



Vegetation Community Monitoring at Ocmulgee National Monument, 2011

Natural Resource Data Series NPS/SECN/NRDS—2014/702



ON THE COVER

Duck potato (*Sagittaria latifolia*) at Ocmulgee National Monument.
Photograph by: Sarah C. Heath, SECN Botanist.

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Contents

	Page
Figures.....	iii
Tables.....	v
Executive Summary	vii
List of Terms.....	ix
Introduction.....	1
Overview	1
Monitoring Objectives.....	1
Methods.....	3
Study Area	3
Sampling Design	3
Sampling Methodology	6
Findings.....	9
Literature Cited	29
Appendix A. Plant species known to occur at OCMU.	31
Appendix B. Plant species detected in sampling locations.	43

Figures

	Page
Figure 1. Location of Ocmulgee National Monument, GA.	4
Figure 2. Vegetation community monitoring sampling locations at Ocmulgee National Monument, 2011.	5
Figure 3. Southeast Coast Network vegetation community monitoring plot and subplot layout.....	7

Tables

	Page
Table 1. Cover estimation coverage class, percent cover range, and value used for analyses.	7
Table 2. New vascular plant species, subspecies, or varieties found at Ocmulgee National Monument, 2011.	11
Table 3. Average canopy cover for vegetation monitoring macroplots at Ocmulgee National Monument, 2011	12
Table 4. Percentage of vegetation cover (relative cover) and frequency of occurrence of shrub species in vegetation monitoring sampling locations at Ocmulgee National Monument, 2011	13
Table 5. Percentage of area covered (absolute cover) and frequency of occurrence of shrub species sampled in vegetation monitoring sampling locations at Ocmulgee National Monument, 2011	15
Table 6. Percentage of vegetation cover (relative cover) and frequency of occurrence of groundcover species in vegetation monitoring sampling locations at Ocmulgee National Monument, 2011	17
Table 7. Percentage of area covered (absolute cover) and frequency of occurrence by groundcover species sampled in vegetation monitoring sampling locations at Ocmulgee National Monument, 2011	21
Table 8. Average canopy species size, measured as diameter (cm) at breast height (DBH) for species sampled in vegetation monitoring macroplots at Ocmulgee National Monument, 2011	25
Table 9. Seedling frequency for canopy and shrub species in vegetation monitoring macroplots at Ocmulgee National Monument, 2011	27
Table A-1. Vascular plant species known occur at Ocmulgee National Monument (NPSpecies 2011) and species detected during 2011 monitoring efforts.	31
Table B-1. Vascular plant species detected at each sampling location across all strata at Ocmulgee National Monument, Georgia, 2011.	43

Executive Summary

In 2009, the National Park Service (NPS) Southeast Coast Network (SECN) Inventory and Monitoring Network began collecting vegetation community data as part of the NPS Vital Signs monitoring program. Information collected under this Vital Signs program will be used to help managers make better-informed decisions by understanding trends and variability related to plant species, frequency of occurrence, percent cover, diversity, and distribution in the groundcover, shrub, and canopy strata.

Within each stratum, vegetation communities were sampled using hybrid methods following the North Carolina Vegetation Survey nested-subplot design (Peet et al. 1998) within a circular plot similar to the Forest Inventory and Analysis protocol (Bechtold and Patterson 2005). This report summarizes vegetation community data collected at Ocmulgee National Monument in 2011.

1. Data were collected at 20 sampling locations at the Monument from 5/19/2011 through 5/28/2011.
2. Monitoring efforts resulted in the addition of 29 species, subspecies, or varieties to the Monument's species list.
3. Absolute canopy cover across the Monument was approximately 66.48%.
4. Loblolly pine (*Pinus taeda*) had the largest average diameter at breast height (DBH) of any canopy species at the Monument where more than two individuals were measured.
5. Chinese privet (*Ligustrum sinense*) occurred with an average DBH of 5.35, with over 100 individuals of canopy size measured.
6. Chinese privet and sweetgum (*Liquidambar styraciflua*) were the most frequently occurring species in the shrub stratum.
7. Japanese honeysuckle (*Lonicera japonica*), greenbriar (*Smilax* spp.), and muscadine grape (*Vitis rotundifolia*) were the most frequently occurring species in the groundcover stratum.
8. Chinese privet had the highest absolute and relative cover in the shrub stratum.
9. Chinese privet had the highest relative cover and the second highest absolute cover, while muscadine grape had the highest absolute cover in the groundcover stratum.

The full dataset, and associated metadata, can be acquired from the data store at

<http://science.nature.nps.gov/nrdata/>

List of Terms

Absolute cover: The total amount of ground surface that is covered by each species or group. This metric describes the amount of cover that each species or group represents in a stratum and is expressed as a percentage that can exceed 100% due to overlap. This metric is calculated as the total cover of each species or group divided by the total possible cover for a plot.

Canopy species: Woody species known to occur in the midstory or overstory of the canopy, or shrub species that grow greater than or equal to four centimeters DBH and are measureable at breast height (1.4 m).

Canopy stratum: The structural zone above 1.1 meters (i.e., elbow height of a typical observer per densiometer instructions), which consists of all live and dead plant material that affects the amount of light penetrating to the ground. This includes individual elements whose cover is also potentially measured and accounted for in the shrub- or groundcover-stratum measurements but exceeds 1.1 meters in height, is detected by the densiometer, and contributes to canopy cover. This stratum can also be referred to as the midstory, overstory, or sub-canopy.

Cover: The vertical projection of the outermost extent of a species, or the extent of the shadow cast by the species if the sun were directly overhead. Cover is also known as foliar cover.

DBH: Diameter at breast height, or 1.4 meters above the ground surface.

Frequency: The number of times a species or group is detected in a plot, expressed as a percentage. This provides information on the regularity with which a species or group is encountered.

Groundcover stratum: The structural zone that consists of all non-woody species (i.e., forbs and graminoids) and all woody species (i.e., shrubs and trees) with a DBH of less than four centimeters and seedlings 30 centimeters or less in height.

Relative cover: The cover of each species or group as a function of all other plant species that occurred in a plot. This metric describes the percentage of cover that each species represents out of the total vegetative cover in a stratum, is expressed as a percentage, and always sums to 100%. Relative cover is calculated as the total cover of each species or group divided by the sum of the cover of all other species that occur in a plot.

Seedlings: Woody dicotyledonous plants less than 30 centimeters in height.

Shrub stratum: All woody species greater than 30 centimeters in height with a DBH of less than four centimeters.

Stratum: A structural size category of vegetation at a site. These are the canopy, shrub, and groundcover layers.

Introduction

Overview

Vegetation communities are the primary drivers of a range of ecological processes and are integral to the proper function of park ecosystems. Moreover, vegetation communities integrate the biological and physical environment. They serve as the foundation for food webs and wildlife habitat for many species. They also function as a carbon sink, produce oxygen, and cycle nutrients and energy through an ecosystem. Additionally, plants influence the local climate, improve water quality, and moderate flooding and erosion. Determining trends in vegetation communities is vital to understanding the ecological processes occurring at a site and identifying stressors and their impacts.

Vegetation communities are dynamic with constant changes in composition, cover, distribution, and structure in response to natural or anthropogenic stressors. Disturbance is the primary stressor and regulating mechanism of Southeast Coast Network (SECN) vegetation communities. The timing, type, and extent of a disturbance generally evoke a distinguishable response in the species composition, diversity, and structure of the landscape (Foster et al. 1998; Turner et al. 1990). The primary natural disturbance processes in SECN parks are fire and weather (e.g., hurricanes and drought). Anthropogenic influences include fire suppression, landscape fragmentation, altered hydrology, and non-native species introduction.

The SECN parks host a diverse assemblage of vegetation communities. Approximately 180 vegetation associations (i.e., fine-resolution floristic description), as defined by the National Vegetation and Classification System (FGDC 2008), occur in the SECN. These include sparsely vegetated primary dune communities, late successional old-growth bottomland hardwood forest communities, and highly diverse herbaceous-dominated mesic pine savannah communities.

Given the widespread anthropogenic influences in SECN parks and the importance of vegetation communities, quantifying trends in vegetation cover, frequency, diversity, and distribution is a high priority (DeVivo et al. 2008). An evaluation of trends in these metrics provides a measure for assessing the ecological integrity and sustainability in southeastern systems and identifying the need for specific management activities on our park lands. The National Park Service Omnibus Management Act of 1998, and other reinforcing policies and regulations, require park managers “to establish baseline information and to provide information on the long-term trends in the condition of National Park System resources” (Title II, Sec. 204). The vegetation community monitoring data summarized herein is a tool to assist park managers in fulfilling this mandate.

This report summarizes vegetation community Vital Signs monitoring data collected at Ocmulgee National Monument in May, 2011.

Monitoring Objectives

To characterize the effects of landscape and local ecosystem drivers on vegetation communities, the SECN monitors several components of community structure, function, and composition. Each component illustrates community change dynamics, and data from the following five monitoring objectives are presented:

1. Determine trends in plant species richness and diversity in the groundcover, shrub, and canopy strata.
2. Determine trends in the percent cover of vegetation in the groundcover, shrub, and canopy strata.
3. Determine trends in the frequency of species in the groundcover stratum.
4. Determine trends in the diameter at breast height (DBH) of canopy species.
5. Determine trends in woody species seedling counts in the groundcover stratum.

Methods

Study Area

Ocmulgee National Monument (OCMU) is located on the “Fall Line” —the transition between the rolling Piedmont and the flat Atlantic Coastal Plain. A portion of the Monument is within the city limits of Macon, Georgia, and the Ocmulgee River borders the southwestern side of the Monument (Figure 1). The natural resources in the Monument have been heavily influenced by human activities, including the construction of Interstate Highway 16 and its associated berm. This construction has separated the river from its floodplain and altered the natural hydrologic pattern of the area. Despite the anthropogenic influences, OCMU has high biodiversity. This is likely related to a corridor, known locally as the “Greenway,” that connects the Monument with other natural areas to the south. The Monument consists primarily of a large floodplain, herbaceous wetlands, and adjacent uplands. The floodplain vegetation community is composed of several canopy species, including green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), hackberry (*Celtis* spp.), and red maple (*Acer rubrum*), while the uplands are characterized by canopy species such as loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), and oaks (*Quercus* spp.). Species such as broadleaf arrowhead (*Sagittaria latifolia*), smartweed (*Polygonum* spp.), sedges, rice cutgrass (*Leersia oryzoides*), and other grasses often occur in the herbaceous wetlands.

Threats to natural resources in the Monument are primarily anthropogenic and include: non-native species invasion; water and air quality deterioration; development; and general proximity to the city of Macon. The Monument's invasive species treatment program targets the most invasive non-native species that occur on the property, including tree-of-heaven (*Ailanthus altissima*), silktree (*Albizia julibrissin*), English ivy (*Hedera helix*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), kudzu (*Pueraria montana*), and Chinaberry (*Melia azedarach*). Foraging damage from non-native animals, such as nutria (*Myocastor coypus*) and feral hogs (*Sus scrofa*), atypically influence succession, and these species serve as vectors for the distribution of non-native plant species.

OCMU has 412 known vascular plant species, subspecies, and varieties (Appendix A), including one state-listed species of concern, fivelobe cucumber (*Cayaponia quinqueloba*).

Sampling Design

To allow for park-wide inference, the Monument’s administrative boundary was used as the sampling frame, in which 20 permanent spatially-balanced random sampling locations were selected for monitoring vegetation, landbird, and vocal anuran communities. Sampling locations were selected using the Reversed Randomized Quadrant-Recursive Raster (RRQRR) algorithm (Figure 2; Theobald et al. 2007 as presented in Byrne et al. 2013). All sampling locations occur within naturally-vegetated areas suitable for co-located Vital Signs monitoring efforts (Byrne et al. 2009).

Vegetation communities were monitored at OCMU from 5/19/2011 through 5/28/2011.

Ocmulgee National Monument

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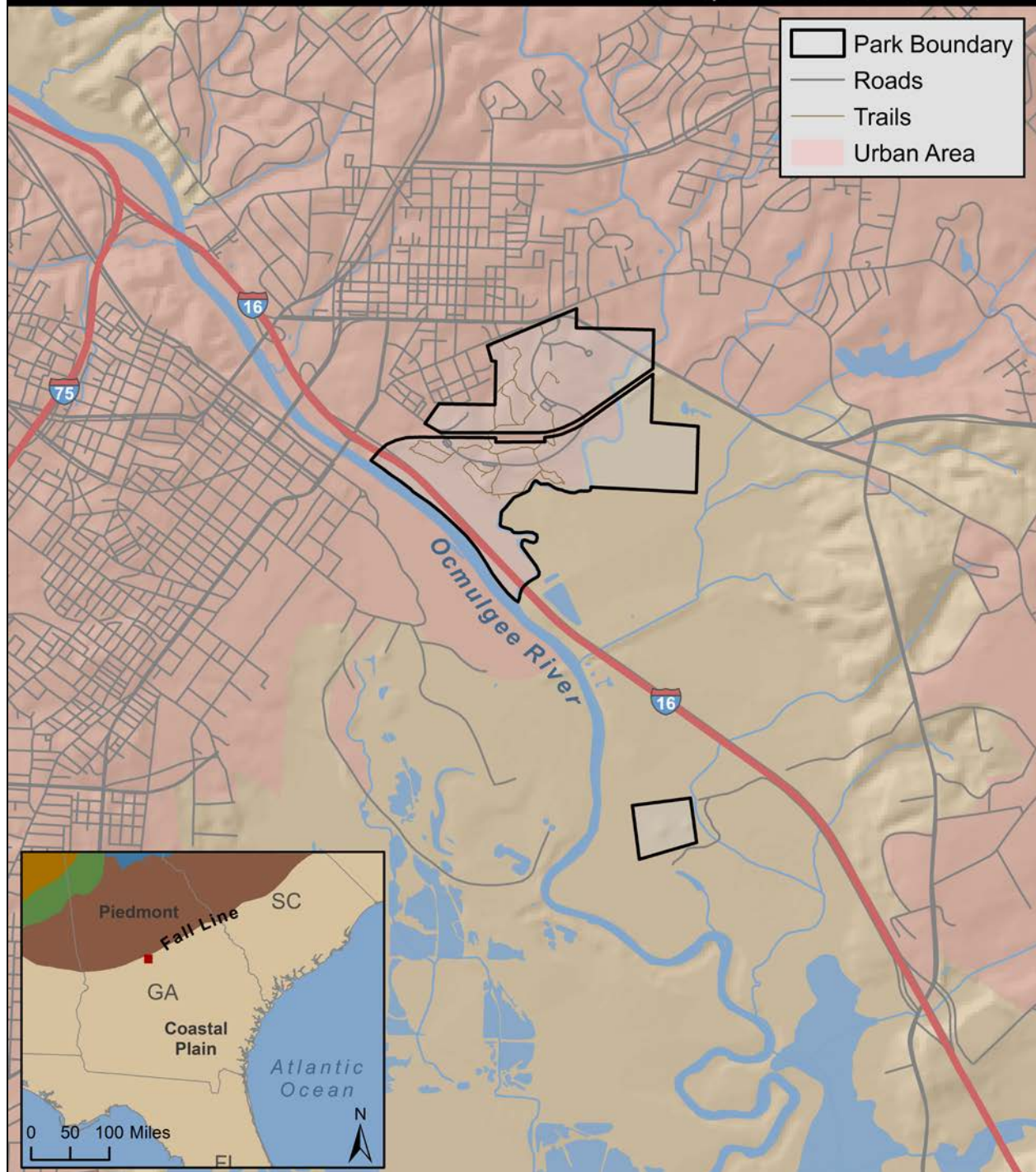


Figure 1. Location of Ocmulgee National Monument, GA.

