Cryptotaenia canadensis	Native	Obs	
PRWI_7_334_071003	4_Apiaceae	Daucus carota	Introduced	Obs	
PRWI_1_612_092503	4_Apiaceae	Hydrocotyle americana	Native	Vou	B32562
PRWI_5_1184_082604	4_Apiaceae	Osmorhiza claytonii	Native	Vou	B32733
PRWI_3_76_050803	4_Apiaceae	Osmorhiza longistylis	Native	Vou	D2303
PRWI_7_335_071003	4_Apiaceae	Sanicula canadensis	Native	Vou	D2407
PRWI_1_220_061703	4_Apocynaceae	Apocynum cannabinum	Native	Obs	
PRWI_6_296_062603	4_Apocynaceae	Vinca minor	Introduced	Obs	
PRWI_3_8_032203	4_Aquifoliaceae	Ilex opaca	Native	Obs	
PRWI_6_84_051303	4_Aquifoliaceae	Ilex verticillata	Native	Obs	
PRWI_2_844_061203	4_Araliaceae	Aralia spinosa	Native	Obs	
PRWI_5_1197_090204	4_Araliaceae	Panax quinquefolius	Native	Obs	
PRWI_7_1072_061704	4_Aristolochiaceae	Aristolochia serpentaria	Native	Obs	
PRWI_5_1016_051304	4_Aristolochiaceae	Asarum canadense	Native	Obs	
PRWI_4_1048_061004	4_Aristolochiaceae	Hexastylis virginica	Native	Vou	B32698
PRWI_3_402_072403	4_Asclepiadaceae	Asclepias amplexicaulis	Native	Vou	D2454
PRWI_1_1081_062404	4_Asclepiadaceae	Asclepias incarnata	Native	Obs	
PRWI_4_673_101603	4_Asclepiadaceae	Asclepias syriaca	Native	Obs	
PRWI_2_1056_061704	4_Asclepiadaceae	Asclepias tuberosa	Native	Obs	
PRWI_3_1034_052004	4_Asclepiadaceae	Asclepias variegata	Native	Obs	
PRWI_3_247_062103	4_Asteraceae	Achillea millefolium	Unknown	Obs	
PRWI_8_1156_081204	4_Asteraceae	Ageratina altissima	Native	Vou	B32721
PRWI_7_501_081403	4_Asteraceae	Ambrosia artemisiifolia	Native	Obs	
PRWI_4_1045_061004	4_Asteraceae	Antennaria howellii ssp. neodioica	Native	Vou	B32700
PRWI_2_869_041603	4_Asteraceae	Antennaria plantaginifolia	Native	Obs	
PRWI_3_26_040503	4_Asteraceae	Antennaria solitaria	Native	Vou	B32244
PRWI_2_1022_052004	4_Asteraceae	Anthemis arvensis	Introduced	Obs	
PRWI_3_519_082103	4_Asteraceae	Artemisia vulgaris	Introduced	Obs	
PRWI_3_522_082103	4_Asteraceae	Aster divaricatus	Native	Obs	
PRWI_6_648_100203	4_Asteraceae	Aster dumosus	Native	Vou	B32578
PRWI_4_1204_090904	4_Asteraceae	Aster laevis	Native	Vou	B32748
PRWI_1_627_092503	4_Asteraceae	Aster lateriflorus	Native	Obs	
PRWI_7_672_100903	4_Asteraceae	Aster linariifolius	Native	Vou	B32591
PRWI_4_1195_090204	4_Asteraceae	Aster pilosus var. demotus	Native	Vou	B32744
PRWI_4_1193_090204	4_Asteraceae	Aster pilosus var. pilosus	Native	Obs	
PRWI_5_1213_091604	4_Asteraceae	Aster prenanthoides	Native	Vou	B32751
PRWI_3_1234_101404	4_Asteraceae	Aster puniceus	Native	Obs	
PRWI_1_617_092503	4_Asteraceae	Aster vimineus	Native	Vou	B32565
PRWI_6_1232_100704	4_Asteraceae	Bidens alba	Unknown	Vou	B32764

PRWI_7_635_100203	4_Asteraceae	Bidens aristosa	Native	Obs	
PRWI_2_579_091103	4_Asteraceae	Bidens connata	Native	Vou	D2497
PRWI_4_1209_090904	4_Asteraceae	Bidens discoidea	Native	Obs	
PRWI_6_1230_100704	4_Asteraceae	Bidens frondosa	Native	Obs	
PRWI_7_549_082803	4_Asteraceae	Bidens polylepis	Native	Vou	D2473
PRWI_7_1070_061704	4_Asteraceae	Carduus nutans	Introduced	Obs	
PRWI_3_351_071203	4_Asteraceae	Chrysogonum virginianum	Native	Obs	
PRWI_2_588_091103	4_Asteraceae	Chrysopsis mariana	Native	Vou	D2506
PRWI_1_223_061703	4_Asteraceae	Cichorium intybus	Introduced	Obs	
PRWI_6_482_080703	4_Asteraceae	Cirsium arvense	Introduced	Obs	
PRWI_1_440_073103	4_Asteraceae	Cirsium discolor	Native	Obs	
PRWI_5_1112_070804	4_Asteraceae	Cirsium pumilum	Native	Vou	D2531
PRWI_1_415_073103	4_Asteraceae	Cirsium vulgare	Introduced	Vou	B32425
PRWI_1_626_092503	4_Asteraceae	Conoclinium coelestinum	Native	Obs	
PRWI_1_619_092503	4_Asteraceae	Conyza candensis	Native	Obs	
PRWI_6_279_062403	4_Asteraceae	Coreopsis verticillata	Native	Obs	
PRWI_3_534_082803	4_Asteraceae	Eclipta prostrata	Native	Obs	
PRWI_3_521_082103	4_Asteraceae	Elephantopus carolinianus	Native	Obs	
PRWI_1_555_090503	4_Asteraceae	Erechtites hieracifolia	Native	Obs	
PRWI_6_290_062403	4_Asteraceae	Erigeron annuus	Native	Obs	
PRWI_5_99_051303	4_Asteraceae	Erigeron philadelphicus	Native	Obs	
PRWI_2_1130_071504	4_Asteraceae	Erigeron pulchellus	Native	Obs	
PRWI_5_211_061703	4_Asteraceae	Erigeron strigosus	Native	Obs	
PRWI_8_1019_052004	4_Asteraceae	Eupatorium fistulosum	Native	Obs	
PRWI_6_649_100203	4_Asteraceae	Eupatorium hyssopifolium var. hyssopifolium	Native	Obs	
PRWI_7_643_100203	4_Asteraceae	Eupatorium hyssopifolium var. laciniata	Native	Obs	
PRWI_6_576_090503	4_Asteraceae	Eupatorium perfoliatum	Native	Obs	
PRWI_7_641_100203	4_Asteraceae	Eupatorium pilosum	Native	Obs	
PRWI_6_652_100203	4_Asteraceae	Eupatorium rotundifolium var. rotundifolium	Native	Vou	B32579
PRWI_7_638_100203	4_Asteraceae	Euthamia graminifolia	Native	Obs	
PRWI_4_1061_061704	4_Asteraceae	Gamochaeta purpurea	Native	Obs	
PRWI_5_1158_081204	4_Asteraceae	Gnaphalium obtusifolium	Native	Obs	
PRWI_6_480_080703	4_Asteraceae	Helenium flexuosum	Native	Vou	B32521
PRWI_8_1219_092304	4_Asteraceae	Helianthus microcephalus	Native	Obs	
PRWI_7_545_082803	4_Asteraceae	Helianthus strumosus	Native	Vou	D2469
PRWI_1_906_051703	4_Asteraceae	Hieracium caespitosum	Introduced	Vou	D2307
PRWI_3_543_082803	4_Asteraceae	Hieracium gronovii	Native	Vou	D2467
PRWI_3_1177_081904	4_Asteraceae	Hieracium paniculatum	Native	Obs	
PRWI_3_90_051303	4_Asteraceae	Hieracium venosum	Native	Obs	
PRWI_1_322_070303	4_Asteraceae	Hypochoeris radicata	Introduced	Obs	
PRWI_6_847_060203	4_Asteraceae	Krigia dandelion	Native	Vou	B32347
PRWI_2_848_061203	4_Asteraceae	Krigia virginica	Native	Obs	
PRWI_7_500_081403	4_Asteraceae	Lactuca canadensis	Native	Obs	
PRWI_8_1154_081204	4_Asteraceae	Lactuca floridana	Native	Vou	B32719
PRWI_4_1054_061704	4_Asteraceae	Lactuca hirsuta	Native	Vou	B32697
PRWI_6_139_060503	4_Asteraceae	Leucanthemum vulgare	Introduced	Obs	
PRWI_6_1186_090204	4_Asteraceae	Liatris graminifolia	Native	Vou	B32737
PRWI_4_380_072403	4_Asteraceae	Liatris squarrosa	Native	Vou	D2434
PRWI_6_412_073103	4_Asteraceae	Mikania scandens	Native	Obs	