Ocmulgee National Monument Terrestrial Sampling Locations

Southeast Coast Network
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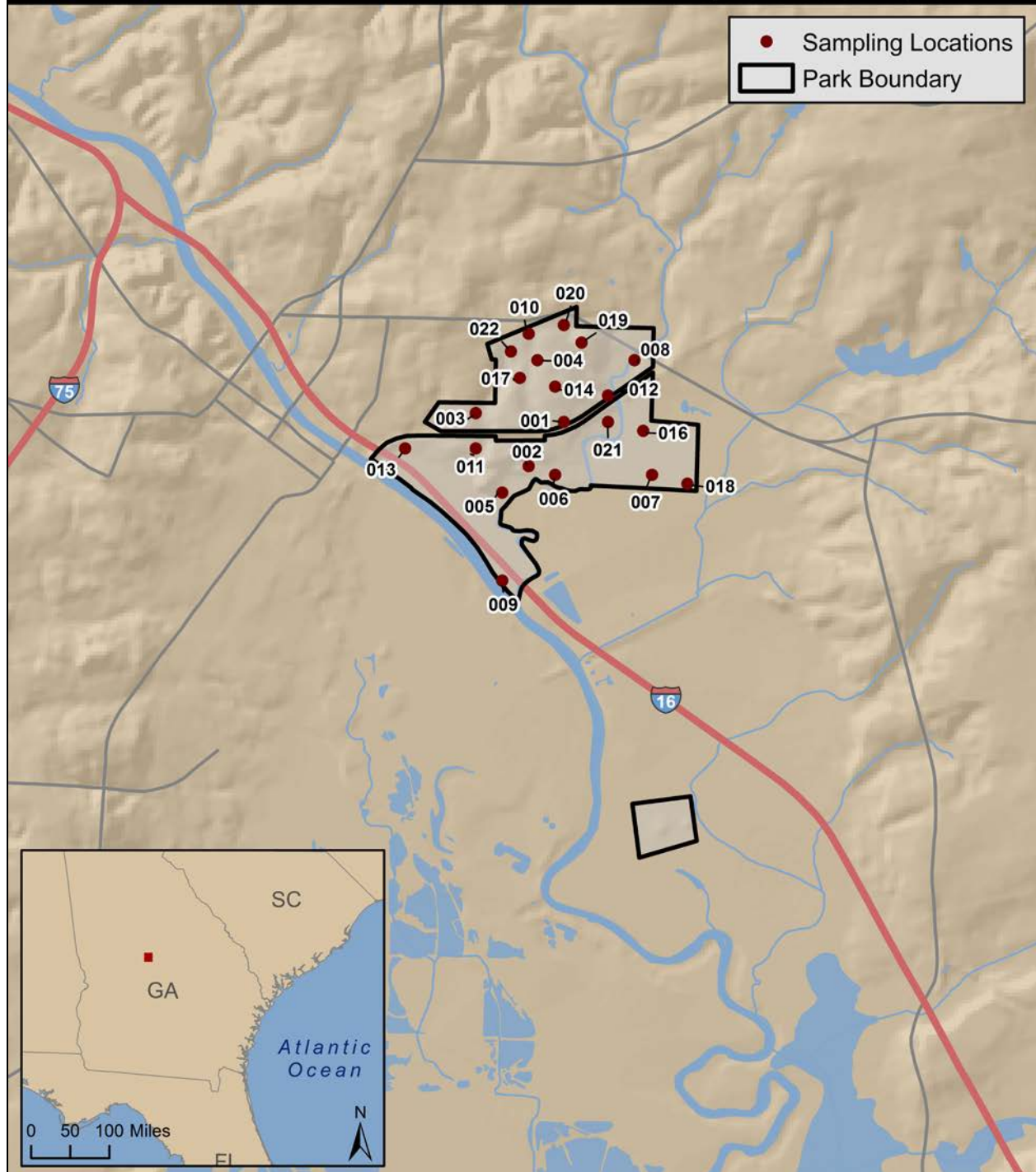


Figure 2. Vegetation community monitoring sampling locations at Ocmulgee National Monument, 2011.

Sampling Methodology

Vegetation community measures were divided into three strata based on height, canopy, shrub, and groundcover. Within each stratum, vegetation communities were sampled using hybrid methods following the North Carolina Vegetation Survey nested-subplot design (Peet et al. 1998) within a circular plot similar to the Forest Inventory and Analysis protocol (Bechtold and Patterson 2005).

The plot layout consisted of a circular plot with a radius of 15 m within each 0.5-ha sampling location. Subplots were systematically placed along six transects that radiated out from the center point at azimuths of 0°/360°, 60°, 120°, 180°, 240°, and 300° (Figure 3). To avoid overlap, subplots originated four meters from the plot array (i.e., 0.5-ha grid) center point and extended away from the center point. Canopy cover, shrub cover, DBH, canopy species seedling frequency, and herbaceous cover data were collected in the nested subplots within each plot. Canopy cover was measured from the center point of the 0.5-ha sampling location. Shrub coverage was measured in two 2- by 4-m shrub plots along each transect. Shrub plots were further subdivided into 2- by 2-m subplots to improve cover estimation accuracy and precision (solid gray shading; Figure 3). Shrub and herbaceous cover is estimated in one of eight coverage classes (Table 1). Groundcover coverage, groundcover nested frequency, and seedling frequency were measured in two 1- by 1-m groundcover plots (solid black shading; Figure 3) along each transect. Canopy species DBH was measured in three sections, each representing 1/3 of the total circular plot (hashed gray shading; Figure 3). A comprehensive species list was also compiled for all species occurring in the 0.5-ha sampling location. See Byrne and Corbett 2012; Byrne, Corbett, and Smrekar 2013; Corbett and Byrne 2012a; Corbett and Byrne 2012b; Corbett 2013 for detailed field methods.

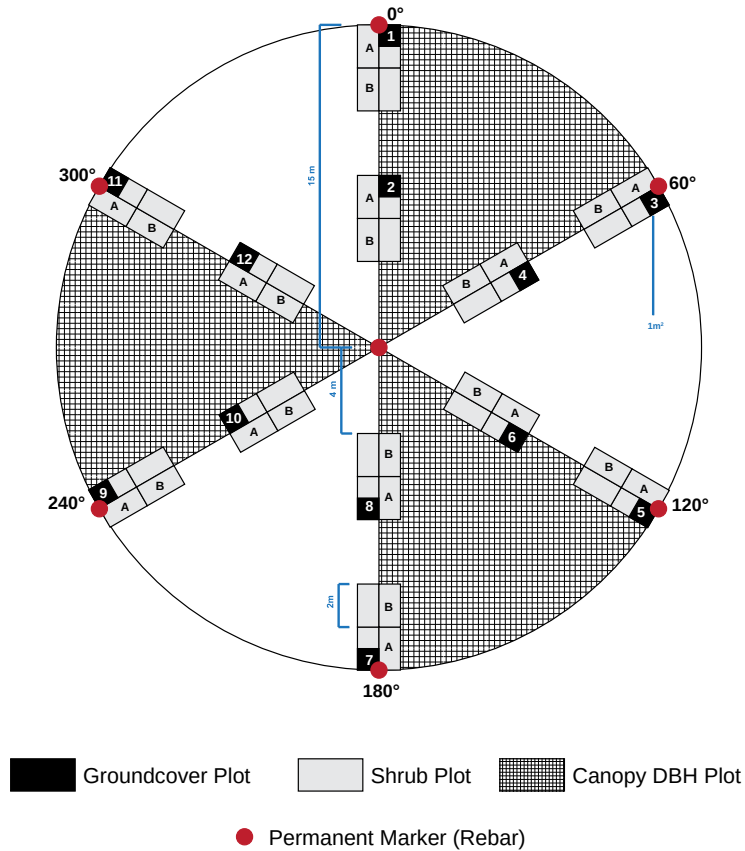


Figure 3. Southeast Coast Network vegetation community monitoring plot and subplot layout identifying the juxtaposition of canopy cover, canopy diameter, shrub, and groundcover plots within a circular array. Although not depicted, the above array is positioned at the center point of each 0.5-ha sampling location.

Table 1. Cover estimation coverage class, percent cover range, and value used for analyses.

Coverage Class	Percent Cover Range	Value Used for Analyses
0	0%	0.0
1	Trace (<1%)	0.5
2	1-5%	2.5
3	5-25%	15.0
4	25-50%	37.5
5	50-75%	62.5
6	75-95%	85.0
7	95-100%	97.5

Findings

We detected 161 taxa during this monitoring effort (Appendix A), including 29 species, subspecies, and varieties not previously known to occur at the Monument (Table 2). We detected 47 occurrences with uncertain taxonomic affinity (Appendix A) that were identified only to genus or family.

Highlights by monitoring objective include:

Plant species richness and diversity in the groundcover, shrub, and canopy strata.

- Twenty-nine species new to the Monument species list were detected, including two exotic species (Table 2).

Percent cover of vegetation in the groundcover, shrub, and canopy strata.

- Absolute canopy cover was variable across all sampling locations ($\bar{x}$ = 66.48%, SD = 30.30; Table 3).
- Chinese privet was the most frequently occurring shrub species (f = 66.67) and had the highest relative cover of all shrub species ($\bar{x}$ = 24.88%, SD = 32.31; Table 4).
- Sweetgum was the second most frequently occurring shrub species (f = 42.81) and had the second highest relative cover ($\bar{x}$ = 9.98%, SD = 18.69; Table 4).
- Chinese privet had the highest absolute cover in the shrub stratum ($\bar{x}$ = 9.38%, SD = 17.64; Table 5). Sweetgum had the second highest absolute cover ($\bar{x}$ = 1.95%, SD = 9.55) in the shrub stratum (Table 5).
- Rice cutgrass had the highest relative cover in the groundcover stratum ($\bar{x}$ = 11.54%, SD = 26.06), followed by muscadine grape (*Vitis rotundifolia*; $\bar{x}$ = 5.73%, SD = 12.16; Table 6).
- Muscadine grape had the highest absolute cover ($\bar{x}$ = 13.73%, SD = 23.27), while rice cutgrass had the second highest cover ($\bar{x}$ = 8.91%, SD = 19.76; Table 7).
- Leaf litter was the most common ground condition, with a relative cover of 81.59% (SD = 17.41; Table 6) and an absolute cover of 82.02% (SD = 19.19; Table 7).

Frequency of species in the groundcover stratum.

- Japanese honeysuckle (f = 76.19), *Smilax* spp. (f = 71.43), and muscadine grape (f = 61.90) were the most frequently occurring species in the groundcover stratum, respectively (Table 6).
- Leaf litter was the most frequently occurring ground condition at the park (f = 100; Table 6).

DBH of canopy species.

- The largest tree detected on average where more than one individual was measured was loblolly pine ($\bar{x} = 41.64$ cm, SD = 10.84; Table 8).
- Red mulberry (*Morus rubra*) had the largest individual DBH (96.20 cm; Table 8).
- An average DBH of 5.35cm (n = 103, SD = 1.71) for Chinese privet was measured across all sampling locations at the park (Table 8).

Woody species seedling counts in the groundcover stratum.

- Red maple had the highest estimated seedling density at the Monument (25.29/m², SD = 49.81; Table 9).
- Chinese privet seedlings were estimated at 0.91/m² (SD = 1.01; Table 9).

Table 2. New vascular plant species, subspecies, or varieties found at Ocmulgee National Monument, 2011.

Order	Family	Species	Non-Native
Fabales	Fabaceae	<i>Amphicarpea bracteata</i>	
Gentianales	Apocynaceae	<i>Apocynum cannabinum</i>	
Nymphaeales	Cabombaceae	<i>Cabomba caroliniana</i>	
Lamiales	Bignoniaceae	<i>Catalpa bignonioides</i>	
Poales	Poaceae	<i>Chasmanthium laxum</i>	
Cyperales	Cyperaceae	<i>Cladium mariscus</i> ssp. <i>jamaicense</i>	
Commelinales	Commelinaceae	<i>Commelina communis</i>	
Asterales	Asteraceae	<i>Conyza canadensis</i>	
Rosales	Rosaceae	<i>Crataegus marshallii</i>	
Myrtales	Lythraceae	<i>Decodon verticillatus</i>	
Rosales	Elaeagnaceae	<i>Elaeagnus pungens</i>	X
Asterales	Asteraceae	<i>Erigeron quercifolius</i>	
Asterales	Asteraceae	<i>Euthamia graminifolia</i>	
Rosales	Moraceae	<i>Ficus pumila</i>	X
Aquifoliales	Aquifoliaceae	<i>Ilex verticillata</i>	
Brassicales	Brassicaceae	<i>Lepidium virginicum</i>	
Lamiales	Lamiaceae	<i>Lycopus americana</i>	
Apiales	Apiaceae	<i>Oxyopolis filiformis</i>	
Poales	Poaceae	<i>Panicum verrucosum</i>	
Poales	Poaceae	<i>Paspalum notatum</i>	
Saxifragales	Haloragaceae	<i>Proserpinica pectinata</i>	
Rosales	Rosaceae	<i>Rubus cuneifolius</i>	
Rosales	Rosaceae	<i>Rubus trivialis</i>	
Alismatales	Alismataceae	<i>Sagittaria lancifolia</i>	
Cyperales	Cyperaceae	<i>Scleria triglomerata</i>	
Lamiales	Plantaginaceae	<i>Scoparia dulcis</i>	
Fabales	Fabaceae	<i>Sesbania punicea</i>	
Lamiales	Lamiaceae	<i>Teucrium canadense</i>	
Fabales	Fabaceae	<i>Vicia angustifolia</i>	

Table 3. Average canopy cover for vegetation monitoring macroplots at Ocmulgee National Monument, 2011. Average canopy cover is based on data pooled across observers at each sampling location.