PRWI_6_943_060503	4_Asteraceae	Packera anonyma	Native	Vou	D2337
PRWI_3_850_052203	4_Asteraceae	Packera aurea	Native	Obs	
PRWI_7_642_100203	4_Asteraceae	Prenanthes serpentaria	Native	Vou	B32575
PRWI_3_485_081403	4_Asteraceae	Pyrrhopappus carolinianus	Native	Obs	
PRWI_6_569_090503	4_Asteraceae	Rudbeckia fulgida	Native	Vou	D2489
PRWI_6_477_080703	4_Asteraceae	Rudbeckia hirta	Native	Obs	
PRWI_5_1182_082604	4_Asteraceae	Rudbeckia laciniata	Native	Obs	
PRWI_1_320_070303	4_Asteraceae	Sericocarpus asteroides	Native	Obs	
PRWI_4_1053_061704	4_Asteraceae	Sericocarpus linifolius	Native	Obs	
PRWI_6_645_100203	4_Asteraceae	Solidago bicolor	Native	Obs	
PRWI_2_586_091103	4_Asteraceae	Solidago caesia	Native	Vou	D2504
PRWI_7_644_100203	4_Asteraceae	Solidago erecta	Native	Vou	B32576
PRWI_6_647_100203	4_Asteraceae	Solidago juncea	Native	Vou	B32577
PRWI_7_633_100203	4_Asteraceae	Solidago nemoralis	Native	Obs	
PRWI_7_640_100203	4_Asteraceae	Solidago rugosa	Native	Obs	
PRWI_4_678_101603	4_Asteraceae	Solidago ulmifolia	Native	Vou	B32594
PRWI_4_1058_061704	4_Asteraceae	Sonchus asper	Introduced	Obs	
PRWI_7_346_071003	4_Asteraceae	Taraxacum officinale	Introduced	Obs	
PRWI_2_631_100203	4_Asteraceae	Tussilago farfara	Introduced	Obs	
PRWI_3_524_082103	4_Asteraceae	Verbesina alternifolia	Native	Obs	
PRWI_6_575_090503	4_Asteraceae	Vernonia noveboracensis	Native	Obs	
PRWI_6_851_060203	4_Asteraceae	Youngia japonica	Introduced	Vou	B32343
PRWI_2_1026_052004	4_Balsaminaceae	Impatiens capensis	Native	Obs	
PRWI_3_11_032203	4_Berberidaceae	Berberis thunbergii	Introduced	Obs	
PRWI_8_1138_071504	4_Berberidaceae	Podophyllum peltatum	Native	Obs	
PRWI_3_359_071203	4_Betulaceae	Alnus serrulata	Native	Obs	
PRWI_1_105_051703	4_Betulaceae	Betula nigra	Native	Obs	
PRWI_3_31_040503	4_Betulaceae	Carpinus caroliniana	Native	Obs	
PRWI_2_852_061203	4_Betulaceae	Corylus americana	Native	Vou	B32365
PRWI_4_382_072403	4_Bignoniaceae	Campsis radicans	Native	Obs	
PRWI_4_385_072403	4_Bignoniaceae	Catalpa speciosa	Introduced	Vou	D2437
PRWI_1_1010_051304	4_Boraginaceae	Buglossoides arvensis	Introduced	Obs	
PRWI_3_88_051303	4_Boraginaceae	Cynoglossum virginianum	Native	Obs	
PRWI_3_65_042803	4_Boraginaceae	Myosotis discolor	Introduced	Vou	D2285
PRWI_3_916_042803	4_Boraginaceae	Myosotis macrosperma	Native	Vou	D2296
PRWI_3_40_041203	4_Brassicaceae	Arabidopsis thaliana	Introduced	Vou	D2267
PRWI_3_70_042803	4_Brassicaceae	Barbarea vulgaris	Introduced	Obs	
PRWI_3_25_040503	4_Brassicaceae	Cardamine concatenata	Native	Obs	
PRWI_1_243_061903	4_Brassicaceae	Cardamine flexuosa	Introduced	Vou	D2363
PRWI_3_23_040503	4_Brassicaceae	Cardamine hirsuta	Introduced	Obs	
PRWI_6_81_051303	4_Brassicaceae	Cardamine pensylvanica	Native	Vou	B32293
PRWI_2_47_041603	4_Brassicaceae	Draba verna	Introduced	Vou	D2275
PRWI_1_107_051703	4_Brassicaceae	Lepidium campestre	Introduced	Vou	D2314
PRWI_2_854_061203	4_Brassicaceae	Lepidium virginicum	Native	Obs	
PRWI_2_1114_070804	4_Buxaceae	Buxus sempervirens	Introduced	Vou	D2529
PRWI_8_1108_070804	4_Callitrichaceae	Callitriche heterophylla	Native	Vou	D2534
PRWI_4_1100_070104	4_Campanulaceae	Campanula aparinoides	Native	Vou	B32703
PRWI_3_530_082103	4_Campanulaceae	Lobelia cardinalis	Native	Obs	
PRWI_7_370_071703	4_Campanulaceae	Lobelia inflata	Native	Obs	
PRWI_6_650_100203	4_Campanulaceae	Lobelia puberula	Native	Obs	

PRWI_2_856_061203	4_Campanulaceae	Lobelia spicata	Native	Obs	
PRWI_6_857_060203	4_Campanulaceae	Triodanis perfoliata var. perfoliata	Native	Obs	
PRWI_5_1159_081204	4_Caprifoliaceae	Lonicera japonica	Introduced	Obs	
PRWI_2_859_061203	4_Caprifoliaceae	Sambucus canadensis	Native	Obs	
PRWI_3_1115_071504	4_Caprifoliaceae	Symphoricarpos orbiculatus	Native	Obs	
PRWI_7_372_071703	4_Caprifoliaceae	Viburnum acerifolium	Native	Obs	
PRWI_3_125_052203	4_Caprifoliaceae	Viburnum dentatum	Native	Obs	
PRWI_6_87_051303	4_Caprifoliaceae	Viburnum nudum	Native	Obs	
PRWI_3_68_042803	4_Caprifoliaceae	Viburnum prunifolium	Native	Vou	D2292
PRWI_3_895_052803	4_Caprifoliaceae	Viburnum setigerum	Introduced	Vou	B32267
PRWI_3_861_052803	4_Caryophyllaceae	Arenaria serpyllifolia	Introduced	Vou	B32265
PRWI_6_862_060203	4_Caryophyllaceae	Cerastium fontanum ssp. vulgare	Introduced	Vou	B32340
PRWI_1_929_051703	4_Caryophyllaceae	Cerastium glomeratum	Introduced	Vou	D2309
PRWI_2_899_061203	4_Caryophyllaceae	Dianthus armeria	Introduced	Obs	
PRWI_3_54_042303	4_Caryophyllaceae	Holosteum umbellatum	Introduced	Vou	D2276
PRWI_3_55_042303	4_Caryophyllaceae	Scleranthus annuus	Introduced	Vou	D2282
PRWI_2_863_061203	4_Caryophyllaceae	Silene antirrhina	Native	Vou	B32374
PRWI_2_1124_071504	4_Caryophyllaceae	Silene stellata	Native	Obs	
PRWI_3_56_042303	4_Caryophyllaceae	Stellaria media	Introduced	Obs	
PRWI_5_116_052203	4_Caryophyllaceae	Stellaria pubera	Native	Obs	
PRWI_3_123_052203	4_Celastraceae	Celastrus orbiculatus	Introduced	Obs	
PRWI_6_864_060203	4_Celastraceae	Euonymus americanus	Native	Obs	
PRWI_1_443_073103	4_Chenopodiaceae	Chenopodium album	Introduced	Obs	
PRWI_1_1233_100704	4_Chenopodiaceae	Chenopodium ambrosioides	Introduced	Obs	
PRWI_6_1172_081204	4_Cistaceae	Lechea racemulosa	Native	Vou	B32729
PRWI_7_490_081403	4_Clusiaceae	Hypericum canadense	Native	Vou	B32526
PRWI_1_439_073103	4_Clusiaceae	Hypericum gentianoides	Native	Obs	
PRWI_4_394_072403	4_Clusiaceae	Hypericum hypericoides	Native	Obs	
PRWI_7_499_081403	4_Clusiaceae	Hypericum mutilum	Native	Obs	
PRWI_7_328_071003	4_Clusiaceae	Hypericum perforatum	Introduced	Vou	D2401
PRWI_6_458_080703	4_Clusiaceae	Hypericum prolificum	Native	Vou	B32510
PRWI_2_1064_061704	4_Clusiaceae	Hypericum punctatum	Native	Obs	
PRWI_4_677_101603	4_Clusiaceae	Triadenum virginicum	Native	Obs	
PRWI_6_461_080703	4_Convolvulaceae	Calystegium sepium	Unknown	Obs	
PRWI_1_666_100903	4_Convolvulaceae	Cuscuta campestris	Native	Vou	B32590
PRWI_2_1024_052004	4_Convolvulaceae	Cuscuta compacta	Native	Obs	
PRWI_2_1221_092304	4_Convolvulaceae	Cuscuta gronovii	Native	Vou	B32757
PRWI_1_553_090503	4_Convolvulaceae	Ipomoea coccinea	Introduced	Vou	D2477
PRWI_1_668_100903	4_Convolvulaceae	Ipomoea hederacea	Native	Obs	
PRWI_1_444_073103	4_Convolvulaceae	Ipomoea lacunosa	Native	Obs	
PRWI_7_371_071703	4_Convolvulaceae	Ipomoea pandurata	Native	Obs	
PRWI_1_422_073103	4_Convolvulaceae	Ipomoea pupurea	Introduced	Obs	
PRWI_2_373_071703	4_Cornaceae	Cornus amomum	Native	Obs	
PRWI_8_36_041203	4_Cornaceae	Cornus florida	Native	Obs	
PRWI_1_622_092503	4_Crassulaceae	Penthorum sedoides	Native	Obs	
PRWI_6_1171_081204	4_Crassulaceae	Sedum telephioides	Native	Obs	
PRWI_6_567_090503	4_Cucurbitaceae	Cucurbita pepo var. ovifera	Introduced	Vou	D2487
PRWI_4_1107_070104	4_Ebenaceae	Diospyros virginiana	Native	Obs	
PRWI_7_1008_050604	4_Elaeagnaceae	Elaeagnus umbellata	Introduced	Obs	
PRWI_1_111_051703	4_Ericaceae	Chimaphila maculata	Native	Obs	