Site	Average Canopy Cover	Standard Deviation
OCMU-1	82.50	2.00
OCMU-2	42.92	2.50
OCMU-3	86.75	3.50
OCMU-4	27.08	1.18
OCMU-5	5.75	0.43
OCMU-6	91.50	2.38
OCMU-7	57.00	4.42
OCMU-8	89.08	3.19
OCMU-9	85.58	3.40
OCMU-10	86.75	2.14
OCMU-11	0.00	0.00
OCMU-12	77.83	0.80
OCMU-13	91.17	3.21
OCMU-14	88.08	1.46
OCMU-16	82.92	5.30
OCMU-17	90.50	0.90
OCMU-18	35.58	2.90
OCMU-19	86.75	2.38
OCMU-20	88.25	3.36
OCMU-21	19.75	3.03
OCMU-22	80.42	3.88
Park Average	66.48	30.30

Table 4. Percentage of vegetation cover (relative cover) and frequency of occurrence of shrub species in vegetation monitoring sampling locations at Ocmulgee National Monument, 2011. Relative cover is averaged across shrub plots at each sampling location, and park-wide calculations are averaged across all sampling locations.

Species	Frequency	Average	Std Dev	Sampling Locations																		
				1	2	3	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21
Acer negundo	23.81	1.67	3.88							4.20	12.20				0.97		13.04					4.72
Acer rubrum	19.05	6.56	15.50		16.73				50.00								21.20		49.76			
Ailanthus altissima	9.52	1.67	6.12								7.62				27.35							
Albizia julibrissin	4.76	0.03	0.15			0.68																
Asimina triloba	4.76	0.63	2.87	13.15																		
Betula nigra	4.76	0.09	0.40								1.83											
Callicarpa americana	19.05	1.47	3.50	6.57								9.43		12.35						2.42		
Carya glabra	4.76	0.01	0.07															0.30				
Carya sp.	4.76	0.11	0.51		2.33																	
Celtis laevigata	4.76	0.03	0.13								0.61											
Cephalanthus occidentalis	9.52	1.08	4.00		4.67		17.95															
Cornus foemina	9.52	0.94	3.70														16.85		2.84			
Diospyros virginiana	19.05	2.22	6.44										27.27		6.35		12.15			0.95		
Elaeagnus pungens	4.76	0.01	0.07									0.31										
Fraxinus caroliniana	23.81	1.59	4.04		5.06				14.29	1.10	12.20										0.79	
Fraxinus pennsylvanica	4.76	0.21	0.95														4.35					
Ilex decidua	33.33	1.37	2.99		12.06		5.98	0.29				1.89			4.76	3.26						0.43
Ilex verticillata	4.76	1.65	7.55																34.60			
Ilex vomitoria	19.05	4.34	17.96	3.29											82.54		4.86					0.43
Itea virginica	4.76	0.34	1.55																7.11			
Ligustrum japonicum	9.52	0.81	2.65									10.75								6.22		
Ligustrum sinense	66.67	24.88	32.31		0.39	53.06	16.24			94.70	60.06	35.20		56.47	99.03		21.20	0.30	5.69	8.30	15.24	56.69
Liquidambar styraciflua	42.86	9.98	18.69	22.54	22.96	4.76						1.89	72.73		4.76		18.83		14.87			46.15
Magnolia grandiflora	14.29	1.22	3.66																	4.15	5.71	15.81
Magnoliopsida	4.76	0.09	0.41									1.89										
Melia azedarach	4.76	0.09	0.40								1.83											
Nandina domestica	4.76	0.01	0.07									0.31										
Ostrya virginiana	9.52	4.39	18.68					85.67				6.60										
Pinus taeda	4.76	1.12	5.15																	23.58		
Prunus caroliniana	14.29	3.81	11.75			40.14											1.82			38.10		
Prunus serotina	4.76	0.43	1.96																			8.97
Quercus laurifolia	28.57	2.21	7.84	0.94										1.76		0.23		1.88		35.96	5.71	
Quercus nigra	28.57	1.28	3.81			1.36								1.76				1.82		2.42	1.90	17.52
Quercus pagoda	14.29	0.48	1.51													1.36				2.07	6.67	

Table 4. (Continued.)

Species	Frequency	Average	Std Dev	Sampling Locations																					
				1	2	3	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22		
Quercus velutina	9.52	0.17	0.63	2.82			0.85																		
Sabal minor	4.76	0.31	1.42														6.52								
Sapium sebiferum	23.81	8.55	17.25		33.46		58.97		35.71								13.59					37.80			
Sassafras albidum	14.29	4.95	15.43	43.66	2.33													58.02							
Ulmus alata	28.57	4.04	8.40	7.04				14.04				27.03		0.29							25.71	10.68			
Ulmus rubra	4.76	0.17	0.80								3.66														
Yucca gloriosa	4.76	0.22	1.03									4.71													

Table 5. Percentage of area covered (absolute cover) and frequency of occurrence of shrub species sampled in vegetation monitoring sampling locations at Ocmulgee National Monument, 2011. Absolute cover is averaged across shrub plots at each sampling location, and park-wide calculations are averaged across all sampling locations.

Species	Frequency	Average	Std Dev	Sampling Location																			
				1	2	3	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22
<i>Acer negundo</i>	23.81	0.49	1.12							2.40	4.17				0.63		2.50					0.63	
<i>Acer rubrum</i>	19.05	1.03	2.63		4.48				2.19								4.06		10.94				
<i>Ailanthus altissima</i>	9.52	0.59	2.16								2.60			9.69									
<i>Albizia julibrissin</i>	4.76	0.00	0.02			0.10																	
<i>Asimina triloba</i>	4.76	0.14	0.64	2.92																			
<i>Betula nigra</i>	4.76	0.03	0.14								0.63												
<i>Callicarpa americana</i>	19.05	0.46	1.16	1.46								3.13		4.38						0.73			
<i>Carya glabra</i>	4.76	0.00	0.02															0.10					
<i>Carya sp.</i>	4.76	0.03	0.14		0.63																		
<i>Celtis laevigata</i>	4.76	0.01	0.05								0.21												
<i>Cephalanthus occidentalis</i>	9.52	0.16	0.54		1.25		2.19																
<i>Cornus foemina</i>	9.52	0.18	0.71														3.23		0.63				
<i>Diospyros virginiana</i>	19.05	0.42	1.11										1.56			2.92		4.17			0.10		
<i>Elaeagnus pungens</i>	4.76	0.00	0.02									0.10											
<i>Fraxinus caroliniana</i>	23.81	0.33	0.94		1.35				0.63	0.63	4.17											0.10	
<i>Fraxinus pennsylvanica</i>	4.76	0.04	0.18														0.83						
<i>Ilex decidua</i>	33.33	0.36	0.83		3.23		0.73	0.10				0.63				2.19	0.63						0.10
<i>Ilex verticillata</i>	4.76	0.36	1.66																7.60				
<i>Ilex vomitoria</i>	19.05	1.92	8.26	0.73												37.92		1.67					0.10
<i>Itea virginica</i>	4.76	0.07	0.34																1.56				
<i>Ligustrum japonicum</i>	9.52	0.26	0.86									3.56								1.88			
<i>Ligustrum sinense</i>	66.67	9.38	17.64		0.10	8.13	1.98			53.96	20.52	11.67		20.00	63.65		4.06	0.10	1.25	2.50	1.67	7.50	
<i>Liquidambar styraciflua</i>	42.86	1.95	3.11	5.00	6.15	0.73						0.63	4.17			2.19		6.46		4.48			11.25
<i>Magnolia grandiflora</i>	14.29	0.27	0.87																	1.25	0.63		3.85
<i>Magnoliopsida</i>	4.76	0.03	0.14									0.63											
<i>Melia azedarach</i>	4.76	0.03	0.14								0.63												
<i>Nandina domestica</i>	4.76	0.00	0.02									0.10											
<i>Ostrya virginiana</i>	9.52	1.59	6.79					31.15				2.19											
<i>Pinus taeda</i>	4.76	0.34	1.55																	7.10			
<i>Prunus caroliniana</i>	14.29	0.52	1.58			6.15												0.63			4.17		
<i>Prunus serotina</i>	4.76	0.10	0.48																				2.19
<i>Quercus laurifolia</i>	28.57	0.62	2.35	0.21										0.63		0.10		0.65		10.83	0.63		
<i>Quercus nigra</i>	28.57	0.32	0.94			0.21								0.63				0.63		0.73	0.21		4.27
<i>Quercus pagoda</i>	14.29	0.09	0.24													0.63				0.63	0.73		

Table 5. (Continued.)

Species	Frequency	Average	Std Dev	Sampling Location																			
				1	2	3	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22
Quercus velutina	9.52	0.03	0.14	0.63			0.10																
Sabal minor	4.76	0.06	0.27														1.25						
Sapium sebiferum	23.81	1.21	2.60		8.96		7.19		1.56								2.60					5.00	
Sassafras albidum	14.29	1.44	4.73	9.69	0.63													19.90					
Ulmus alata	28.57	1.01	2.26	1.56				5.10				8.96		0.10							2.81		2.60
Ulmus rubra	4.76	0.06	0.27								1.25												
Yucca gloriosa	4.76	0.07	0.34									1.56											

17

Species	Average	Std Dev	Frequency	Sampling Location																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
Acer negundo	0.49	1.49	19.05									0.67			1.46		6.67						1.46		
Acer rubrum	1.70	6.89	23.81		2.50						1.25						31.67	0.04					0.21		
Ailanthus altissima	0.05	0.16	9.52										0.42		0.63										
Albizia julibrissin	0.01	0.05	9.52									0.04			0.25										
Alternanthera philoxeroides	3.81	13.35	14.29		19.79				58.96										1.25						
Amaranthus sp.	0.07	0.27	9.52						1.25		0.21														
Ambrosia artemisiifolia	0.01	0.05	4.76														0.25								
Ampelopsis arborea	0.31	0.94	14.29	0.21											3.13						3.13				
Andropogon virginicus	0.01	0.05	4.76																		0.21				
Apiaceae	1.32	5.68	9.52										26.04				1.67								
Apocynum cannabinum	0.27	0.75	14.29		3.13										1.25					1.25					
Arundinaria gigantea	0.95	3.49	9.52		4.38							15.63													
Asimina triloba	0.01	0.05	4.76	0.21																					
Asplenium platyneuron	0.13	0.38	14.29													1.25					0.21		1.25		
Asteraceae	0.09	0.32	14.29						1.46				0.21				0.21								
Berchemia scandens	0.06	0.27	4.76						1.25																
Bidens sp.	0.00	0.01	4.76									0.04													
Bignonia capreolata	0.08	0.32	9.52						1.46	0.21															
Boehmeria cylindrica	0.97	2.37	23.81		10.21				1.25		3.13						3.13						2.71		
Campsis radicans	0.51	1.02	28.57	1.46					2.50			3.75	0.21			1.46				1.25					
Carex sp.	1.06	3.69	19.05		16.88				2.75						1.25					1.46					
Carya alba	0.01	0.05	4.76		0.21																				
Celtis laevigata	0.14	0.38	28.57			0.25						0.08	1.71			0.21				0.21	0.42				
Chasmanthium latifolium	0.40	1.26	9.52										3.96				4.38								
Chasmanthium laxum	0.01	0.05	4.76													0.21									
Commelina communis	0.01	0.05	4.76													0.21									
Commelina virginica	0.46	2.09	4.76						9.58																
Commelinaceae	0.12	0.55	4.76		2.50																				
Crataegus sp.	0.01	0.05	4.76			0.21																			
Cyperaceae	0.15	0.44	14.29					1.67									0.21					1.25			
Cyperus sp.	0.06	0.27	4.76		1.25																				
Decodon verticillatus	1.36	6.23	4.76																28.54						
Diospyros virginiana	0.01	0.05	4.76			0.21																			
Elaeagnus pungens	0.01	0.05	4.76										0.21												

Table 6. (Continued.)