PRWI_1_321_070303	4_Ericaceae	Chimaphila umbellata	Native	Obs	
PRWI_3_72_042803	4_Ericaceae	Gaylussacia baccata	Native	Vou	D2297
PRWI_3_1093_062404	4_Ericaceae	Kalmia latifolia	Native	Obs	
PRWI_2_866_061203	4_Ericaceae	Lyonia ligustrina	Native	Obs	
PRWI_3_1091_062404	4_Ericaceae	Monotropa hypopithys	Native	Vou	B32736
PRWI_3_1090_062404	4_Ericaceae	Monotropa uniflora	Native	Obs	
PRWI_3_630_100203	4_Ericaceae	Oxydendrum arboreum	Native	Obs	
PRWI_6_48_042303	4_Ericaceae	Rhododendron periclymenoides	Native	Vou	D2278
PRWI_6_1003_042904	4_Ericaceae	Rhododendron viscosum	Native	Vou	D2527
PRWI_4_1149_080504	4_Ericaceae	Vaccinium corymbosum	Native	Vou	D2537
PRWI_8_1180_082604	4_Ericaceae	Vaccinium formosum	Native	Vou	B32734
PRWI_2_896_041603	4_Ericaceae	Vaccinium fuscatum	Native	Vou	D2274
PRWI_7_45_041603	4_Ericaceae	Vaccinium pallidum	Native	Vou	D2273
PRWI_6_74_050803	4_Ericaceae	Vaccinium stamineum	Native	Vou	D2300
PRWI_2_585_091103	4_Euphorbiaceae	Acalypha gracilens	Native	Vou	D2503
PRWI_5_507_081403	4_Euphorbiaceae	Acalypha rhomboidea	Native	Vou	B32536
PRWI_3_629_100203	4_Euphorbiaceae	Chamaesyce maculata	Native	Obs	
PRWI_4_1063_061704	4_Euphorbiaceae	Chamaesyce nutans	Native	Obs	
PRWI_6_468_080703	4_Euphorbiaceae	Croton capitatus	Native	Vou	B32515
PRWI_3_265_062103	4_Euphorbiaceae	Euphorbia corollata	Native	Vou	D2382
PRWI_3_1140_072204	4_Euphorbiaceae	Phyllanthus caroliniensis	Native	Obs	
PRWI_6_309_062603	4_Fabaceae	Albizia julibrissin	Introduced	Obs	
PRWI_3_520_082103	4_Fabaceae	Amphicarpa bracteata	Native	Obs	
PRWI_2_1025_052004	4_Fabaceae	Apios americana	Native	Obs	
PRWI_3_258_062103	4_Fabaceae	Baptisia tinctoria	Native	Vou	D2375
PRWI_3_14_040503	4_Fabaceae	Cercis canadensis	Native	Obs	
PRWI_2_1160_081204	4_Fabaceae	Chamaecrista fasciculata	Native	Obs	
PRWI_6_483_080703	4_Fabaceae	Chamaecrista nictitans	Native	Obs	
PRWI_3_399_072403	4_Fabaceae	Clitoria mariana	Native	Vou	D2451
PRWI_6_151_060503	4_Fabaceae	Coronilla varia	Introduced	Obs	
PRWI_4_1205_090904	4_Fabaceae	Crotalaria sagittalis	Introduced	Obs	
PRWI_1_1228_100704	4_Fabaceae	Desmodium ciliare	Native	Vou	B32766
PRWI_4_1194_090204	4_Fabaceae	Desmodium glabellum	Native	Vou	B32743
PRWI_2_597_091103	4_Fabaceae	Desmodium laevigatum	Native	Vou	D2514
PRWI_3_541_082803	4_Fabaceae	Desmodium marilandicum	Native	Vou	D2465
PRWI_4_393_072403	4_Fabaceae	Desmodium nudiflorum	Native	Vou	D2445
PRWI_8_1220_092304	4_Fabaceae	Desmodium obtusum	Native	Vou	B32758
PRWI_2_584_091103	4_Fabaceae	Desmodium paniculatum	Native	Vou	D2502
PRWI_2_580_091103	4_Fabaceae	Desmodium pauciflorum	Native	Vou	D2498
PRWI_2_581_091103	4_Fabaceae	Desmodium rotundifolium	Native	Vou	D2499
PRWI_3_1225_100704	4_Fabaceae	Gleditsia triacanthos	Native	Vou	B32765
PRWI_2_1057_061704	4_Fabaceae	Kummerowia stipulacea	Introduced	Obs	
PRWI_4_510_082103	4_Fabaceae	Kummerowia striata	Introduced	Obs	
PRWI_2_1161_081204	4_Fabaceae	Lathyrus latifolius	Introduced	Obs	
PRWI_3_1145_072204	4_Fabaceae	Lespedeza bicolor	Introduced	Obs	
PRWI_5_515_082103	4_Fabaceae	Lespedeza cuneata	Introduced	Obs	
PRWI_2_582_091103	4_Fabaceae	Lespedeza intermedia	Native	Vou	D2500
PRWI_8_1018_052004	4_Fabaceae	Lespedeza procumbens	Native	Obs	
PRWI_3_400_072403	4_Fabaceae	Lespedeza repens	Native	Vou	D2452
PRWI_7_634_100203	4_Fabaceae	Lespedeza virginica	Native	Obs	

PRWI_1_904_051703	4_Fabaceae	Lotus corniculatus	Introduced	Vou	D2304
PRWI_6_148_060503	4_Fabaceae	Medicago lupulina	Introduced	Vou	D2343
PRWI_1_446_073103	4_Fabaceae	Melilotus alba	Introduced	Obs	
PRWI_1_225_061703	4_Fabaceae	Melilotus officinalis	Introduced	Obs	
PRWI_1_1014_051304	4_Fabaceae	Robinia hispida	Native	Obs	
PRWI_3_77_050803	4_Fabaceae	Robinia pseudoacacia	Native	Obs	
PRWI_7_547_082803	4_Fabaceae	Senna hebecarpa	Native	Vou	D2471
PRWI_8_1152_080504	4_Fabaceae	Senna marilandica	Native	Obs	
PRWI_3_449_073103	4_Fabaceae	Strophostyles umbellata	Native	Vou	B32438
PRWI_3_360_071203	4_Fabaceae	Stylosanthes biflora	Native	Vou	D2425
PRWI_7_1069_061704	4_Fabaceae	Tephrosia virginiana	Native	Obs	
PRWI_3_267_062103	4_Fabaceae	Trifolium arvense	Introduced	Obs	
PRWI_6_152_060503	4_Fabaceae	Trifolium campestre	Introduced	Vou	D2351
PRWI_4_1068_061704	4_Fabaceae	Trifolium dubium	Introduced	Obs	
PRWI_1_427_073103	4_Fabaceae	Trifolium pratense	Introduced	Obs	
PRWI_2_1066_061704	4_Fabaceae	Trifolium repens	Introduced	Obs	
PRWI_1_108_051703	4_Fabaceae	Vicia sativa	Introduced	Vou	D2306
PRWI_3_1028_052004	4_Fabaceae	Vicia tetrasperma	Introduced	Obs	
PRWI_3_73_042803	4_Fabaceae	Wisteria sinensis	Introduced	Vou	D2294
PRWI_1_1044_060304	4_Fagaceae	Castanea dentata	Native	Obs	
PRWI_2_870_061203	4_Fagaceae	Castanea pumila	Native	Obs	
PRWI_4_1055_061704	4_Fagaceae	Fagus grandifolia	Native	Obs	
PRWI_6_142_060503	4_Fagaceae	Quercus alba	Native	Obs	
PRWI_3_1174_081904	4_Fagaceae	Quercus bicolor	Native	Obs	
PRWI_1_625_092503	4_Fagaceae	Quercus coccinea	Native	Vou	B32560
PRWI_3_871_060203	4_Fagaceae	Quercus falcata	Native	Obs	
PRWI_1_217_061703	4_Fagaceae	Quercus marilandica	Native	Obs	
PRWI_6_1043_060304	4_Fagaceae	Quercus palustris	Native	Obs	
PRWI_6_143_060503	4_Fagaceae	Quercus phellos	Native	Obs	
PRWI_1_608_092503	4_Fagaceae	Quercus prinus	Native	Obs	
PRWI_1_610_092503	4_Fagaceae	Quercus rubra	Native	Obs	
PRWI_2_872_061203	4_Fagaceae	Quercus stellata	Native	Obs	
PRWI_1_606_092503	4_Fagaceae	Quercus velutina	Native	Obs	
PRWI_3_21_040503	4_Fumariaceae	Corydalis flavula	Native	Obs	
PRWI_6_1223_093004	4_Gentianaceae	Gentiana clausa	Native	Vou	B32761
PRWI_3_96_051303	4_Gentianaceae	Obolaria virginica	Native	Obs	
PRWI_6_463_080703	4_Gentianaceae	Sabatia angularis	Native	Obs	
PRWI_6_149_060503	4_Geraniaceae	Geranium carolinianum	Native	Vou	D2352
PRWI_3_1096_062404	4_Geraniaceae	Geranium maculatum	Native	Obs	
PRWI_3_89_051303	4_Hamamelidaceae	Hamamelis virginiana	Native	Obs	
PRWI_6_144_060503	4_Hamamelidaceae	Liquidambar styraciflua	Native	Obs	
PRWI_4_1208_090904	4_Hydrocharitaceae	Hydrilla verticillata	Introduced	Vou	B32750
PRWI_1_907_051703	4_Hydrophyllaceae	Phacelia dubia	Native	Vou	D2308
PRWI_7_344_071003	4_Juglandaceae	Carya alba	Native	Vou	D2415
PRWI_1_680_102203	4_Juglandaceae	Carya cordiformis	Native	Vou	D2516
PRWI_1_414_073103	4_Juglandaceae	Carya glabra	Native	Vou	B32424
PRWI_2_1126_071504	4_Juglandaceae	Carya ovalis	Native	Obs	
PRWI_5_1181_082604	4_Juglandaceae	Juglans cinerea	Native	Obs	
PRWI_2_513_082103	4_Juglandaceae	Juglans nigra	Native	Obs	
PRWI_8_60_042803	4_Lamiaceae	Ajuga reptans	Introduced	Vou	D2290

PRWI_1_557_090503	4_Lamiaceae	Clinopodium vulgare	Unknown	Vou	D2479
PRWI_3_1095_062404	4_Lamiaceae	Collinsonia canadensis	Native	Obs	
PRWI_3_1122_071504	4_Lamiaceae	Cunila origanoides	Native	Obs	
PRWI_6_874_060203	4_Lamiaceae	Glechoma hederacea	Introduced	Obs	
PRWI_6_470_080703	4_Lamiaceae	Hedeoma pulegioides	Native	Obs	
PRWI_3_57_042303	4_Lamiaceae	Lamium amplexicaule	Introduced	Obs	
PRWI_1_103_051703	4_Lamiaceae	Lamium purpureum	Introduced	Obs	
PRWI_6_453_080703	4_Lamiaceae	Lycopus americanus	Native	Vou	B32509
PRWI_6_478_080703	4_Lamiaceae	Lycopus virginicus	Native	Obs	
PRWI_6_1169_081204	4_Lamiaceae	Mentha arvensis	Unknown	Vou	B32728
PRWI_6_469_080703	4_Lamiaceae	Nepeta cataria	Introduced	Obs	
PRWI_2_511_082103	4_Lamiaceae	Perilla frutescens	Introduced	Obs	
PRWI_4_378_072403	4_Lamiaceae	Prunella vulgaris	Unknown	Obs	
PRWI_1_324_070303	4_Lamiaceae	Pycnanthemum tenuifolium	Native	Obs	
PRWI_3_91_051303	4_Lamiaceae	Salvia lyrata	Native	Obs	
PRWI_3_262_062103	4_Lamiaceae	Scutellaria elliptica	Native	Vou	D2379
PRWI_7_331_071003	4_Lamiaceae	Scutellaria integrifolia	Native	Vou	D2404
PRWI_6_411_073103	4_Lamiaceae	Scutellaria lateriflora	Native	Obs	
PRWI_3_264_062103	4_Lamiaceae	Scutellaria parvula var. leonardii	Native	Vou	D2381
PRWI_5_531_082803	4_Lamiaceae	Trichostema dichotomum	Native	Vou	D2456
PRWI_3_20_040503	4_Lauraceae	Lindera benzoin	Native	Obs	
PRWI_1_232_061903	4_Lauraceae	Sassafras albidum	Native	Obs	
PRWI_6_474_080703	4_Lentibulariaceae	Utricularia gibba	Native	Vou	B32518
PRWI_2_1113_070804	4_Linaceae	Linum intercursum	Native	Vou	D2530
PRWI_4_392_072403	4_Linaceae	Linum medium var. texanum	Native	Vou	D2444
PRWI_7_329_071003	4_Linaceae	Linum striatum	Native	Vou	D2402
PRWI_6_473_080703	4_Loganiaceae	Polypremum procumbens	Native	Obs	
PRWI_1_554_090503	4_Lythraceae	Cuphea viscosissima	Native	Obs	
PRWI_5_38_041203	4_Magnoliaceae	Liriodendron tulipifera	Native	Obs	
PRWI_3_1051_061004	4_Magnoliaceae	Magnolia virginiana	Native	Obs	
PRWI_6_1166_081204	4_Malvaceae	Hibiscus moscheutos	Native	Vou	B32726
PRWI_1_441_073103	4_Malvaceae	Hibiscus syriaca	Introduced	Obs	
PRWI_3_1117_071504	4_Malvaceae	Sida spinosa	Native	Obs	
PRWI_6_646_100203	4_Melastomataceae	Rhexia mariana	Native	Obs	
PRWI_2_596_091103	4_Melastomataceae	Rhexia virginica	Native	Vou	D2513
PRWI_3_94_051303	4_Menispermaceae	Menispermum canadense	Native	Obs	
PRWI_1_226_061703	4_Moraceae	Morus alba	Introduced	Obs	
PRWI_1_228_061703	4_Moraceae	Morus rubra	Native	Obs	
PRWI_2_875_061203	4_Nyssaceae	Nyssa sylvatica	Native	Vou	B32375
PRWI_7_101_051703	4_Oleaceae	Chionanthus virginicus	Native	Vou	D2322
PRWI_3_409_073103	4_Oleaceae	Fraxinus americana	Native	Vou	B32422
PRWI_6_141_060503	4_Oleaceae	Fraxinus pennsylvanica	Native	Vou	D2329
PRWI_3_894_052803	4_Oleaceae	Ligustrum obtusifolium	Introduced	Vou	B32266
PRWI_1_227_061703	4_Oleaceae	Ligustrum ovalifolium	Introduced	Vou	B32392
PRWI_2_1162_081204	4_Oleaceae	Ligustrum sinense	Introduced	Vou	B32723
PRWI_3_1084_062404	4_Onagraceae	Circaea lutetiana ssp. canadensis	Native	Obs	
PRWI_7_502_081403	4_Onagraceae	Ludwigia alternifolia	Native	Obs	
PRWI_4_1106_070104	4_Onagraceae	Ludwigia decurrens	Native	Vou	B32705
PRWI_1_1079_062404	4_Onagraceae	Ludwigia palustris	Native	Obs	
PRWI_1_556_090503	4_Onagraceae	Oenothera biennis	Native	Vou	D2478

PRWI_6_917_060503	4_Onagraceae	Oenothera fruticosa	Native	Vou	D2331
PRWI_3_1089_062404	4_Orobanchaceae	Epifagus virginiana	Native	Obs	
PRWI_1_423_073103	4_Oxalidaceae	Oxalis dillenii	Native	Vou	B32428
PRWI_6_79_051303	4_Oxalidaceae	Oxalis violacea	Native	Obs	
PRWI_8_49_042303	4_Papaveraceae	Sanguinaria canadensis	Native	Obs	
PRWI_2_1125_071504	4_Passifloraceae	Passiflora lutea	Native	Obs	
PRWI_1_614_092503	4_Phytolaccaceae	Phytolacca americana	Native	Obs	
PRWI_2_876_061203	4_Plantaginaceae	Plantago aristata	Introduced	Obs	
PRWI_2_877_061203	4_Plantaginaceae	Plantago lanceolata	Introduced	Obs	
PRWI_4_674_101603	4_Plantaginaceae	Plantago rugelii	Native	Vou	B32592
PRWI_4_1062_061704	4_Plantaginaceae	Plantago virginica	Native	Obs	
PRWI_4_1037_052704	4_Platanaceae	Platanus occidentalis	Native	Obs	
PRWI_5_1183_082604	4_Polemoniaceae	Phlox paniculata	Native	Obs	
PRWI_7_492_081403	4_Polygalaceae	Polygala curtisii	Native	Vou	B32528
PRWI_5_506_081403	4_Polygalaceae	Polygala incarnata	Native	Obs	
PRWI_6_467_080703	4_Polygalaceae	Polygala mariana	Native	Vou	B32514
PRWI_6_272_062403	4_Polygalaceae	Polygala sanguinea	Native	Vou	B32395
PRWI_7_488_081403	4_Polygalaceae	Polygala verticillata var. verticillata	Native	Vou	B32524
PRWI_6_137_060203	4_Polygonaceae	Polygonum arifolium	Native	Obs	
PRWI_3_407_073103	4_Polygonaceae	Polygonum aviculare	Introduced	Obs	
		Polygonum cespitosum var. longisetum	Introduced	Vou	D2461
PRWI_3_537_082803	4_Polygonaceae	Polygonum cuspidatum	Introduced	Obs	
PRWI_2_1020_052004	4_Polygonaceae	Polygonum pensylvanicum	Native	Obs	
PRWI_1_660_100903	4_Polygonaceae	Polygonum perfoliatum	Introduced	Obs	
PRWI_1_110_051703	4_Polygonaceae	Polygonum persicaria	Introduced	Vou	B32746
PRWI_3_1201_090904	4_Polygonaceae	Polygonum punctatum	Native	Vou	B32563
PRWI_1_613_092503	4_Polygonaceae	Polygonum punctatum	Native	Obs	
PRWI_1_1078_062404	4_Polygonaceae	Polygonum sagittatum	Native	Obs	
PRWI_6_1231_100704	4_Polygonaceae	Polygonum setaceum	Native	Vou	B32763
PRWI_3_527_082103	4_Polygonaceae	Polygonum virginianum	Native	Obs	
PRWI_3_58_042303	4_Polygonaceae	Rumex acetosella	Introduced	Obs	
PRWI_2_878_061203	4_Polygonaceae	Rumex crispus	Introduced	Obs	
PRWI_2_879_061203	4_Polygonaceae	Rumex obtusifolius	Introduced	Vou	B32368
PRWI_3_16_040503	4_Portulacaceae	Claytonia virginica	Native	Obs	
PRWI_3_1202_090904	4_Portulacaceae	Portulaca oleracea	Introduced	Obs	
PRWI_4_1235_101404	4_Primulaceae	Anagallis arvensis	Introduced	Obs	
PRWI_4_1101_070104	4_Primulaceae	Lysimachia ciliata	Native	Obs	
PRWI_2_880_061203	4_Primulaceae	Lysimachia quadrifolia	Native	Obs	
		Anemone quinquefolia var. quinquefolia	Native	Vou	B32295
PRWI_6_82_051303	4_Ranunculaceae	Anemone virginiana	Native	Obs	
PRWI_4_1206_090904	4_Ranunculaceae	Aquilegia canadensis	Native	Obs	
PRWI_5_1017_051304	4_Ranunculaceae	Cimicifuga racemosa	Native	Obs	
PRWI_8_1137_071504	4_Ranunculaceae	Clematis ochroleuca	Native	Obs	
PRWI_4_1046_061004	4_Ranunculaceae	Clematis virginiana	Native	Obs	
PRWI_4_1060_061704	4_Ranunculaceae	Hepatica americana	Native	Obs	
PRWI_4_1035_032404	4_Ranunculaceae	Ranunculus abortivus	Native	Obs	
PRWI_1_1074_062404	4_Ranunculaceae	Ranunculus abortivus	Native	Obs	
PRWI_3_67_042803	4_Ranunculaceae	Ranunculus bulbosus	Introduced	Vou	D2293
PRWI_6_881_051303	4_Ranunculaceae	Ranunculus pusillus	Native	Vou	B32294
PRWI_6_83_051303	4_Ranunculaceae	Ranunculus recurvatus	Native	Vou	B32290
PRWI_7_337_071003	4_Ranunculaceae	Thalictrum pubescens	Native	Vou	D2409