Species	Average	Std Dev	Frequency	Sampling Location																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Erechtites hieracifolia</i>	0.01	0.05	4.76										0.21												
<i>Eupatorium</i> sp.	0.00	0.01	4.76									0.04													
<i>Euthamia graminifolia</i>	0.01	0.05	4.76					0.21																	
<i>Fabaceae</i>	0.10	0.36	19.05							0.21		0.04					0.21		1.67						
<i>Fraxinus pennsylvanica</i>	0.07	0.32	4.76														1.46								
<i>Galium aparine</i>	0.18	0.45	14.29											1.25			1.25		1.25						
<i>Geranium carolinianum</i>	0.06	0.27	4.76									1.25													
<i>Gnaphalium</i> sp.	0.22	1.00	4.76				4.58																		
<i>Gonolobus suberosa</i>	0.06	0.27	4.76												1.25										
<i>Hedera helix</i>	0.02	0.06	9.52			0.21										0.21									
<i>Hibiscus laevis</i>	0.06	0.27	4.76					1.25																	
<i>Ilex decidua</i>	0.01	0.05	4.76																				0.21		
<i>Ilex vomitoria</i>	0.77	3.19	19.05									0.21					14.63		1.25				0.08		
<i>Impatiens capensis</i>	0.14	0.44	9.52														1.46					1.46			
<i>Ipomoea</i> sp.	0.03	0.10	9.52														0.42					0.21			
<i>Juncus effusus</i>	0.01	0.05	4.76											0.21											
<i>Juncus</i> sp.	0.07	0.27	9.52											0.21					1.25						
<i>Krigia caespitosa</i>	0.08	0.37	4.76				1.71																		
<i>Lamiaceae</i>	0.01	0.05	4.76									0.21													
<i>Leersia oryzoides</i>	11.54	26.06	23.81							59.79			74.38				9.58		15.21			83.33			
<i>Ligustrum japonicum</i>	0.12	0.38	9.52									1.25							1.25						
<i>Ligustrum sinense</i>	0.86	1.76	42.86	0.21		5.21			0.21		4.00		0.42		5.42	0.25	2.08		0.25						
<i>Liliopsida</i>	1.18	3.74	14.29														15.83		1.46			7.50			
<i>Liquidambar styraciflua</i>	0.01	0.05	4.76					0.21																	
<i>Lonicera japonica</i>	3.44	3.55	76.19	3.13	5.00	7.71	1.25	6.88	0.42		3.96	8.75	2.92	5.21	2.71		0.21	1.25	13.13		5.21	4.58			
<i>Ludwigia</i> sp.	0.06	0.27	4.76					1.25																	
<i>Lycopus americanus</i>	0.19	0.64	9.52							2.71									1.25						
<i>Magnoliopsida</i>	0.09	0.32	19.05				0.25				0.21						1.46		0.04						
<i>Matelea carolinensis</i>	0.26	1.18	4.76									5.42													
<i>Melica mutica</i>	0.09	0.41	4.76										1.88												
<i>Menispermum canadense</i>	0.22	0.95	9.52									4.38			0.21										
<i>Microstegium vimineum</i>	0.78	3.07	9.52														13.96					2.50			
<i>Mikania scandens</i>	0.63	1.83	19.05		1.25									2.50					8.13			1.25			
<i>Onoclea sensibilis</i>	0.25	1.14	4.76																5.21						
<i>Oplismenus hirtellus</i>	0.46	1.61	9.52									7.08										2.50			

Table 6. (Continued.)

Species	Average	Std Dev	Frequency	Sampling Location																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Ostrya virginiana</i>	0.02	0.09	4.76						0.42																
<i>Oxalis stricta</i>	0.06	0.28	4.76				1.29																		
<i>Panicum</i> sp.	0.46	1.11	28.57					0.21				3.75	0.21		2.71			2.75					0.04		
<i>Panicum verrucosum</i>	0.21	0.95	4.76		4.38																				
<i>Parthenocissus quinquefolia</i>	0.57	0.99	52.38	1.88		0.46					0.25	1.88	0.29		0.04	1.29	0.04		0.46		3.79	1.67			
<i>Passiflora lutea</i>	0.06	0.27	4.76		1.25																				
<i>Phytolacca americana</i>	0.07	0.27	9.52	1.25		0.21																			
<i>Pinus taeda</i>	0.00	0.01	4.76																			0.04			
<i>Pluchea camphorata</i>	0.06	0.27	4.76		1.25																				
Poaceae	2.32	5.98	28.57		4.38	1.46	24.38	3.17										14.17			1.25				
<i>Polygonum sagittatum</i>	1.78	5.72	19.05							1.25					25.42			2.50				8.13			
<i>Polygonum</i> sp.	2.15	4.67	33.33		13.33			2.71		3.13					1.46			5.83		1.29		17.33			
<i>Prunus caroliniana</i>	0.52	1.63	23.81	0.21		6.67										0.04	0.21				3.79				
<i>Prunus serotina</i>	0.05	0.24	4.76										1.08												
<i>Pueraria montana</i> var. <i>lobata</i>	0.18	0.82	4.76												3.75										
<i>Quercus laurifolia</i>	0.18	0.46	23.81										0.67				0.67		1.96		0.25	0.21			
<i>Quercus nigra</i>	0.10	0.21	28.57			0.63			0.13						0.21		0.04				0.42		0.67		
<i>Quercus</i> sp.	0.00	0.02	4.76	0.08																					
<i>Quercus velutina</i>	0.01	0.05	4.76												0.21										
<i>Rubus argutus</i>	1.49	4.16	33.33	1.46	18.96	2.71		1.25							1.25	1.29					4.38				
<i>Rubus cuneifolius</i>	0.06	0.27	4.76																	1.25					
<i>Rubus trivialis</i>	0.57	1.44	33.33				0.21				0.21	3.83	0.42		5.63				0.42			1.25			
<i>Saccharum giganteum</i>	0.06	0.27	4.76																	1.25					
<i>Sagittaria lancifolia</i>	4.75	14.86	14.29							32.50					61.67					5.63					
<i>Sagittaria latifolia</i>	0.06	0.27	4.76		1.25																				
<i>Sapium sebiferum</i>	0.23	0.96	9.52		4.38													0.50							
<i>Sassafras albidum</i>	0.11	0.45	9.52	0.21															2.08						
<i>Saururus cernuus</i>	1.05	2.75	23.81					1.25		1.25							10.21		8.13			1.25			
<i>Smilax bona-nox</i>	0.12	0.55	4.76					2.50																	
<i>Smilax laurifolia</i>	0.37	1.42	9.52	6.46								1.25													
<i>Smilax</i> sp.	1.79	2.79	71.43	5.00	1.25	5.67		1.25	0.46		2.71	1.71	0.50		11.13	0.04	0.54		1.38		0.21	5.04	0.79		
<i>Solidago</i> sp.	0.22	0.53	19.05			0.21						1.25		2.50				1.25							
<i>Stellaria media</i>	0.13	0.55	9.52			0.21									2.50										
<i>Toxicodendron radicans</i>	1.16	1.61	57.14		1.25			4.58	0.21		4.38		1.88	1.25	1.50	0.21	0.21	2.50		4.58	1.88				
<i>Trachelospermum difforme</i>	0.06	0.27	4.76		1.25																				

Table 6. (Continued.)

Species	Average	Std Dev	Frequency	Sampling Location																								
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22				
<i>Ulmus alata</i>	0.08	0.28	14.29	0.25	1.25																		0.21					
<i>Ulmus rubra</i>	0.13	0.55	9.52																	2.50		0.21						
<i>Verbesina occidentalis</i>	0.15	0.68	4.76																	3.13								
<i>Vicia angustifolia</i>	0.25	1.14	4.76																	5.21								
<i>Viola</i> sp.	0.01	0.05	9.52			0.21																		0.04				
<i>Vitis cinerea</i> var. <i>floridana</i>	0.07	0.27	9.52	1.25																		0.21						
<i>Vitis rotundifolia</i>	5.73	12.16	61.90	23.75	1.25			2.63		0.21	1.46	0.04	1.25		0.08	1.71	17.54		23.33	47.08	0.08							
<i>Yucca gloriosa</i>	0.06	0.27	4.76																	1.25								
Ground Condition																												
Bare Ground	10.19	14.99	66.67	7.92	2.71	3.38	6.67	14.38			38.33	38.33	0.21	14.17		31.67	45.83		0.25			10.00	0.21					
Exposed Humus	7.44	17.34	23.81	22.29				18.33		3.13				57.71				54.79										
Leaf Litter/Duff	81.59	17.41	100.00	92.50	70.29	94.58	79.58	67.54	97.50	94.58	68.54	82.50	93.54	37.08	85.63	69.58	96.46	60.83	96.46	50.25	97.50	96.46	85.42	96.46				
Open Water	0.40	1.30	9.52																	5.21						3.13		
Tree Base	0.49	1.01	23.81	1.25																		3.33		1.25		1.25		3.13
Upland Non-Vascular/Lichen	0.06	0.27	4.76																	1.25								

Table 7. Percentage of area covered (absolute cover) and frequency of occurrence by groundcover species sampled in vegetation monitoring sampling locations at Ocmulgee National Monument, 2011. Absolute cover is averaged across groundcover plots at each sampling location, and park-wide calculations are averaged across all sampling locations.

[illegible]

Table 7. (Continued.)

Species	Average	St Dev	Frequency	Sampling Location																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Erechtites hieraciifolia</i>	0.01	0.06	4.76									0.25													
<i>Eupatorium</i> sp.	0.00	0.01	4.76									0.05													
<i>Euthamia graminifolia</i>	0.01	0.04	4.76					0.19																	
<i>Fabaceae</i>	0.13	0.43	19.05							0.20		0.34					0.15		1.95						
<i>Fraxinus pennsylvanica</i>	0.05	0.23	4.76														1.06								
<i>Galium aparine</i>	0.15	0.39	14.29										0.67				0.91		1.46						
<i>Geranium carolinianum</i>	0.07	0.33	4.76									1.53													
<i>Gnaphalium</i> sp.	0.30	1.38	4.76				6.31																		
<i>Gonolobus suberosa</i>	0.12	0.57	4.76											2.59											
<i>Hedera helix</i>	0.24	0.99	9.52			0.62									4.50										
<i>Hibiscus laevis</i>	0.06	0.25	4.76					1.17																	
<i>Ilex decidua</i>	0.32	1.45	4.76																				6.67		
<i>Ilex vomitoria</i>	4.23	17.67	19.05									1.71				81.25		3.27					2.67		
<i>Impatiens capensis</i>	0.11	0.33	9.52														1.06					1.15			
<i>Ipomoea</i> sp.	0.02	0.07	9.52														0.30					0.16			
<i>Juncus effusus</i>	0.01	0.02	4.76										0.11												
<i>Juncus</i> sp.	0.07	0.32	9.52										0.11					1.46							
<i>Krigia caespitosa</i>	0.11	0.51	4.76				2.35																		
<i>Lamiaceae</i>	0.08	0.37	4.76									1.71													
<i>Leersia oryzoides</i>	8.91	19.76	23.81							56.72			40.07				6.99		17.79			65.45			
<i>Ligustrum japonicum</i>	0.19	0.63	9.52									1.53							2.51						
<i>Ligustrum sinense</i>	2.55	4.57	42.86	0.46		15.57			4.46		11.07		3.41		11.24	5.41		1.52		0.50					
<i>Liliopsida</i>	0.91	2.77	14.29														11.55		1.71			5.89			
<i>Liquidambar styraciflua</i>	0.01	0.04	4.76					0.19																	
<i>Lonicera japonica</i>	7.54	9.22	76.19	6.83	4.08	23.04	1.72	6.42	8.93		10.96	10.69	23.89	2.81	5.62		1.16	0.91	34.31		10.47	6.54			
<i>Ludwigia</i> sp.	0.06	0.25	4.76					1.17																	
<i>Lycopus americanus</i>	0.19	0.63	9.52							2.57									1.46						
<i>Magnoliopsida</i>	0.10	0.26	19.05				0.34				0.58						1.06		0.05						
<i>Matelea carolinensis</i>	0.32	1.44	4.76									6.62													
<i>Melica mutica</i>	0.73	3.35	4.76									15.36													
<i>Menispermum canadense</i>	0.47	1.49	9.52									5.34			4.50										
<i>Microstegium vimineum</i>	0.58	2.24	9.52														10.18					1.96			
<i>Mikania scandens</i>	0.61	2.08	19.05		1.02									1.35					9.50			0.98			
<i>Onoclea sensibilis</i>	0.29	1.33	4.76																6.09						
<i>Oplismenus hirtellus</i>	0.58	2.01	9.52									8.65										3.57			

Table 7. (Continued.)

Species	Average	St Dev	Frequency	Sampling Location																					
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Ostrya virginiana</i>	0.43	1.95	4.76						8.93																
<i>Oxalis stricta</i>	0.08	0.39	4.76				1.78																		
<i>Panicum</i> sp.	0.74	1.58	28.57					0.19				4.58	1.71		5.62		2.01						1.33		
<i>Panicum verrucosum</i>	0.17	0.78	4.76		3.57																				
<i>Parthenocissus quinquefolia</i>	2.39	6.14	52.38	4.10		1.37					0.69	2.29	2.39		0.09	27.93	0.23		1.20		7.62	2.38			
<i>Passiflora lutea</i>	0.05	0.22	4.76		1.02																				
<i>Phytolacca americana</i>	0.16	0.60	9.52	2.73		0.62																			
<i>Pinus taeda</i>	0.00	0.02	4.76																		0.08				
<i>Pluchea camphorata</i>	0.05	0.22	4.76		1.02																				
Poaceae	2.73	7.50	28.57		3.57	4.36	33.56	2.95									10.33				2.51				
<i>Polygonum sagittatum</i>	1.10	3.22	19.05							1.19				13.69			1.82					6.38			
<i>Polygonum</i> sp.	1.74	3.72	33.33		10.88			2.53		2.96				0.79			4.26		1.51			13.61			
<i>Prunus caroliniana</i>	1.45	4.49	23.81	0.46		19.93									0.09	4.50					5.41				
<i>Prunus serotina</i>	0.42	1.94	4.76										8.87												
<i>Pueraria montana</i> var. <i>lobata</i>	0.37	1.70	4.76												7.78										
<i>Quercus laurifolia</i>	0.72	1.72	23.81										5.46			3.70		5.12		0.50	0.30				
<i>Quercus nigra</i>	1.32	4.64	28.57			1.87			2.68					0.11		0.90				0.84		21.33			
<i>Quercus</i> sp.	0.01	0.04	4.76	0.18																					
<i>Quercus velutina</i>	0.02	0.09	4.76												0.43										
<i>Rubus argutus</i>	1.91	4.03	33.33	3.19	15.48	8.09		1.17						0.67	2.68					8.79					
<i>Rubus cuneifolius</i>	0.07	0.32	4.76																	1.46					
<i>Rubus trivialis</i>	1.12	2.72	33.33				0.29				0.58	4.68	3.41		11.67			1.09			1.78				
<i>Saccharum giganteum</i>	0.07	0.32	4.76																	1.46					
<i>Sagittaria lancifolia</i>	3.36	9.64	14.29							30.83				33.22						6.58					
<i>Sagittaria latifolia</i>	0.05	0.22	4.76		1.02																				
<i>Sapium sebiferum</i>	0.19	0.78	9.52		3.57												0.36								
<i>Sassafras albidum</i>	0.28	1.19	9.52	0.46															5.45						
<i>Saururus cernuus</i>	0.97	2.55	23.81					1.17		1.19							7.45		9.50			0.98			
<i>Smilax bona-nox</i>	0.11	0.51	4.76					2.33																	
<i>Smilax laurifolia</i>	0.74	3.08	9.52	14.12								1.53													
<i>Smilax</i> sp.	5.58	7.68	71.43	10.93	1.02	16.94		1.17	9.82		7.50	2.09	4.10		23.08	0.90	3.01		3.59		0.42	7.19	25.33		
<i>Solidago</i> sp.	0.24	0.57	19.05			0.62						1.53		1.35			0.91								
<i>Stellaria media</i>	0.28	1.13	9.52			0.62									5.19										
<i>Toxicodendron radicans</i>	2.88	4.33	57.14		1.02			4.28	4.46		12.11		15.36	0.67	3.11	4.50	1.16	1.82			9.21	2.68			
<i>Trachelospermum difforme</i>	0.05	0.22	4.76		1.02																				