PRWI_3_19_040503	4_Ranunculaceae	Thalictrum thalictroides	Native	Obs	
PRWI_6_671_100903	4_Rosaceae	Agrimonia parviflora	Native	Obs	
PRWI_3_540_082803	4_Rosaceae	Agrimonia pubescens	Native	Vou	D2464
PRWI_5_1157_081204	4_Rosaceae	Agrimonia rostellata	Native	Vou	B32722
PRWI_3_30_040503	4_Rosaceae	Amelanchier arborea	Native	Vou	B32241
PRWI_8_37_041203	4_Rosaceae	Amelanchier laevis	Native	Vou	D2269
PRWI_5_100_051303	4_Rosaceae	Aphanes microcarpa	Introduced	Obs	
PRWI_4_1203_090904	4_Rosaceae	Aronia arbutifolia	Native	Obs	
PRWI_3_64_042803	4_Rosaceae	Duchesnea indica	Introduced	Obs	
PRWI_3_1032_052004	4_Rosaceae	Fragaria virginiana	Native	Obs	
PRWI_3_1085_062404	4_Rosaceae	Geum canadense	Native	Obs	
PRWI_2_1065_061704	4_Rosaceae	Potentilla canadensis	Native	Obs	
PRWI_3_1030_052004	4_Rosaceae	Potentilla simplex	Native	Obs	
PRWI_3_22_040503	4_Rosaceae	Prunus angustifolia	Native	Vou	B32247
PRWI_3_295_041903	4_Rosaceae	Prunus avium	Introduced	Vou	B32249
PRWI_1_1012_051304	4_Rosaceae	Prunus cerasus	Introduced	Vou	B32603
PRWI_3_1141_072204	4_Rosaceae	Prunus serotina	Native	Obs	
PRWI_1_218_061703	4_Rosaceae	Pyrus calleryana	Introduced	Obs	
PRWI_1_425_073103	4_Rosaceae	Pyrus pyrifolia	Introduced	Vou	B32429
PRWI_6_285_062403	4_Rosaceae	Rosa carolina	Native	Obs	
PRWI_4_1102_070104	4_Rosaceae	Rosa multiflora	Introduced	Obs	
PRWI_4_1067_061704	4_Rosaceae	Rosa wichuraiana	Introduced	Obs	
PRWI_1_1075_062404	4_Rosaceae	Rubus argutus	Native	Obs	
PRWI_6_885_060203	4_Rosaceae	Rubus enslenii	Native	Vou	B32344
PRWI_4_1188_090204	4_Rosaceae	Rubus flagellaris	Native	Obs	
PRWI_1_1082_062404	4_Rosaceae	Rubus occidentalis	Native	Obs	
PRWI_4_676_101603	4_Rosaceae	Rubus phoenicolasius	Introduced	Obs	
PRWI_4_1059_061704	4_Rosaceae	Spiraea prunifolia	Introduced	Vou	B32696
PRWI_7_639_100203	4_Rubiaceae	Cephalanthus occidentalis	Native	Obs	
PRWI_1_930_051703	4_Rubiaceae	Cruciata pedemontana	Introduced	Vou	D2311
PRWI_2_376_071703	4_Rubiaceae	Diodia teres	Native	Obs	
PRWI_6_140_060503	4_Rubiaceae	Galium aparine	Native	Obs	
PRWI_1_239_061903	4_Rubiaceae	Galium circaeans	Native	Vou	D2359
PRWI_6_287_062403	4_Rubiaceae	Galium obtusum var. filifolium	Native	Vou	B32406
PRWI_6_886_060203	4_Rubiaceae	Galium obtusum var. obtusum	Native	Vou	B32338
PRWI_7_332_071003	4_Rubiaceae	Galium pilosum	Native	Vou	D2405
PRWI_6_305_062603	4_Rubiaceae	Galium tinctorium	Native	Vou	D2396
PRWI_3_348_071203	4_Rubiaceae	Galium triflorum	Native	Vou	D2418
PRWI_7_32_041203	4_Rubiaceae	Houstonia caerulea	Native	Obs	
PRWI_5_551_090503	4_Rubiaceae	Houstonia longifolia	Native	Vou	D2475
PRWI_2_887_061203	4_Rubiaceae	Houstonia purpurea	Native	Obs	
PRWI_4_1210_090904	4_Rubiaceae	Mitchella repens	Native	Obs	
PRWI_7_35_041203	4_Salicaceae	Populus grandidentata	Native	Obs	
PRWI_1_229_061703	4_Salicaceae	Salix babylonica	Introduced	Obs	
PRWI_6_147_060503	4_Salicaceae	Salix nigra	Native	Vou	D2330
PRWI_5_1215_091604	4_Saururaceae	Saururus cernuus	Native	Obs	
PRWI_2_1023_052004	4_Saxifragaceae	Heuchera americana	Native	Vou	B32617
PRWI_3_1094_062404	4_Saxifragaceae	Hydrangea arborescens	Native	Obs	
PRWI_5_516_082103	4_Saxifragaceae	Philadelphus inodorus	Native	Vou	B32553
PRWI_3_17_040503	4_Saxifragaceae	Saxifraga virginensis	Native	Vou	B32245

PRWI_6_651_100203	4_Scrophulariaceae	Agalinis purpurea	Native	Obs	
PRWI_6_566_090503	4_Scrophulariaceae	Agalinis tenuifolia	Native	Vou	D2486
PRWI_8_1218_092304	4_Scrophulariaceae	Aureolaria pectinata	Native	Vou	B32756
PRWI_2_594_091103	4_Scrophulariaceae	Chelone glabra	Native	Obs	
PRWI_1_621_092503	4_Scrophulariaceae	Gratiola virginiana	Native	Vou	B32568
PRWI_6_1170_081204	4_Scrophulariaceae	Kickxia elatine	Introduced	Obs	
PRWI_3_450_073103	4_Scrophulariaceae	Lindernia anagallidea	Native	Obs	
PRWI_5_1198_090204	4_Scrophulariaceae	Lindernia dubia	Native	Obs	
PRWI_3_529_082103	4_Scrophulariaceae	Mimulus alatus	Native	Obs	
PRWI_6_455_080703	4_Scrophulariaceae	Mimulus ringens	Native	Obs	
PRWI_3_249_062103	4_Scrophulariaceae	Nuttallanthus canadensis	Native	Vou	D2367
PRWI_3_66_042803	4_Scrophulariaceae	Paulownia tomentosa	Unknown	Obs	
PRWI_6_150_060503	4_Scrophulariaceae	Verbascum blattaria	Introduced	Obs	
PRWI_6_481_080703	4_Scrophulariaceae	Verbascum phlomoides	Introduced	Vou	B32522
PRWI_1_102_051703	4_Scrophulariaceae	Verbascum thapsus	Introduced	Obs	
PRWI_8_888_042303	4_Scrophulariaceae	Veronica arvensis	Introduced	Vou	D2284
PRWI_3_889_052803	4_Scrophulariaceae	Veronica officinalis	Introduced	Obs	
PRWI_3_1199_090904	4_Scrophulariaceae	Veronica peregrina	Native	Obs	
PRWI_1_230_061703	4_Scrophulariaceae	Veronica persica	Introduced	Obs	
PRWI_3_890_052803	4_Scrophulariaceae	Veronica serpyllifolia	Introduced	Obs	
PRWI_6_153_060503	4_Simaroubaceae	Ailanthus altissima	Introduced	Obs	
PRWI_3_1116_071504	4_Solanaceae	Datura stramonium	Introduced	Obs	
PRWI_3_1033_052004	4_Solanaceae	Physalis heterophylla	Native	Obs	
PRWI_4_1196_090204	4_Solanaceae	Physalis longifolia	Native	Vou	B32745
PRWI_1_445_073103	4_Solanaceae	Solanum americanum	Native	Obs	
PRWI_2_891_061203	4_Solanaceae	Solanum carolinense	Native	Obs	
PRWI_3_1121_071504	4_Solanaceae	Solanum sarrachoides	Introduced	Vou	B32708
PRWI_3_1176_081904	4_Staphyleaceae	Staphylea trifolia	Native	Obs	
PRWI_4_1104_070104	4_Tiliaceae	Tilia americana	Native	Obs	
PRWI_3_1178_081904	4_Ulmaceae	Celtis occidentalis	Native	Obs	
PRWI_4_1216_091604	4_Ulmaceae	Celtis tenuifolia	Native	Vou	B32753
PRWI_6_457_080703	4_Ulmaceae	Ulmus rubra	Native	Obs	
PRWI_3_349_071203	4_Urticaceae	Boehmeria cylindrica	Native	Obs	
PRWI_3_1086_062404	4_Urticaceae	Laportea canadensis	Native	Obs	
PRWI_6_562_090503	4_Urticaceae	Pilea pumila	Native	Obs	
PRWI_1_1013_051304	4_Valerianaceae	Valerianella radiata	Native	Obs	
PRWI_7_333_071003	4_Verbenaceae	Verbena simplex	Native	Vou	D2406
PRWI_5_518_082103	4_Verbenaceae	Verbena urticifolia	Native	Obs	
PRWI_5_51_042303	4_Violaceae	Viola bicolor	Native	Vou	D2280
PRWI_6_892_051303	4_Violaceae	Viola cucullata	Native	Vou	B32292
PRWI_4_1038_052704	4_Violaceae	Viola hirsutula	Native	Obs	
PRWI_7_1009_050604	4_Violaceae	Viola palmata	Native	Vou	B32622
PRWI_7_914_051703	4_Violaceae	Viola primulifolia	Native	Vou	D2321
PRWI_1_63_042803	4_Violaceae	Viola pubescens	Native	Vou	D2289
PRWI_1_62_042803	4_Violaceae	Viola sagittata	Native	Vou	D2286
PRWI_3_71_042803	4_Violaceae	Viola sororia	Native	Vou	D2295
PRWI_6_146_060503	4_Vitaceae	Parthenocissus quinquefolia	Native	Obs	
PRWI_6_460_080703	4_Vitaceae	Vitis aestivalis var. argentifolia	Native	Obs	
PRWI_1_1011_051304	4_Vitaceae	Vitis baileyana	Native	Obs	
PRWI_2_375_071703	4_Vitaceae	Vitis labrusca	Native	Obs	