Species	Average	St Dev	Frequency	Sampling Location																									
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22					
<i>Ulmus alata</i>	0.22	0.82	14.29	0.55	3.74																		0.30						
<i>Ulmus rubra</i>	0.15	0.67	9.52																3.05		0.15								
<i>Verbesina occidentalis</i>	0.18	0.83	4.76																3.82										
<i>Vicia angustifolia</i>	0.51	2.36	4.76																10.80										
<i>Viola</i> sp.	0.03	0.14	9.52	0.62																	0.03								
<i>Vitis cinerea</i> var. <i>floridana</i>	0.06	0.23	9.52	1.02					0.25																				
<i>Vitis rotundifolia</i>	13.73	23.27	61.90	51.91	1.02						56.25	0.58	1.78	0.34	2.59		1.80	9.49	45.86		46.90	67.18	2.67						
<i>Yucca gloriosa</i>	0.49	2.23	4.76																10.24										
Ground Condition																													
Bare Ground	9.66	13.79	66.67	7.79	2.84	3.45	7.73	14.34				35.87	31.72	0.21	14.02		31.28	42.97		0.26				10.15	0.22				
Exposed Humus	7.37	17.03	23.81	23.39				18.29			3.20			57.71				52.16											
Leaf Litter/Duff	82.02	19.19	100.00	90.98	73.76	96.55	92.27	67.37	100.00	96.80	64.13	68.28	96.35	37.08	84.74	68.72	98.72	57.03	99.74	47.84	98.73	96.86	86.68	99.78					
Open Water	0.40	1.30	9.52																5.21				3.17						
Tree Base	0.49	1.03	23.81	1.23													3.43		1.28				1.27		3.14				
Upland Non-Vascular/Lichen	0.06	0.27	4.76																1.24										

Table 9. Seedling frequency for canopy and shrub species in vegetation monitoring macroplots at Ocmulgee National Monument, 2011. Seedling frequency is averaged across groundcover plots at each sampling location, and park-wide calculations are averaged across all sampling locations.

Species	Total Seedlings	Seedlings per m ²	Std Dev	Sampling Location																	
				1	2	3	5	6	7	8	9	10	12	13	14	16	17	19	20	21	22
<i>Acer negundo</i>	70	1.46	0.81							0.83			0.92			2.58				1.50	
<i>Acer rubrum</i>	1214	25.29	49.81		0.67				0.42							100.00				0.08	
<i>Ailanthus altissima</i>	7	0.29	0.18								0.17		0.42								
<i>Albizia julibrissin</i>	3	0.13	0.06							0.08			0.17								
<i>Asimina triloba</i>	1	0.08		0.08																	
<i>Celtis laevigata</i>	19	0.26	0.24			0.25				0.17	0.75			0.17				0.08	0.17		
<i>Crataegus</i> sp.	1	0.08				0.08															
<i>Diospyros virginiana</i>	2	0.17				0.17															
<i>Elaeagnus pungens</i>	1	0.08										0.08									
<i>Fabaceae</i>	1	0.08										0.08									
<i>Fraxinus pennsylvanica</i>	2	0.17														0.17					
<i>Ilex decidua</i>	1	0.08																			0.08
<i>Ilex vomitoria</i>	181	3.77	7.10									0.08			14.42		0.42				0.17
<i>Ipomoea</i> sp.	1	0.08														0.08					
<i>Ligustrum japonicum</i>	7	0.29	0.06								0.25							0.33			
<i>Ligustrum sinense</i>	98	0.91	1.01	0.08		1.58		0.25		1.75		0.25	3.00	0.17		0.92		0.17			
<i>Liquidambar styraciflua</i>	1	0.08				0.08															
<i>Microstegium vimineum</i>	3	0.25																		0.25	
<i>Ostrya virginiana</i>	2	0.17						0.17													
<i>Panicum</i> sp.	1	0.08														0.08					
<i>Parthenocissus quinquefolia</i>	1	0.08																0.08			
<i>Pinus taeda</i>	1	0.08																0.08			
<i>Prunus caroliniana</i>	58	0.97	1.66	0.08		3.92							0.08	0.17					0.58		
<i>Prunus serotina</i>	11	0.92										0.92									
<i>Quercus laurifolia</i>	22	0.37	0.32									0.33			0.50		0.83	0.08	0.08		
<i>Quercus nigra</i>	22	0.37	0.33			0.42		0.25						0.08				0.17			0.92
<i>Quercus</i> sp.	2	0.17		0.17																	
<i>Quercus velutina</i>	1	0.08											0.08								
<i>Rubus trivialis</i>	3	0.25								0.25											
<i>Sapium sebiferum</i>	89	3.71	4.77		7.08											0.33					
<i>Sassafras albidum</i>	9	0.38	0.29	0.17													0.58				
<i>Ulmus alata</i>	4	0.11	0.05	0.17		0.08													0.08		

Table 9. (Continued.)

Species	Total Seedlings	Seedlings per m ²	Std Dev	Sampling Location																	
				1	2	3	5	6	7	8	9	10	12	13	14	16	17	19	20	21	22
<i>Ulmus rubra</i>	11	0.46	0.06								0.50						0.42				
<i>Vitis rotundifolia</i>	1	0.08		0.08																	
<i>Yucca gloriosa</i>	2	0.17										0.17									

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Appendix A. Plant species known to occur at OCMU.

Table A-1. Vascular plant species known occur at Ocmulgee National Monument (NPSpecies 2011) and species detected during 2011 monitoring efforts.

Order	Family	Scientific Name	NPSpecies	This Study
Malpighiales	Euphorbiaceae	<i>Acalypha gracilens</i>	X	
Sapindales	Sapindaceae	<i>Acer barbatum</i>	X	
Sapindales	Sapindaceae	<i>Acer negundo</i>	X	X
Sapindales	Sapindaceae	<i>Acer rubrum</i>	X	X
Sapindales	Sapindaceae	<i>Acer saccharinum</i>	X	
Sapindales	Sapindaceae	<i>Aesculus pavia</i>	X	X
Lamiales	Orobanchaceae	<i>Agalinis obtusifolia</i>	X	
Lamiales	Orobanchaceae	<i>Agalinis purpurea</i>	X	
Sapindales	Simaroubaceae	<i>Ailanthus altissima</i>	X	X
Fabales	Fabaceae	<i>Albizia julibrissin</i>	X	X
Asparagales	Amaryllidaceae	<i>Allium</i> sp.		X
Fagales	Betulaceae	<i>Alnus serrulata</i>	X	
Caryophyllales	Amaranthaceae	<i>Alternanthera philoxeroides</i>	X	X
Caryophyllales	Amaranthaceae	<i>Amaranthus hybridus</i>	X	
Caryophyllales	Amaranthaceae	<i>Amaranthus</i> sp.	X	X
Asterales	Asteraceae	<i>Ambrosia artemisiifolia</i>	X	X
Fabales	Fabaceae	<i>Amorpha fruticosa</i>	X	
Vitales	Vitaceae	<i>Ampelopsis arborea</i>	X	X
Fabales	Fabaceae	<i>Amphicarpea bracteata</i>		X
Gentianales	Apocynaceae	<i>Amsonia tabernaemontana</i>	X	
Poales	Cyperaceae	<i>Andropogon</i> sp.	X	X
Poales	Poaceae	<i>Andropogon virginicus</i>	X	X
Ranunculales	Ranunculaceae	<i>Anemone berlandieri</i>	X	
Rosales	Rosaceae	<i>Aphanes microcarpa</i>	X	
Gentianales	Apocynaceae	<i>Apocynum cannabinum</i>		X
Ranunculales	Ranunculaceae	<i>Aquilegia canadensis</i>	X	
Brassicales	Brassicaceae	<i>Arabidopsis thaliana</i>	X	
Apiales	Araliaceae	<i>Aralia spinosa</i>	X	X
Alismatales	Araceae	<i>Arisaema dracontium</i>	X	X
Alismatales	Araceae	<i>Arisaema triphyllum</i>	X	
Poales	Poaceae	<i>Aristida</i> sp.	X	
Poales	Poaceae	<i>Arundinaria gigantea</i>	X	X
Magnoliales	Annonaceae	<i>Asimina triloba</i>	X	X
Asparagales	Asparagaceae	<i>Asparagus officinalis</i>	X	
Polypodiales	Aspleniaceae	<i>Asplenium platyneuron</i>	X	X
Polypodiales	Aspleniaceae	<i>Asplenium</i> sp.	X	X
Polypodiales	Woodsiaceae	<i>Athyrium filix-femina</i>	X	

Order	Family	Scientific Name	NPSpecies	This Study
Poales	Poaceae	<i>Axonopus compressus</i>	X	
Asterales	Asteraceae	<i>Baccharis halimifolia</i>	X	X
Rosales	Rhamnaceae	<i>Berchemia scandens</i>	X	X
Fagales	Betulaceae	<i>Betula nigra</i>	X	X
Fagales	Betulaceae	<i>Betula</i> sp.	X	X
Asterales	Asteraceae	<i>Bidens aristosa</i>	X	
Asterales	Asteraceae	<i>Bidens bipinnata</i>	X	
Lamiales	Bignoniaceae	<i>Bignonia capreolata</i>	X	X
Rosales	Urticaceae	<i>Boehmeria cylindrica</i>	X	X
Ophioglossales	Ophioglossaceae	<i>Botrychium lunarioides</i>	X	
Poales	Poaceae	<i>Briza minor</i>	X	X
Poales	Poaceae	<i>Bromus racemosus</i>	X	
Caryophyllales	Polygonaceae	<i>Brunnichia ovata</i>	X	
Nymphaeales	Cabombaceae	<i>Cabomba caroliniana</i>		X
Lamiales	Lamiaceae	<i>Callicarpa americana</i>	X	X
Laurales	Calycanthaceae	<i>Calycanthus floridus</i>	X	
Lamiales	Bignoniaceae	<i>Campsis radicans</i>	X	X
Brassicales	Brassicaceae	<i>Capsella bursa-pastoris</i>	X	
Brassicales	Brassicaceae	<i>Cardamine hirsuta</i>	X	
Poales	Cyperaceae	<i>Carex abscondita</i>	X	
Poales	Cyperaceae	<i>Carex albicans</i>	X	
Poales	Cyperaceae	<i>Carex amphibola</i>	X	
Poales	Cyperaceae	<i>Carex atlantica</i>	X	
Poales	Cyperaceae	<i>Carex blanda</i>	X	
Poales	Cyperaceae	<i>Carex crebriflora</i>	X	
Poales	Cyperaceae	<i>Carex crinita</i>	X	
Poales	Cyperaceae	<i>Carex debilis</i>	X	
Poales	Cyperaceae	<i>Carex flaccosperma</i>	X	
Poales	Cyperaceae	<i>Carex gigantea</i>	X	
Poales	Cyperaceae	<i>Carex intumescens</i>	X	
Poales	Cyperaceae	<i>Carex louisianica</i>	X	
Poales	Cyperaceae	<i>Carex lupulina</i>	X	
Poales	Cyperaceae	<i>Carex lurida</i>	X	
Poales	Cyperaceae	<i>Carex nigromarginata</i>	X	
Poales	Cyperaceae	<i>Carex retroflexa</i>	X	
Poales	Cyperaceae	<i>Carex scoparia</i>	X	
Poales	Cyperaceae	<i>Carex</i> sp.	X	X
Poales	Cyperaceae	<i>Carex styloflexa</i>	X	
Poales	Cyperaceae	<i>Carex venusta</i>	X	
Fagales	Betulaceae	<i>Carpinus caroliniana</i>	X	
Fagales	Juglandaceae	<i>Carya alba</i>	X	X