PRWI_2_1163_081204	4_Vitaceae	Vitis vulpina	Native	Vou	B32724
--------------------	------------	---------------	--------	-----	--------

APPENDIX C: Metadata for the Floristic Survey Access 97 Database

Introduction

The database was created by Christina Wright at CUE with input from GMU. It consists of 17 tables, three of which constitute the actual plant inventory while the other 14 are used to “look up” data. A form was also created that utilizes the 14 lookup tables and provides a handy way to update the three tables that comprise the plant inventory database. The form consists of a main part and two sub forms: "frmEnterData", "fsubEvent", and "fsubObservation" respectively. Merely activating "frmEnterData" allows all fields of the three inventory tables to be populated. The three tables that contain the plant inventory are the "tblEvent", "tblLocation", and "tblObservation" tables. Two lookup tables, included in the 14, were added after the project was underway: "tblDupInd" and "tluNativity". The first helps in separating unique plant species from species having more than one occurrence in the inventory while the second was added to provide more information on each plant to the Park Service. A description of each table and its associated fields is provided below.

1. tblLocation

This table contains information about the geographic area in which the plant was found. It contains 18 fields as described below.

1.1 LocationID – A key field containing a unique identifier for each plant. The identifier consists of three parts separated by an underscore “_”: the first four letters are the abbreviation for Prince William Forest Park (PRWI), the second number in the range from 1-8 is the park area (further defined in the look-up table tluParkArea), and the final number (up to 4 digits) is a unique number associated with each plant. An example of key value for this field is “PRWI_1_1012”.

1.2 ParkCode – An abbreviation for the park. Since all work was done in Prince William Forest Park, all fields are populated with “PRWI”.

1.3 ParkArea – The actual name of the park area corresponding to the second number in the "LocationID" field. A list will be provided in the description of the lookup table "tluParkArea". In the example for "LocationID", park area “1” is called “Cabin Camp 1 & 4”.

1.4 SearchArea – Not used.

1.5 Project – Not used.

1.6 Description – Not used.

1.7 SourceLocationInfo – Not used.

1.8 UTMX – The Universal Transverse Mercator (UTM) East-West coordinate of the plant location.

1.9 UTMY – The Universal Transverse Mercator (UTM) North-South coordinate of the plant location.

1.10 UTMZone – The Universal Transverse Mercator (UTM) zone in which the plant is located. All of Prince William Forest Park is in zone “18 North”.

1.11 Datum – The datum reference used by the GPS when recording a plant's location. All Trimble references obtained from the Data Logger .SSF files used the NAD 1927 CONUS datum. On rare occasions, a Garmin GPS was used when the Trimble could not access satellites or the Trimble was not available. The Garmin also used the NAD 1927 CONUS datum. On a number of occasions in the early part of the survey, the Trimble data was not properly saved in the Data Logger in an .SSF file; these readings use the NAD 1927 Eastern US datum, as explained in Appendix D.

1.12 EstHError – The estimated horizontal error in the plant's coordinates as calculated by the GPS. Note that all Trimble GPS NAD 1927 CONUS entries have a recorded error, but the NAD 27 Eastern US datum coordinates do not; see Appendix D.

1.13 HaccNotes – Not used.

1.14 Elevation – Not used.

1.15 EstVError – Not used.

1.16 Aspect – Not used.

1.17 Slope – Not used.

1.18 Notes – Not used.

2. tblEvent

This table contains information pertinent to the act of discovering the plant. It contains 7 fields as described below.

2.1 EventID – A key field identical to the "LocationID" but with the date appended after an underscore (“_”) in 6 digit “MMDDYY” format. An example is “PRWI_1_1012_051303”.

2.2 LocationID – A key field previously explained and identical to that in the "tblLocation" table.

2.3 Project - Not used.

2.4 Observer - The initials of the persons who discovered the plant. The lookup table "tluObserver" was designed to aid in populating this field but was not used due to the variability of the observer set.

2.5 Date - The date in Month/Day/Year format on which the plant was observed.

2.6 SiteQuality - A qualitative estimate of the growing conditions for the plant. It consists of one of four categories: Excellent, Fair, Good, Poor. The lookup table "tluQuality" aids in populating this field.

2.7 TripReport - Not used.

3. tblObservation

This table contains the details of the observed plant. It consists of 18 fields as described below.

3.1 RecordId - A computer generated number beginning with "1" and incremented each time a plant was added to the database. It provides a historical indication of when a plant was found during the project in relation to other plants. Note that there are gaps in the sequence since occasionally a record was deleted that had been entered in error.

3.2 ParkCode - An abbreviation for the park. Since all work was done in Prince William Forest Park, all fields are populated with "PRWI". This field is the same as the like-named field in the "tblLocation" table.

3.3 ParkArea - The actual name of the park area corresponding to the second number in the LocationID field. A list will be provided in the description of the lookup table "tluParkArea". This field is the same as the like-named field in the "tblLocation" table.

3.4 Project - Not used. This field is the same as the like-named field in the "tblLocation" table.

3.5 LocationID - A key field previously explained and identical to that in the "tblLocation" table.

3.6 EventID - A key field previously explained and identical to that in the "tblEvent" table.

3.7 SortGroup - A field created by prefixing the family of a plant with a number from "1-4" followed by an underscore "_". This aids in listing the plants in taxonomic order as follows: 1 includes all ferns and fern allies; 2 includes gymnosperms; 3 includes angiosperm monocots; and 4 includes angiosperm dicots. The field is populated through the use of the lookup table "tluFamily". An example is "1_Lycopodiaceae".

3.8 Family - Contains the same data as the "SortGroup" field. The lookup table "tluFamily" was modified to prefix the plant family with an underscore "_" and a number in the range of "1-4" as explained in the "SortGroup" field definition. The same lookup table was used to populate both the "SortGroup" and "Family" fields.

3.9 Species - Provides the genus and species of the plant. It is populated through the use of the lookup table "tluSpecies".

3.10 DupInd - Contains a "Duplicate Indicator" consisting of an "O" for the "Original" instance of a plant and a "D" for all subsequent "Duplicate" instances of the plant. Updating is facilitated by use of the lookup table "tblDupInd".

3.11 Group Number - Contains a number if the plant is one of a group observed under a single GPS coordinates reading. All plants observed in that group have the same number (and will all have the same coordinates in the "tblLocation" table).

3.12 Commonality - A subjective indication of the number of plants of that species found in Prince William Forest Park. Populated with the lookup table

"tluCommonality", self-explanatory values are "Common", "Occasional" and "Uncommon".

3.13 Nativity - Specifies whether a plant is "Native", "Introduced" or its nativity is "Unknown" based on Gleason and Cronquist (Ref. 2). Lookup table "tluNativity" helps in populating this field.

3.14 SearchAreaCode - Contains a code (example "SA1" for Search Area 1) for each search area used or the letter "I" for "Incidental" plants found outside of search areas. Since no search areas were used in this study, all entries contain an "I". The lookup table "tluSearchArea" was used to populate this field.

3.15 SampleCode - Indicates whether a plant was recognized on sight ("Obs" for "Observed") or whether a sample was collected for determination in the lab ("Vou" for "Voucher"). The lookup table "tluCode" was used to populate this field.

3.16 VoucherNo - Contains the number assigned by the GMU researcher for plants collected in the field for determination in the lab. These plants have "Vou" in the "SampleCode" field.

3.17 Photograph - Indicates whether a photograph was taken of the plant. The lookup table "tluPhoto" contains the allowable values of "Yes" or "No". Since no photographs were taken during this study, all entries will contain "No".

3.18 Notes - Contains a brief description of the plant habitat and where the plant was found. Example: "South Valley trail, 150m downstream from CC3 pond discharge".

4. tblDupInd

A lookup table containing one field "DupInd" with the values of "O" for the "Original" instance of a plant and a "D" for every subsequent "Duplicate" instance of the same species. It was not always possible to identify a plant in the field so multiple collections resulted in several plants of the same species being entered into the database. This lookup table is used to populate the "DupInd" field in the "tblObservation" table.