Order	Family	Scientific Name	NPSpecies	This Study
Fagales	Juglandaceae	<i>Carya aquatica</i>	X	
Fagales	Juglandaceae	<i>Carya cordiformis</i>	X	
Fagales	Juglandaceae	<i>Carya glabra</i>	X	X
Fagales	Juglandaceae	<i>Carya illinoensis</i>	X	X
Fagales	Juglandaceae	<i>Carya ovata</i>	X	X
Fagales	Juglandaceae	<i>Carya pallida</i>	X	
Fagales	Juglandaceae	<i>Carya sp.</i>	X	X
Fagales	Fagaceae	<i>Castanea pumila</i>	X	
Lamiales	Bignoniaceae	<i>Catalpa bignonioides</i>		X
Cucurbitales	Cucurbitaceae	<i>Cayaponia quinqueloba</i>	X	
Pinales	Pinaceae	<i>Cedrus deodara</i>	X	
Rosales	Cannabaceae	<i>Celtis laevigata</i>	X	X
Poales	Poaceae	<i>Cenchrus tribuloides</i>	X	
Fabales	Fabaceae	<i>Centrosema virginianum</i>	X	
Gentianales	Rubiaceae	<i>Cephalanthus occidentalis</i>	X	X
Caryophyllales	Caryophyllaceae	<i>Cerastium glomeratum</i>	X	
Fabales	Fabaceae	<i>Cercis canadensis</i>	X	
Apiales	Apiaceae	<i>Chaerophyllum tainturieri</i>	X	
Fabales	Fabaceae	<i>Chamaecrista fasciculata</i>	X	
Malpighiales	Euphorbiaceae	<i>Chamaesyce maculata</i>	X	
Poales	Poaceae	<i>Chasmanthium latifolium</i>	X	X
Poales	Poaceae	<i>Chasmanthium laxum</i>		X
Poales	Poaceae	<i>Chasmanthium sp.</i>	X	X
Caryophyllales	Amaranthaceae	<i>Chenopodium ambrosioides</i>	X	
Ericales	Ericaceae	<i>Chimaphila maculata</i>	X	
Asterales	Asteraceae	<i>Chrysogonum virginianum</i>	X	
Asterales	Asteraceae	<i>Cirsium horridulum</i>	X	
Cyperales	Cyperaceae	<i>Cladium mariscus ssp. jamaicense</i>		X
Ranunculales	Ranunculaceae	<i>Clematis virginiana</i>	X	X
Malpighiales	Euphorbiaceae	<i>Cnidioscolus stimulosus</i>	X	
Ranunculales	Menispermaceae	<i>Cocculus carolinus</i>	X	X
Commelinales	Commelinaceae	<i>Commelina communis</i>		X
Commelinales	Commelinaceae	<i>Commelina virginica</i>	X	X
Asterales	Asteraceae	<i>Conoclinium coelestinum</i>	X	
Asterales	Asteraceae	<i>Conyza canadensis</i>		X
Cornales	Cornaceae	<i>Cornus florida</i>	X	
Cornales	Cornaceae	<i>Cornus foemina</i>	X	X
Rosales	Rosaceae	<i>Crataegus marshallii</i>		X
Rosales	Rosaceae	<i>Crataegus sp.</i>	X	X
Rosales	Rosaceae	<i>Crataegus spathulata</i>	X	
Rosales	Rosaceae	<i>Crataegus uniflora</i>	X	

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Rosales	Rosaceae	<i>Crataegus viridis</i>	X	
Malpighiales	Euphorbiaceae	<i>Croton capitatus</i>	X	
Solanales	Convolvulaceae	<i>Cuscuta gronovii</i>	X	
Poales	Poaceae	<i>Cynodon dactylon</i>	X	
Poales	Cyperaceae	<i>Cyperus echinatus</i>	X	
Poales	Cyperaceae	<i>Cyperus erythrorhizos</i>	X	
Poales	Cyperaceae	<i>Cyperus retrorsus</i>	X	
Poales	Cyperaceae	<i>Cyperus</i> sp.	X	X
Poales	Cyperaceae	<i>Cyperus strigosus</i>	X	
Poales	Cyperaceae	<i>Cyperus virens</i>	X	
Poales	Poaceae	<i>Danthonia spicata</i>	X	
Myrtales	Lythraceae	<i>Decodon verticillatus</i>		X
Fabales	Fabaceae	<i>Desmodium</i> sp.	X	
Poales	Poaceae	<i>Dichanthelium aciculare</i>	X	
Poales	Poaceae	<i>Dichanthelium boscii</i>	X	
Poales	Poaceae	<i>Dichanthelium scoparium</i>	X	
Solanales	Convolvulaceae	<i>Dichondra carolinensis</i>	X	
Lamiales	Acanthaceae	<i>Dicliptera brachiata</i>	X	
Poales	Poaceae	<i>Digitaria sanguinalis</i>	X	
Gentianales	Rubiaceae	<i>Diodia teres</i>	X	
Gentianales	Rubiaceae	<i>Diodia virginiana</i>	X	
Dioscoreales	Dioscoreaceae	<i>Dioscorea floridana</i>	X	
Dioscoreales	Dioscoreaceae	<i>Dioscorea</i> sp.	X	X
Ericales	Ebenaceae	<i>Diospyros virginiana</i>	X	X
Rosales	Rosaceae	<i>Duchesnea indica</i>	X	
Poales	Poaceae	<i>Echinochloa crus-galli</i>	X	
Rosales	Elaeagnaceae	<i>Elaeagnus commutata</i>	X	
Rosales	Elaeagnaceae	<i>Elaeagnus pungens</i>		X
Asterales	Asteraceae	<i>Elephantopus carolinianus</i>	X	X
Poales	Poaceae	<i>Elymus virginicus</i>	X	
Equisetales	Equisetaceae	<i>Equisetum hyemale</i>	X	
Poales	Poaceae	<i>Eragrostis spectabilis</i>	X	
Asterales	Asteraceae	<i>Erechtites hieracifolia</i>	X	X
Asterales	Asteraceae	<i>Erigeron quercifolius</i>		X
Asterales	Asteraceae	<i>Erigeron strigosus</i>	X	
Fabales	Fabaceae	<i>Erythrina herbacea</i>	X	
Liliales	Liliaceae	<i>Erythronium americanum</i>	X	
Celastrales	Celastraceae	<i>Euonymus americanus</i>	X	
Asterales	Asteraceae	<i>Eupatorium capillifolium</i>	X	X
Asterales	Asteraceae	<i>Eupatorium</i> sp.	X	X
Asterales	Asteraceae	<i>Euthamia graminifolia</i>		X

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Asterales	Asteraceae	<i>Euthamia</i> sp.		X
Asterales	Asteraceae	<i>Facelis retusa</i>	X	
Fagales	Fagaceae	<i>Fagus grandifolia</i>	X	
Rosales	Moraceae	<i>Ficus pumila</i>		X
Lamiales	Oleaceae	<i>Forestiera acuminata</i>	X	
Rosales	Rosaceae	<i>Fragaria virginiana</i>	X	
Lamiales	Oleaceae	<i>Fraxinus caroliniana</i>	X	X
Lamiales	Oleaceae	<i>Fraxinus pennsylvanica</i>	X	X
Gentianales	Rubiaceae	<i>Galium aparine</i>	X	X
Gentianales	Gelsemiaceae	<i>Gelsemium sempervirens</i>	X	X
Geraniales	Geraniaceae	<i>Geranium carolinianum</i>	X	X
Geraniales	Geraniaceae	<i>Geranium maculatum</i>	X	X
Lamiales	Verbenaceae	<i>Glandularia pulchella</i>	X	
Fabales	Fabaceae	<i>Glottidium vesicarium</i>	X	
Asterales	Asteraceae	<i>Gnaphalium obtusifolium</i> var. <i>obtusifolium</i>	X	
Asterales	Asteraceae	<i>Gnaphalium</i> sp.	X	X
Caryophyllales	Amaranthaceae	<i>Gomphrena serrata</i>	X	
Gentianales	Apocynaceae	<i>Gonolobus suberosa</i>	X	X
Ericales	Styracaceae	<i>Halesia carolina</i>	X	
Saxifragales	Hamamelidaceae	<i>Hamamelis virginiana</i>	X	
Apiales	Araliaceae	<i>Hedera helix</i>	X	X
Asterales	Asteraceae	<i>Helenium amarum</i>	X	
Asterales	Asteraceae	<i>Helianthus angustifolius</i>	X	
Asterales	Asteraceae	<i>Helianthus annuus</i>	X	
Boraginales	Boraginaceae	<i>Heliotropium indicum</i>	X	
Asterales	Asteraceae	<i>Heterotheca subaxillaris</i>	X	
Piperales	Aristolochiaceae	<i>Hexastylis arifolia</i>	X	
Malvales	Malvaceae	<i>Hibiscus laevis</i>	X	X
Malvales	Malvaceae	<i>Hibiscus</i> sp.	X	X
Gentianales	Rubiaceae	<i>Houstonia caerulea</i>	X	
Cornales	Hydrangeaceae	<i>Hydrangea quercifolia</i>	X	
Apiales	Araliaceae	<i>Hydrocotyle verticillata</i>	X	
Solanales	Hydroleaceae	<i>Hydrolea quadrivalvis</i>	X	
Malpighiales	Hypericaceae	<i>Hypericum gentianoides</i>	X	
Malpighiales	Hypericaceae	<i>Hypericum hypericoides</i>	X	
Malpighiales	Hypericaceae	<i>Hypericum mutilum</i>	X	
Asterales	Asteraceae	<i>Hypochaeris radicata</i>	X	
Aquifoliales	Aquifoliaceae	<i>Ilex cornuta</i>	X	
Aquifoliales	Aquifoliaceae	<i>Ilex decidua</i>	X	X
Aquifoliales	Aquifoliaceae	<i>Ilex opaca</i>	X	X
Aquifoliales	Aquifoliaceae	<i>Ilex verticillata</i>		X

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Aquifoliales	Aquifoliaceae	<i>Ilex vomitoria</i>	X	X
Ericales	Balsaminaceae	<i>Impatiens capensis</i>	X	X
Solanales	Convolvulaceae	<i>Ipomoea coccinea</i>	X	
Solanales	Convolvulaceae	<i>Ipomoea lacunosa</i>	X	
Solanales	Convolvulaceae	<i>Ipomoea nil</i>	X	
Solanales	Convolvulaceae	<i>Ipomoea pandurata</i>	X	
Solanales	Convolvulaceae	<i>Ipomoea sp.</i>	X	X
Asparagales	Iridaceae	<i>Iris cristata</i>	X	
Asparagales	Iridaceae	<i>Iris virginica</i>	X	
Saxifragales	Iteaceae	<i>Itea virginica</i>	X	X
Solanales	Convolvulaceae	<i>Jacquemontia tamnifolia</i>	X	
Fagales	Juglandaceae	<i>Juglans nigra</i>	X	
Poales	Juncaceae	<i>Juncus coriaceus</i>	X	
Poales	Juncaceae	<i>Juncus effusus</i>	X	X
Poales	Juncaceae	<i>Juncus sp.</i>	X	X
Cupressales	Cupressaceae	<i>Juniperus virginiana</i>	X	
Sapindales	Sapindaceae	<i>Koeleruteria paniculata</i>	X	
Asterales	Asteraceae	<i>Krigia caespitosa</i>	X	X
Asterales	Asteraceae	<i>Kuhnia eupatorioides</i>	X	
Lamiales	Lamiaceae	<i>Lamium amplexicaule</i>	X	
Lamiales	Lamiaceae	<i>Lamium purpureum</i>	X	
Poales	Poaceae	<i>Leersia oryzoides</i>	X	X
Poales	Poaceae	<i>Leersia virginica</i>	X	
Alismatales	Araceae	<i>Lemna perpusilla</i>	X	
Brassicales	Brassicaceae	<i>Lepidium virginicum</i>		X
Poales	Poaceae	<i>Leptoloma cognatum</i>	X	
Lamiales	Oleaceae	<i>Ligustrum japonicum</i>	X	X
Lamiales	Oleaceae	<i>Ligustrum sinense</i>	X	X
Laurales	Lauraceae	<i>Lindera benzoin</i>	X	
Lamiales	Linderniaceae	<i>Lindernia dubia</i>	X	
Saxifragales	Altingiaceae	<i>Liquidambar styraciflua</i>	X	X
Magnoliales	Magnoliaceae	<i>Liriodendron tulipifera</i>	X	
Asparagales	Asparagaceae	<i>Liriope muscari</i>	X	X
Asterales	Campanulaceae	<i>Lobelia cardinalis</i>	X	
Poales	Poaceae	<i>Lolium perenne</i>	X	
Poales	Poaceae	<i>Lolium pratense</i>	X	
Dipsacales	Caprifoliaceae	<i>Lonicera fragrantissima</i>	X	
Dipsacales	Caprifoliaceae	<i>Lonicera japonica</i>	X	X
Myrtales	Onagraceae	<i>Ludwigia decurrens</i>	X	
Myrtales	Onagraceae	<i>Ludwigia glandulosa</i>	X	
Myrtales	Onagraceae	<i>Ludwigia leptocarpa</i>	X	

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Myrtales	Onagraceae	<i>Ludwigia repens</i>	X	
Myrtales	Onagraceae	<i>Ludwigia</i> sp.	X	X
Brassicales	Brassicaceae	<i>Lunaria annua</i>	X	
Poales	Juncaceae	<i>Luzula echinata</i>	X	
Lamiales	Lamiaceae	<i>Lycopus americana</i>		X
Lamiales	Lamiaceae	<i>Lycopus</i> sp.	X	X
Schizaeales	Lygodiaceae	<i>Lygodium japonicum</i>	X	
Ericales	Ericaceae	<i>Lyonia lucida</i>	X	
Rosales	Moraceae	<i>Maclura pomifera</i>	X	
Magnoliales	Magnoliaceae	<i>Magnolia grandiflora</i>	X	X
Magnoliales	Magnoliaceae	<i>Magnolia virginiana</i>	X	
Rosales	Rosaceae	<i>Malus angustifolia</i>	X	
Gentianales	Apocynaceae	<i>Matelea carolinensis</i>	X	X
Lamiales	Phrymaceae	<i>Mazus pumilus</i>	X	
Sapindales	Meliaceae	<i>Melia azedarach</i>	X	X
Poales	Poaceae	<i>Melica mutica</i>	X	X
Cucurbitales	Cucurbitaceae	<i>Melothria pendula</i>	X	
Ranunculales	Menispermaceae	<i>Menispermum canadense</i>	X	X
Poales	Poaceae	<i>Microstegium vimineum</i>	X	X
Asterales	Asteraceae	<i>Mikania scandens</i>	X	X
Lamiales	Phrymaceae	<i>Mimulus alatus</i>	X	
Gentianales	Rubiaceae	<i>Mitchella repens</i>	X	X
Malvales	Malvaceae	<i>Modiola caroliniana</i>	X	
Lamiales	Lamiaceae	<i>Monarda punctata</i>	X	
Fagales	Myricaceae	<i>Morella cerifera</i>	X	
Rosales	Moraceae	<i>Morus alba</i>	X	
Rosales	Moraceae	<i>Morus rubra</i>	X	X
Commelinales	Commelinaceae	<i>Murdannia keisak</i>	X	
Boraginales	Boraginaceae	<i>Myosotis macrosperma</i>	X	
Saxifragales	Haloragaceae	<i>Myriophyllum aquaticum</i>	X	
Alismatales	Hydrocharitaceae	<i>Najas filifolia</i>	X	
Ranunculales	Berberidaceae	<i>Nandina domestica</i>	X	X
Boraginales	Boraginaceae	<i>Nemophila aphylla</i>	X	
Asparagales	Amaryllidaceae	<i>Nothoscordum bivalve</i>	X	
Lamiales	Plantaginaceae	<i>Nuttallanthus canadensis</i>	X	
Cornales	Nyssaceae	<i>Nyssa biflora</i>	X	
Cornales	Nyssaceae	<i>Nyssa sylvatica</i>	X	
Myrtales	Onagraceae	<i>Oenothera fruticosa</i>	X	
Myrtales	Onagraceae	<i>Oenothera speciosa</i>	X	
Polypodiales	Onocleaceae	<i>Onoclea sensibilis</i>	X	X
Poales	Poaceae	<i>Oplismenus hirtellus</i>	X	X