5. tblVoucher (Not used)

6. tluCode

A lookup table containing two fields used to update the "SampleCode" field in the "tblObservation" table. The fields are described below.

6.1 SampleCode - Contains two entries: "Obs" for "Observation" and "Vou" for "Voucher", i. e., a sample of the plant had to be collected for determination in the lab. This field is used for updating the "SampleCode" field in the "tblObservation" table.

6.2 Definition - Contains two entries spelling the entire word for the entries in the "SampleCode" field: "Observation" and "Voucher".

7. tluCommonality

A lookup table consisting of one field "Commonality" that contains three entries: "Common", "Occasional", and "Uncommon". These values indicate the abundance of a plant at the site in Prince William Forest Park where it was logged. The values are used to populate the "Commonality" field in the "tblObservation" table.

8. tluFamily

A lookup table containing one field "Family" in which all plant families expected to be found in Prince William Forest Park were recorded. To aid in listing the plants in a useful taxonomic order, a number in the range of "1-4" followed by an underscore "_" was prefixed to each family name. The numbers correspond to taxonomic groupings as follows: 1 includes all ferns and fern allies; 2 includes gymnosperms; 3 includes angiosperm monocots; and 4 includes angiosperm dicots. This table was used to populate the "Family" and "SortGroup" fields in the "tblObservation" table.

9. tluNativity

A lookup table consisting of one field "Nativity" that contains three entries: "Native", "Introduced", and "Unknown". Based on Gleason and Cronquist (Ref. 2) descriptions, this table was used to populate the "Nativity" field in the "tblObservation" table.

10. tluObserver

A lookup table containing 17 fields that was provided to populate the "Observer" field in the "tblEvent" table. Due to the many interns and other guest helpers, this table was not used; instead initials were typed directly into the "Observer" field.

11. tluParkArea

A lookup table consisting of two fields containing entries for each of the eight individual areas of Prince William Forest park. The fields are described below.

11.1 ParkAreas - Contains the actual name of each park area as follows: "Cabin Camp 1 & 4", "Cabin Camp 2 & 5", "Entrance", "Chopawamsic", "Headquarters", "North District", "Oak Ridge", and "Turkey Run". This field was used to populate the "ParkArea" fields in tables "tblLocation" and "tblObservation".

11.2 ParkAreaNumber - Contains the numbers "1-8" respectively for each of the areas listed in "ParkAreas" above. For example, "Cabin Camp 1 & 4" would be associated with number "1" and "Turkey Run" would be associated with number "8".

12. tluParkCode

A lookup table consisting of two fields populated with "PRWI" and "Prince William Forest Park" since that was the only park covered in this study. The table was not used since "PRWI" was coded as the default for the field "ParkCode" in the "tblLocation" and "tblObservation" tables. The two fields are described below.

12.1 ParkCode - Contains the abbreviation for the park: "PRWI".

12.2 ParkName - Contains the name of the park: "Prince William Forest Park".

13. tluPhoto

A lookup table containing one field "Photo" with two entries; "Yes" if a photo was taken of the plant and "No" if no photo was taken. This table was used to populate the "Photograph" field in the "tblObservation" table. No photos were taken so all entries for this field contain the word "No".

14. tluProject (Not used).

15. tluQuality

A lookup table containing one field "SiteQuality" with 5 entries: "Developed", "Excellent", "Fair", "Good", and "Poor". This table was used to populate the "SiteQuality" field in the "tblEvent" table giving an assessment of the growing conditions for a plant. Because of the difficulty of uniformly classifying sites as "Developed", this entry was not used.

16. tluSearchArea

A lookup table containing two fields giving the code and name of selected search areas in the park. Since no search areas were used, all plants were observed "Incidental" to a search area and are coded with an "I" in the "SearchAreaCode" field of the "tblObservation" table. The two fields are described below.

16.1 SearchAreaCode - Contains the code for eight search areas and an "I" for "Incidental". The search area codes are in the range "SA1-SA8". This field was used to populate the "SearchAreaCode" field of the "tblObservation" table.

16.2 SearchAreaName - Contains the name of the search area specified in the "SearchAreaCode" field. "I" translates to "Incidental" while "SA1-SA8" translates to "Search Area 1 - Search Area 8".

17. tluSpecies

A lookup table containing two fields giving the genus and species of a plant in the first field and its common name in the second field. The fields are described in more detail

below.

17.1 Scientific - Contains the genus and species (and the variety, if known) of a plant. This field was used to populate the "Species" field of the "tblObservation" table. An example is "Acer negundo".

17.2 Common - Contains the common name of the plant referenced in the "Scientific" field. The common name corresponding to the example above is "Boxelder."

APPENDIX D: Datum and GPS Procedures Changes, and Grouped Plants

Early in the survey in 2003, while the GMU survey team was learning to operate the Trimble GPS receiver and Data Logger, several instances occurred where different GPS receiver procedures occurred that resulted in some changes in the data. These instances are discussed below.

1. On the first survey day, March 22, 2003, the Trimble GPS receiver was not yet available, so data was taken for 11 plants using a Garmin GPS-12 handheld unit. Four of these plant loggings appear in the final species list in Appendix B; the other 7 species were logged again later in the survey using the Trimble GPS receiver and Data Logger, so that the plants logged with the Garmin GPS are in the database as duplicates. On September 14, 2003, an investigation of a particular species of plant was accomplished with the Garmin GPS-12. This plant proved to be a duplicate plant, so this logging does not appear in the final list in Appendix B. On March 24, 2004, at the beginning of the second season, the Trimble was not yet available, so the one plant found that day was recorded using the Garmin GPS-12; this plant does appear in the final species list in Appendix B. On April 21, 2004, one reading was taken using the Garmin GPS-12; this plant is also a duplicate. These Garmin readings appear in the database with the usual UTMX and UTM Y coordinate readings, but without the decimal fractions of meters, and the estimated errors range from 6 meters to 13 meters, rather than a meter or less. The Garmin GPS-12 uses the NAD 27 CONUS datum.

2. During the first season in 2003, the Trimble Data Logger was operated using the NAD 1927 Eastern datum, as that was the GMU understanding of the datum used on the United States Geological Survey “quad” topographical maps of primary interest to the Park. Early in the second season, it was determined that the preferred datum for the Park was the NAD 1927 CONUS, so GMU immediately began using this datum with the Trimble GPS receiver and Data Logger. Data obtained using the NAD 1927 Eastern datum that was recorded in Data Logger SSF files were readily converted to NAD 1927 CONUS using the Trimble Pathfinder software.

There were a number of sets of coordinates that were not converted. These are loggings that were made using the Trimble GPS receiver and Data Logger, but were not in a completed Data Logger file (.SSF file). The coordinates for all plants in this category are those recorded in the field notebook; in the database the coordinates are listed to the closest meter, but show no decimal fractions of meters, nor do they indicate an estimated horizontal error. The reason these loggings were not in an .SSF file was likely due to inexperience on the part of the Trimble operator. As the season progressed, there were fewer incidences of this type. In 2003, there were three survey days in which all loggings were not in an .SSF file, one day in which roughly half were not, and six days that had one or two loggings which were not in an .SSF file. All plants logged in the rest of the 2003 season and all of the plants logged in 2004 are in an .SSF file. The error in the plant location due to this procedural problem cannot be determined exactly but is estimated to be 3 meters or less.

3. During the first season, no post-collection corrections were made to the data. GMU Trimble operators believed that the real-time corrections made using the available signal from the Coast Guard station in Annapolis were adequate. Early in the second season, it was suggested to GMU that best practice was to use the available post-collection correction feature; this was done for the rest of the season starting April 8, 2004. A few of these corrections were examined to see their effect; in these cases the post-collection correction resulted in a change of less than a meter. It is possible of course that the unexamined corrections were greater. Additional details are in Appendix E.

4. GMU proposed to log coordinates for groups of plants, to reduce logging time in the field. For example, two or more plants in a grouping of a few meters apart would be listed separately as to species but would have the same coordinates. At the start of the survey, this procedure was used. In late May or early June 2003, CUE asked GMU to provide separate coordinates for each plant logged. GMU agreed and began individual coordinate logging for plants on June 12, 2003. About 300 plants had been logged by that time, with many of them in groups. All plants in groups have been identified by a group number in the database; a listing of these plants by group number, plant number, and date follows; there are about 175 plants in these groups. Many species of these grouped plants were relogged later in the survey as opportunities to do so arose; in the final species list in Appendix B, there are about 83 plant species that are in a group.