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Caryophyllales	Cactaceae	<i>Opuntia ficus-indica</i>	X	
Osmundales	Osmundaceae	<i>Osmunda cinnamomea</i>	X	
Osmundales	Osmundaceae	<i>Osmunda regalis</i> var. <i>spectabilis</i>	X	
Fagales	Betulaceae	<i>Ostrya virginiana</i>	X	X
Oxalidales	Oxalidaceae	<i>Oxalis stricta</i>	X	X
Oxalidales	Oxalidaceae	<i>Oxalis violacea</i>	X	
Apiales	Apiaceae	<i>Oxypolis filiformis</i>		X
Asterales	Asteraceae	<i>Packera anonyma</i>	X	
Asterales	Asteraceae	<i>Packera glabella</i>	X	X
Poales	Poaceae	<i>Panicum anceps</i>	X	
Poales	Poaceae	<i>Panicum</i> sp.	X	X
Poales	Poaceae	<i>Panicum verrucosum</i>		X
Poales	Poaceae	<i>Panicum virgatum</i>	X	
Vitales	Vitaceae	<i>Parthenocissus quinquefolia</i>	X	X
Poales	Poaceae	<i>Paspalum dilatatum</i>	X	
Poales	Poaceae	<i>Paspalum notatum</i>		X
Poales	Poaceae	<i>Paspalum</i> sp.	X	
Poales	Poaceae	<i>Paspalum urvillei</i>	X	
Malpighiales	Passifloraceae	<i>Passiflora incarnata</i>	X	
Malpighiales	Passifloraceae	<i>Passiflora lutea</i>	X	X
Poales	Poaceae	<i>Pennisetum glaucum</i>	X	
Lamiales	Plantaginaceae	<i>Penstemon australis</i>	X	
Lamiales	Lamiaceae	<i>Perilla frutescens</i>	X	
Laurales	Lauraceae	<i>Persea palustris</i>	X	
Boraginales	Boraginaceae	<i>Phacelia maculata</i>	X	
Poales	Poaceae	<i>Phanopyrum gymnocarpon</i>	X	
Santalales	Santalaceae	<i>Phoradendron leucarpum</i>	X	
Poales	Poaceae	<i>Phyllostachys aurea</i>	X	
Caryophyllales	Phytolaccaceae	<i>Phytolacca americana</i>	X	X
Rosales	Urticaceae	<i>Pilea pumila</i>	X	
Pinales	Pinaceae	<i>Pinus echinata</i>	X	
Pinales	Pinaceae	<i>Pinus glabra</i>	X	
Pinales	Pinaceae	<i>Pinus palustris</i>	X	
Pinales	Pinaceae	<i>Pinus taeda</i>	X	X
Poales	Poaceae	<i>Piptochaetium avenaceum</i>	X	
Asterales	Asteraceae	<i>Pityopsis graminifolia</i> var. <i>graminifolia</i>	X	
Rosales	Ulmaceae	<i>Planera aquatica</i>	X	
Proteales	Platanaceae	<i>Platanus occidentalis</i>	X	X
Asterales	Asteraceae	<i>Pluchea camphorata</i>	X	X
Poales	Poaceae	<i>Poa annua</i>	X	
Poales	Poaceae	<i>Poa chapmaniana</i>	X	

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Ranunculales	Berberidaceae	<i>Podophyllum peltatum</i>	X	
Asparagales	Asparagaceae	<i>Polygonatum biflorum</i>	X	X
Caryophyllales	Polygonaceae	<i>Polygonum hirsutum</i>	X	
Caryophyllales	Polygonaceae	<i>Polygonum hydropiperoides</i>	X	
Caryophyllales	Polygonaceae	<i>Polygonum lapathifolium</i>	X	
Caryophyllales	Polygonaceae	<i>Polygonum punctatum</i>	X	
Caryophyllales	Polygonaceae	<i>Polygonum sagittatum</i>	X	X
Caryophyllales	Polygonaceae	<i>Polygonum</i> sp.	X	X
Caryophyllales	Polygonaceae	<i>Polygonum virginianum</i>	X	
Polypodiales	Polypodiaceae	<i>Polypodium polypodioides</i>	X	
Lamiales	Tetrachondraceae	<i>Polypremum procumbens</i>	X	
Polypodiales	Dryopteridaceae	<i>Polystichum acrostichoides</i>	X	
Malpighiales	Salicaceae	<i>Populus deltoides</i>	X	X
Rosales	Rosaceae	<i>Potentilla canadensis</i>	X	
Saxifragales	Haloragaceae	<i>Proserpinica pectinata</i>		X
Rosales	Rosaceae	<i>Prunus angustifolia</i>	X	
Rosales	Rosaceae	<i>Prunus caroliniana</i>	X	X
Rosales	Rosaceae	<i>Prunus serotina</i>	X	X
Sapindales	Rutaceae	<i>Ptelea trifoliata</i>	X	
Polypodiales	Dennstaedtiaceae	<i>Pteridium aquilinum</i>	X	X
Apiales	Apiaceae	<i>Ptilimnium capillaceum</i>	X	
Fabales	Fabaceae	<i>Pueraria lobata</i>	X	X
Fabales	Fabaceae	<i>Pueraria lobata</i> var. <i>montana</i>		X
Asterales	Asteraceae	<i>Pyrhopappus carolinianus</i>	X	
Fagales	Fagaceae	<i>Quercus alba</i>	X	
Fagales	Fagaceae	<i>Quercus falcata</i>	X	
Fagales	Fagaceae	<i>Quercus laurifolia</i>	X	X
Fagales	Fagaceae	<i>Quercus lyrata</i>	X	
Fagales	Fagaceae	<i>Quercus michauxii</i>	X	
Fagales	Fagaceae	<i>Quercus nigra</i>	X	X
Fagales	Fagaceae	<i>Quercus pagoda</i>	X	X
Fagales	Fagaceae	<i>Quercus phellos</i>	X	
Fagales	Fagaceae	<i>Quercus shumardii</i>	X	
Fagales	Fagaceae	<i>Quercus</i> sp.		X
Fagales	Fagaceae	<i>Quercus velutina</i>	X	X
Ranunculales	Ranunculaceae	<i>Ranunculus abortivus</i>	X	
Ericales	Ericaceae	<i>Rhododendron canescens</i>	X	
Sapindales	Anacardiaceae	<i>Rhus copallina</i>	X	
Gentianales	Rubiaceae	<i>Richardia brasiliensis</i>	X	
Rosales	Rosaceae	<i>Rosa carolina</i>	X	
Rosales	Rosaceae	<i>Rubus argutus</i>	X	X

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Rosales	Rosaceae	<i>Rubus canadensis</i>	X	
Rosales	Rosaceae	<i>Rubus cuneifolius</i>		X
Rosales	Rosaceae	<i>Rubus trivialis</i>		X
Asterales	Asteraceae	<i>Rudbeckia hirta</i>	X	
Lamiales	Acanthaceae	<i>Ruellia caroliniensis</i>	X	
Caryophyllales	Polygonaceae	<i>Rumex acetosella</i>	X	
Caryophyllales	Polygonaceae	<i>Rumex crispus</i>	X	X
Arecales	Arecaceae	<i>Sabal minor</i>	X	X
Poales	Poaceae	<i>Saccharum giganteum</i>	X	X
Alismatales	Alismataceae	<i>Sagittaria lancifolia</i>		X
Alismatales	Alismataceae	<i>Sagittaria latifolia</i>	X	X
Malpighiales	Salicaceae	<i>Salix nigra</i>	X	X
Lamiales	Lamiaceae	<i>Salvia lyrata</i>	X	X
Dipsacales	Adoxaceae	<i>Sambucus canadensis</i>	X	
Ranunculales	Papaveraceae	<i>Sanguinaria canadensis</i>	X	
Apiales	Apiaceae	<i>Sanicula marilandica</i>	X	
Malpighiales	Euphorbiaceae	<i>Sapium sebiferum</i>	X	X
Laurales	Lauraceae	<i>Sassafras albidum</i>	X	X
Piperales	Saururaceae	<i>Saururus cernuus</i>	X	X
Poales	Poaceae	<i>Schizachyrium scoparium</i>	X	
Poales	Cyperaceae	<i>Scirpus cyperinus</i>	X	
Cyperales	Cyperaceae	<i>Scleria triglomerata</i>		X
Lamiales	Plantaginaceae	<i>Scoparia dulcis</i>		X
Lamiales	Lamiaceae	<i>Scutellaria lateriflora</i>	X	
Fabales	Fabaceae	<i>Senna obtusifolia</i>	X	
Fabales	Fabaceae	<i>Sesbania punicea</i>		X
Gentianales	Rubiaceae	<i>Sherardia arvensis</i>	X	
Malvales	Malvaceae	<i>Sida rhombifolia</i>	X	
Ericales	Sapotaceae	<i>Sideroxylon lycioides</i>	X	X
Ericales	Sapotaceae	<i>Sideroxylon</i> sp.	X	X
Ericales	Sapotaceae	<i>Sideroxylon tenax</i>	X	
Asparagales	Iridaceae	<i>Sisyrinchium atlanticum</i>	X	
Asparagales	Asparagaceae	<i>Smilacina racemosa</i>	X	
Liliales	Smilacaceae	<i>Smilax bona-nox</i>	X	X
Liliales	Smilacaceae	<i>Smilax glauca</i>	X	
Liliales	Smilacaceae	<i>Smilax laurifolia</i>	X	X
Liliales	Smilacaceae	<i>Smilax rotundifolia</i>	X	X
Liliales	Smilacaceae	<i>Smilax</i> sp.	X	X
Liliales	Smilacaceae	<i>Smilax tamnoides</i>	X	
Liliales	Smilacaceae	<i>Smilax walteri</i>	X	
Solanales	Solanaceae	<i>Solanum carolinense</i>	X	

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Solanales	Solanaceae	<i>Solanum</i> sp.	X	X
Asterales	Asteraceae	<i>Solidago canadensis</i> var. <i>scabra</i>	X	
Asterales	Asteraceae	<i>Solidago odora</i>	X	
Asterales	Asteraceae	<i>Solidago</i> sp.	X	X
Poales	Poaceae	<i>Sorghum halepense</i>	X	
Rosales	Rosaceae	<i>Spiraea arguta</i>	X	
Alismatales	Araceae	<i>Spirodela polyrhiza</i>	X	
Poales	Poaceae	<i>Sporobolus indicus</i> var. <i>indicus</i>	X	
Poales	Poaceae	<i>Sporobolus</i> sp.	X	X
Lamiales	Lamiaceae	<i>Stachys floridana</i>	X	
Caryophyllales	Caryophyllaceae	<i>Stellaria media</i>	X	X
Fabales	Fabaceae	<i>Strophostyles helvula</i>	X	
Asterales	Asteraceae	<i>Symphyotrichum pilosum</i>	X	
Asterales	Asteraceae	<i>Symphyotrichum puniceum</i> var. <i>puniceum</i>	X	
Asterales	Asteraceae	<i>Taraxacum officinale</i>	X	
Fabales	Fabaceae	<i>Tephrosia virginiana</i>	X	
Lamiales	Lamiaceae	<i>Teucrium canadense</i>		X
Poales	Bromeliaceae	<i>Tillandsia usneoides</i>	X	
Asparagales	Orchidaceae	<i>Tipularia discolor</i>	X	
Sapindales	Anacardiaceae	<i>Toxicodendron radicans</i>		X
Sapindales	Anacardiaceae	<i>Toxicodendron radicans</i> ssp. <i>radicans</i>	X	
Gentianales	Apocynaceae	<i>Trachelospermum difforme</i>	X	X
Commelinales	Commelinaceae	<i>Tradescantia virginiana</i>	X	
Malpighiales	Hypericaceae	<i>Triadenum walteri</i>	X	
Lamiales	Lamiaceae	<i>Trichostema dichotomum</i>	X	
Poales	Poaceae	<i>Tridens flavus</i>	X	
Fabales	Fabaceae	<i>Trifolium dubium</i>	X	
Fabales	Fabaceae	<i>Trifolium</i> sp.	X	X
Liliales	Melanthiaceae	<i>Trillium decipiens</i>	X	
Asterales	Campanulaceae	<i>Triodanis perfoliata</i>	X	
Rosales	Ulmaceae	<i>Ulmus alata</i>	X	X
Rosales	Ulmaceae	<i>Ulmus americana</i>	X	X
Rosales	Ulmaceae	<i>Ulmus rubra</i>	X	X
Apiales	Apiaceae	unknown	X	X
Asterales	Asteraceae	unknown	X	X
Asterales	Asteraceae	unknown	X	X
Caryophyllales	Caryophyllaceae	unknown	X	X
Commelinales	Commelinaceae	unknown	X	X
Fabales	Fabaceae	unknown	X	X
Gentianales	Loganiaceae	unknown		X
Lamiales	Lamiaceae	unknown	X	X