**PLANT GROUPS WITH ONE SET OF COORDINATES
FROM THE SURVEY START TO 6-12-03**

Group No.	Plants	Date
1	6, 7, 8, 9, 10	3-22-3
2	2, 3	3-22-3
3	21, 22	4-5-3
4	39, 40	4-12-3
5	43, 44	4-12-3
6	54, 55, 56, 57, 58, 59	4-23-3
7	62, 883	4-28-3
8	77, 78	5-8-3
9	927, 928	5-8-3
10	74, 918	5-8-3
11	163, 192, 839	5-13-3
12	167, 184, 196, 805	5-13-3
13	92, 181	5-13-3
14	97, 845	5-13-3
15	98, 99, 100	5-13-3
16	86, 156	5-13-3
17	87, 190	5-13-3
18	813, 815	5-13-3

19	83, 841, 882, 892	5-13-3
20	80, 81, 881	5-13-3
21	103, 104	5-17-3
22	907, 910, 913, 929, 930	5-17-3
23	106, 107, 931	5-17-3
24	101, 934	5-17-3
25	122, 123, 124	5-22-3
26	127, 165, 174	5-22-3
27	121, 807	5-22-3
28	119, 197	5-22-3
29	159, 179, 180, 186, 188, 198, 808	5-22-3
30	128, 129, 130	5-22-3
31	113, 114, 115, 116, 117, 175	5-22-3
32	189, 901	5-22-3
33	182, 820, 902	5-22-3
34	112, 166, 935	5-22-3
35	76, 164, 889	5-8-3, 5-22-3, 5-28-3
36	894, 936	5-28-3
37	824, 937	6-2-3
38	199, 925, 938, 939	6-2-3
39	158, 176, 177, 183, 185, 187, 809, 816, 826, 840, 860	6-2-3
40	172, 865	6-2-3
41	810, 862, 874	6-2-3
42	838, 864	6-2-3
43	851, 884	6-2-3
44	131, 846, 857, 885	6-2-3
45	133, 134, 193	6-2-3
46	138, 800, 814	6-2-3
47	136, 867	6-2-3
48	155, 191	6-2-3
49	142, 143, 144, 923	6-5-3
50	145, 146, 917	6-5-3
51	919, 922, 941	6-5-3
52	139, 140, 920	6-5-3
53	942, 943	6-5-3
54	944, 945, 946, 947, 948, 949	6-5-3
55	148, 149, 921, 950	6-5-3
56	951, 952	6-5-3
57	153, 953, 954	6-5-3

APPENDIX E: Metadata for SSF Files from the Trimble Data Logger

The SSF files were collected on a Trimble GPS using a data dictionary requiring the field surveyor to enter a key and brief description for each plant found. The data dictionary was implemented on June 17, 2003, therefore previous SSF files did not contain a key, only a brief description of the plant. The SSF files were processed through GPS Pathfinder Office 2.90 software which converted them to the NAD 27 CONUS datum. Beginning on April 8, 2004, the SSF coordinates were also corrected with the Pathfinder software using the Corbin, VA, correction files found on the Internet. Once the SSF files were in the proper datum (and corrected beginning on April 8, 2004), the Pathfinder software converted them to Microsoft Access format. The Access SSF files were then edited to provide a key prior to June 17, 2003 and to correct any field errors on the key after that date. The edited Access SSF data was then run through a “homegrown” JAVA program to update the plant inventory with accurate coordinates using the key field to match the plant on the edited Access SSF file to the plant in the plant inventory Access database. When a match was found, the UTMX, UTMY, and EstHError fields were populated on the plant inventory database.

The SSF files prior to April 8, 2004 (.ssf suffix) and the corrected files (.cor suffix) thereafter are provided on the compact disc (CD) labeled “SSF Files & MDB Conversions”. These files are usually named with the Park initials (PRWI) followed by the date they were created, e. g., PRWI042904. Not all field surveyors used that exact convention but the park initials and date are still evident. Also contained on the CD are the edited Access SSF files (named the same as the SSF files except having an .mdb suffix). They are contained in their own directories: “PRWI SSF Files” for the SSF files, and “PRWI SSF Files Converted to Access” for the edited Access SSF files.

While it may be possible to use the SSF files to populate an ArcView map, the plant description and key entered in the field are not always correct. A more accurate method would be to use the plant inventory Access database via Microsoft's ODBC software to produce an ArcView map. Then highlighting a specific plant location would show an accurate plant name.

APPENDIX F: Estimate of Plant Species

ESTIMATE OF PLANT SPECIES IN PRINCE WILLIAM FOREST PARK FOR THE 2003-2004 VASCULAR PLANT SURVEY

By Dr. Ted Bradley and John Dodge

September 2, 2003

Introduction

The National Park Service Task Agreement with George Mason University (GMU) for the vascular plant survey of Prince William Forest Park (PRWI) (ref. 1) includes a requirement for an estimate of the number of plant species in the park. GMU proposed to provide this estimate using two methods: first, by deriving a species density from other surveys and applying it to PRWI; and second, by determining the number of species reported in the "Atlas of the Virginia Flora, Third Edition" by Harvill et al. (ref. 2) for Prince William County and estimating the portion of these growing in PRWI. This technical note describes the methods used and results obtained.

Estimate based on other surveys

While the Task Agreement uses the phrase "species density", a more useful description for this application is "species count". Species density is a function in part of the size of the surveyed area, whereas the quantity of primary concern is not species density but species count for this particular area. If species density is desired, it can be calculated by dividing the species count by the surveyed area.

The following vascular plant surveys were considered during the development of this estimate. All are relatively recent surveys on the Northern Neck of Virginia, the peninsula between the Potomac and Rappahannock Rivers.

Survey area location	Approximate area	Species count
Corrotoman River watershed, Lancaster Co., VA (ref. 3)	85 sq. miles	824
Potomac River watershed, King George Co., VA (ref. 4)	89 sq. miles	918
Part of Potomac River watershed, Westmoreland Co. VA (ref. 5)	25 sq. miles	628

The approach used for estimating species count for PRWI was to empirically determine a relationship between the size of previously surveyed areas and species counts. Using the above data, it can be shown that the number of species increases roughly as the fourth root of the area increase ratio. This relationship was developed by first averaging the two larger areas in both size and species count, resulting in an 87 square mile area with 871 species. Next, it was experimentally determined what root of the area increase ratio (comparing the Westmoreland survey area with the 87 square mile

averaged area) provides the closest approximation to the species count increase ratio. See the demonstration below.

Area increase ratio = 87 square miles / 25 square miles = 3.48

Species count increase ratio = 871 species / 628 species = 1.39

Fourth root of 3.48 = 1.37

An additional illustration of the relationship between area and species number is shown comparing the species in the Westmoreland survey area with the species in Prince William County as given in the Atlas (ref. 2).

Area increase ratio = 360 square miles / 25 square miles = 14.4

Fourth root of 14.4 = 1.95

Estimated species count = (1.95) (628) = 1225

Species count in the Atlas = 1143

The area of Prince William County including the several independent cities is 360 square miles as given on the official Prince William County website (ref. 6). For purposes of this estimate, we believe that the accuracy of the described empirical relationship is adequate.

All of these surveys were done in Northern Neck counties in the coastal plain of Virginia, while PRWI is just west of the fall line and is thus in the piedmont. There are other similarities and differences among all four survey areas. The survey areas are not far apart (25-75 miles) and therefore share similar rainfalls and temperatures. The survey areas in Northern Neck all have significant brackish marshes and shorelines, which PRWI does not. Also, all the three survey areas include a high proportion of rural development, including farms and homes, while PRWI does not. Conversely, it is likely that PRWI will have habitats and plants not present in the Northern Neck.

PRWI's approximate area is 27 square miles, based on the 17,000 acres cited in the park brochure. Using this area and the empirical relationship between area and species count, we can estimate the PRWI species count (using the Westmoreland survey as a baseline) as follows:

Area increase ratio = 27 square miles / 25 square miles = 1.08

Fourth root of 1.08 = 1.02

PRWI species estimate based on other surveys = (1.02) (628) = 641.

Estimate based on Atlas plant species numbers

The second approach to estimating the species count is also based on the Atlas (ref. 2), but in a different way. The primary area of interest in the Atlas is of course Prince William County. But because there are plants that have been recorded from nearby counties but not Prince William, the four adjacent counties were also included in the estimating process. These are Fairfax, Loudoun, Fauquier, and Stafford Counties. Certainly some of the plants listed for these adjacent counties but not for Prince William County will also be found in Prince William County. To acknowledge that some of these additional plants will also appear in PRWI, a list of all vascular plant species recorded in

at least 3 of the 5 counties just mentioned has been prepared; the species count for this list is 1164 (compared to the number for Prince William County alone of 1143 as cited above). The list was reviewed by the surveyors who estimated whether or not each of these plants would likely be found in PRWI. The surveyors have the advantage of several months of surveying in the park, so have some idea of the prevalence of certain types of plants. Plants already located and determined (identified) as part of the current survey are included, provided that they are on the 3-of-5-county list. The resulting species count estimate for PRWI is 663.

Arriving at a single estimate

Because all the species count numbers used are based on surveys, it seems reasonable that the results from the two estimating methods could be averaged and used as the 90% species goal for the PRWI survey. The GMU estimate for 90% species count is $(641 + 663) / 2 = 652$. The GMU estimate for total species in PRWI is therefore $652 / 0.9 = 724$.

References (for Appendix F only)

1. National Park Service Chesapeake Watershed Cooperative Ecosystem Studies Unit Task Agreement, Cooperative Agreement No. 1443CA309701200, Task Agreement No. T-3097-02-400, Project Title: Inventory of Vascular Plants of Prince William Forest Park of the National Capital Region, effective October 15, 2002.
2. Harvill, A. M., T. R. Bradley, C. E. Stevens, T. F. Wieboldt, D. M. E. Ware, D. W. Ogle, G. W. Ramsey, G. P. Fleming; "Atlas of the Virginia Flora", third edition, Burkeville, VA, A. M. Harville, Jr., 1992; 144 pages.
3. Weldy, Troy W., "The Vascular Flora of the Corrotoman River Watershed, Lancaster County, VA. Master's thesis, Department of Biology, College of William and Mary, Williamsburg, VA, 1995; 140 pages.
4. Simmons, M. P., D. M. E. Ware, W. J. Hayden; "The Vascular Flora of the Potomac River Watershed of King George County, VA. *Castanea* 60(3): pages 179-209; September, 1995.
5. Dodge, John E., "A Floristic Survey of the Potomac River Watershed in Westmoreland County, VA, from Bridges Creek to Currioman Bay. Master's thesis, Department of Biology, George Mason University, Fairfax, VA, 2000; 127 pages.
6. Data from Prince William County Government web page on Sept. 1, 2003. Web address: www.pwcgov.org/demographics/geography.htm.



As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environment and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS D-61 / September 2002 / Printed on recycled paper

★ U.S. GOVERNMENT PRINTING OFFICE: 2002—846-033