Order	Family	Scientific Name	NPSpecies	This Study
Poales	Poaceae	unknown	X	X
Lamiales	Lentibulariaceae	<i>Utricularia inflata</i>	X	
Ericales	Ericaceae	<i>Vaccinium arboreum</i>	X	X
Ericales	Ericaceae	<i>Vaccinium corymbosum</i>	X	
Ericales	Ericaceae	<i>Vaccinium stamineum</i>	X	
Lamiales	Scrophulariaceae	<i>Verbascum thapsus</i>	X	
Lamiales	Verbenaceae	<i>Verbena bonariensis</i>	X	
Lamiales	Verbenaceae	<i>Verbena brasiliensis</i>	X	
Lamiales	Verbenaceae	<i>Verbena rigida</i>	X	X
Asterales	Asteraceae	<i>Verbesina occidentalis</i>	X	X
Asterales	Asteraceae	<i>Verbesina</i> sp.	X	X
Asterales	Asteraceae	<i>Vernonia acaulis</i>	X	
Asterales	Asteraceae	<i>Vernonia noveboracensis</i>	X	
Lamiales	Plantaginaceae	<i>Veronica arvensis</i>	X	
Dipsacales	Adoxaceae	<i>Viburnum nudum</i>	X	
Dipsacales	Adoxaceae	<i>Viburnum</i> sp.	X	X
Fabales	Fabaceae	<i>Vicia angustifolia</i>		X
Fabales	Fabaceae	<i>Vicia sativa</i> ssp. <i>nigra</i>	X	
Malpighiales	Violaceae	<i>Viola affinis</i>	X	
Malpighiales	Violaceae	<i>Viola bicolor</i>	X	
Malpighiales	Violaceae	<i>Viola sororia</i>	X	
Malpighiales	Violaceae	<i>Viola</i> sp.	X	X
Malpighiales	Violaceae	<i>Viola</i> X <i>primulifolia</i>	X	
Vitales	Vitaceae	<i>Vitis cinerea</i> var. <i>floridana</i>	X	X
Vitales	Vitaceae	<i>Vitis rotundifolia</i>	X	
Vitales	Vitaceae	<i>Vitis</i> sp.	X	
Asterales	Campanulaceae	<i>Wahlenbergia marginata</i>	X	X
Fabales	Fabaceae	<i>Wisteria sinensis</i>	X	X
Polypodiales	Blechnaceae	<i>Woodwardia areolata</i>	X	X
Asterales	Asteraceae	<i>Xanthium strumarium</i>	X	
Asterales	Asteraceae	<i>Youngia japonica</i>	X	
Asparagales	Asparagaceae	<i>Yucca filamentosa</i>	X	
Asparagales	Asparagaceae	<i>Yucca gloriosa</i>	X	X
Asparagales	Amaryllidaceae	<i>Zephyranthes atamasca</i>	X	
		<i>Magnoliopsida</i> (Division)	X	X
		<i>Liliopsida</i> (Division)	X	X
		<i>Plantae</i> (Kingdom)	X	X

Appendix B. Plant species detected in sampling locations.

Table B-1. Vascular plant species detected at each sampling location across all strata at Ocmulgee National Monument, Georgia, 2011.

Species	Sampling Location																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Acer barbatum</i>						X		X														
<i>Acer negundo</i>					X			X	X			X	X		X					X	X	
<i>Acer rubrum</i>		X					X	X		X					X	X	X			X	X	
<i>Aesculus pavia</i>								X														
<i>Ailanthus altissima</i>						X		X	X			X										
<i>Albizia julibrissin</i>			X					X				X										
<i>Allium</i> sp.										X												
<i>Alternanthera philoxeroides</i>		X			X												X					
<i>Amaranthus</i> sp.					X		X															
<i>Ambrosia artemisiifolia</i>			X							X					X						X	
<i>Ampelopsis arborea</i>	X	X						X			X						X	X			X	
<i>Amphicarpaea bracteata</i>							X															
<i>Andropogon</i> sp.					X																	
<i>Andropogon virginicus</i>																		X				
Apiaceae									X						X		X					
<i>Apocynum cannabinum</i>		X									X						X					
<i>Aralia spinosa</i>	X																					
<i>Arisaema dracontium</i>					X																	
<i>Arundinaria gigantea</i>		X			X	X	X	X														
<i>Hexastylis arifolia</i>						X																
<i>Asimina triloba</i>	X																					
<i>Asplenium platyneuron</i>	X		X			X						X	X			X			X		X	
<i>Asplenium</i> sp.																		X				
Asteraceae					X				X				X		X						X	
<i>Baccharis halimifolia</i>					X																	
<i>Berchemia scandens</i>		X			X																X	
<i>Betula nigra</i>								X	X													
<i>Betula</i> sp.		X																				
<i>Bidens alba</i>																					X	
<i>Bidens</i> sp.								X														
<i>Bignonia capreolata</i>			X		X	X	X	X														
<i>Boehmeria cylindrica</i>		X			X		X						X		X		X			X	X	
<i>Briza minor</i>																		X				
<i>Cabomba caroliniana</i>																X						
<i>Callicarpa americana</i>	X					X				X		X		X				X				
<i>Campsis radicans</i>	X		X		X	X	X	X	X				X					X				
<i>Carex</i> sp.		X			X		X			X	X						X				X	
<i>Carya alba</i>	X	X				X																
<i>Carya glabra</i>																X		X				
<i>Carya illinoensis</i>																			X			
<i>Carya ovata</i>		X				X		X					X									
<i>Carya</i> sp.		X				X																
Caryophyllaceae			X																			
<i>Catalpa bignonioides</i>																					X	
<i>Celtis laevigata</i>			X					X	X	X		X	X	X		X		X	X			
<i>Cephalanthus occidentalis</i>		X			X										X							
<i>Chasmanthium latifolium</i>								X	X						X						X	
<i>Chasmanthium laxum</i>													X									

Species	Sampling Location																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Chasmanthium</i> sp.	X																					
<i>Cladium mariscus</i> ssp. <i>jamaicense</i>		X																				
<i>Clematis virginiana</i>									X													
<i>Cocculus carolinus</i>								X					X									
<i>Commelina communis</i>														X								
<i>Commelina virginica</i>					X			X									X				X	
<i>Commelinaceae</i>		X																				
<i>Conyza canadensis</i>									X													
<i>Cornus foemina</i>															X		X					
<i>Crataegus marshallii</i>					X																	
<i>Crataegus</i> sp.			X			X								X				X				
<i>Cyperaceae</i>	X			X												X			X			
<i>Cyperus</i> sp.		X																				
<i>Decodon verticillatus</i>																	X					
<i>Dioscorea</i> sp.									X													
<i>Diospyros virginiana</i>	X		X			X					X			X		X			X			
<i>Elaeagnus pungens</i>										X												
<i>Elephantopus carolinus</i>																		X				
<i>Erechtites hieraciifolia</i>									X													
<i>Erigeron quercifolius</i>				X																		
<i>Eupatorium capillifolium</i>																		X				
<i>Eupatorium</i> sp.									X												X	
<i>Euthamia graminifolia</i>					X																	
<i>Euthamia</i> sp.																	X					
<i>Fabaceae</i>							X			X					X		X	X				
<i>Ficus pumila</i>														X								
<i>Filicopsida</i>														X								
<i>Fraxinus caroliniana</i>		X					X	X	X											X	X	
<i>Fraxinus pennsylvanica</i>								X						X		X						
<i>Galium aparine</i>											X				X		X	X				
<i>Galium</i> sp.			X																			
<i>Gelsemium sempervirens</i>	X																	X				
<i>Geranium carolinianum</i>									X													
<i>Geranium maculatum</i>													X	X								
<i>Gnaphalium</i> sp.	X			X	X													X				
<i>Gonolobus suberosa</i>		X							X				X	X								
<i>Hedera helix</i>			X					X					X									
<i>Hibiscus laevis</i>					X																	
<i>Hibiscus</i> sp.					X																	
<i>Ilex decidua</i>	X	X			X	X				X			X	X	X			X		X	X	
<i>Ilex opaca</i>	X		X							X				X								
<i>Ilex verticillata</i>																	X					
<i>Ilex vomitoria</i>	X									X				X		X					X	
<i>Impatiens capensis</i>															X					X	X	
<i>Ipomoea</i> sp.									X						X					X	X	
<i>Itea virginica</i>																	X					
<i>Juncus effusus</i>										X	X						X					
<i>Juncus</i> sp.											X						X					
<i>Krigia caespitosa</i>				X																		
<i>Lamiaceae</i>										X												
<i>Leersia oryzoides</i>							X				X				X		X			X	X	
<i>Lepidium virginicum</i>					X																	
<i>Ligustrum japonicum</i>									X	X			X					X				

Species	Sampling Location																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Ligustrum sinense</i>	X	X	X		X	X		X	X	X		X	X		X	X	X	X	X	X	X	
<i>Liliopsida</i>															X		X			X	X	
<i>Liquidambar styraciflua</i>	X	X	X	X	X	X		X		X	X	X	X	X	X	X		X	X	X	X	
<i>Liriope muscari</i>										X		X										
<i>Loganiaceae</i>					X																	
<i>Lonicera japonica</i>	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X	X		X	
<i>Ludwigia</i> sp.					X																X	
<i>Lycopus americanus</i>							X										X					
<i>Lycopus</i> sp.							X										X					
<i>Magnolia grandiflora</i>	X									X						X		X	X	X	X	
<i>Magnoliopsida</i>	X			X				X		X			X		X		X	X			X	
<i>Matelea carolinensis</i>									X													
<i>Melia azedarach</i>									X													
<i>Melica mutica</i>										X												
<i>Menispermum canadense</i>						X			X				X									
<i>Microstegium vimineum</i>															X					X	X	
<i>Mikania scandens</i>		X			X						X						X			X	X	
<i>Mitchella repens</i>	X																					
<i>Morus rubra</i>						X		X		X			X									
<i>Nandina domestica</i>	X									X												
<i>Onoclea sensibilis</i>													X				X					
<i>Oplismenus hirtellus</i>	X								X										X			
<i>Ostrya virginiana</i>						X				X												
<i>Oxalis stricta</i>				X								X						X				
<i>Oxypolis filiformis</i>																	X					
<i>Packera glabella</i>															X							
<i>Panicum</i> sp.			X		X	X			X	X		X			X		X	X			X	
<i>Panicum verrucosum</i>		X																				
<i>Parthenocissus quinquefolia</i>	X		X					X	X	X		X	X	X		X		X	X		X	
<i>Paspalum notatum</i>				X																		
<i>Passiflora lutea</i>		X			X	X		X														
<i>Phytolacca americana</i>	X		X									X	X									
<i>Pinus taeda</i>	X					X						X		X		X		X	X		X	
<i>Plantae</i>		X			X		X					X	X		X		X	X		X		
<i>Platanus occidentalis</i>								X	X				X								X	
<i>Pluchea camphorata</i>		X			X																X	
<i>Poaceae</i>		X	X	X	X	X							X		X		X	X				
<i>Polygonatum biflorum</i>							X															
<i>Polygonum sagittatum</i>							X				X				X					X	X	
<i>Polygonum</i> sp.		X			X		X				X		X		X		X			X	X	
<i>Populus deltoides</i>									X													
<i>Proserpinaca pectinata</i>																	X					
<i>Prunus caroliniana</i>	X		X			X		X	X	X		X	X			X		X	X		X	
<i>Prunus serotina</i>	X									X				X				X		X	X	
<i>Pteridium aquilinum</i>	X																					
<i>Pueraria montana</i> var. <i>lobata</i>							X					X										
<i>Quercus laurifolia</i>	X									X		X		X		X		X	X			
<i>Quercus nigra</i>	X	X	X		X	X				X	X	X	X	X		X		X	X	X	X	
<i>Quercus pagoda</i>		X	X			X								X				X	X			
<i>Quercus</i> sp.	X																		X			
<i>Quercus velutina</i>	X				X	X						X										
<i>Rubus argutus</i>	X	X	X		X			X	X		X	X						X				
<i>Rubus cuneifolius</i>		X															X					

Species	Sampling Location																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	
<i>Rubus trivialis</i>				X				X	X	X		X				X		X	X			
<i>Rumex crispus</i>																					X	
<i>Sabal minor</i>															X							
<i>Saccharum giganteum</i>																	X					
<i>Sagittaria lancifolia</i>							X				X						X					
<i>Sagittaria latifolia</i>		X			X												X			X		
<i>Salix nigra</i>							X		X													
<i>Sambucus canadensis</i>								X					X				X					
<i>Sapium sebiferum</i>	X	X			X		X	X							X		X			X	X	
<i>Sassafras albidum</i>	X	X															X					
<i>Saururus cernuus</i>					X		X								X		X			X	X	
<i>Scleria triglomerata</i>						X																
<i>Scoparia dulcis</i>				X																		
<i>Sesbania punicea</i>											X										X	
<i>Sideroxylon lycioides</i>						X																
<i>Sideroxylon</i> sp.														X								
<i>Smilax bona-nox</i>					X				X	X												
<i>Smilax laurifolia</i>	X								X													
<i>Smilax rotundifolia</i>		X				X															X	
<i>Smilax</i> sp.	X	X	X		X	X		X	X	X		X	X	X		X		X	X		X	
<i>Solanum</i> sp.									X				X								X	
<i>Solidago</i> sp.		X	X		X				X		X	X			X						X	
<i>Sporobolus</i> sp.					X																	
<i>Stellaria media</i>	X		X									X	X									
<i>Teucrium canadense</i>									X													
<i>Toxicodendron radicans</i>	X	X	X		X	X	X	X		X	X	X	X	X	X			X	X		X	
<i>Trachelospermum difforme</i>		X																				
<i>Trifolium</i> sp.													X									
<i>Ulmus alata</i>	X	X	X		X	X		X		X		X		X		X		X	X	X	X	
<i>Ulmus americana</i>													X									
<i>Ulmus rubra</i>								X	X	X		X			X	X			X			
<i>Vaccinium arboreum</i>						X																
<i>Verbena rigida</i>																		X				
<i>Verbesina occidentalis</i>									X													
<i>Verbesina</i> sp.									X	X												
<i>Viburnum</i> sp.								X														
<i>Vicia angustifolia</i>													X									
<i>Viola</i> sp.			X		X			X					X		X							
<i>Vitis cinerea</i> var. <i>floridana</i>		X							X												X	
<i>Vitis rotundifolia</i>	X	X	X			X		X	X	X		X	X	X		X		X	X		X	
<i>Wahlenbergia marginata</i>																		X				
<i>Wisteria sinensis</i>																			X			
<i>Woodwardia areolata</i>																	X					
<i>Yucca gloriosa</i>										X		X										

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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