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Natural Resource Stewardship and Science

Vegetation Mapping at Ocmulgee Mounds National Historical Park

Photointerpretation Key and Final Vegetation Map

Natural Resource Report NPS/SECN/NRR—2019/2018



ON THE COVER

Great Temple (right) and Lesser Temple Mounds (left) at Ocmulgee Mounds National Historical Park.
Photograph by: Nancy K. O'Hare, May 2014

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This report received formal peer review by subject-matter experts who were not directly involved in the development or pilot implementation of the project. Peer review was conducted by highly qualified individuals with subject area technical expertise and was overseen by a peer review manager.

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Contents

Page

Figures v

Tables vii

Appendices ix

Executive Summary xi

Acknowledgments xiii

Introduction 1

Ocmulgee Mounds National Historical Park Vegetation Mapping Project 1

Vegetation Mapping Inventory Program 1

NPS Southeast Coast Inventory and Monitoring Network 1

Location of Ocmulgee Mounds National Historical Park 2

Vegetation Classification System 7

Vegetation Mapping Workflow 11

Base Data and GIS Geodatabase Construction 13

Initial Photointerpretation Key and Vegetation Delineation 17

Field Surveys and Ground Truth 19

Photointerpretation and GIS Methods 23

Final Vegetation Mapping and Summary Statistics 25

Accuracy Assessment 31

Point Selection 31

Point Acquisition 33

Accuracy of Vegetation Map 35

Quality Assurance of AA Plots 35

Potential Improvements 38

Conclusions 39

Literature Cited 41

Figures

Page

Figure 1. Location of Ocmulgee Mounds National Historical Park and its position relative to the State of Georgia, Bibb County, and the City of Macon. 3

Figure 2. Topography of Ocmulgee Mounds National Historical Park and its landscape context near Macon, Georgia along the Ocmulgee River 4

Figure 3. Foundation Geodatabase created for Ocmulgee Mounds National Historical Park. 14

Figure 4. NatureServe vegetation plots and aerial photo center points for Ocmulgee Mounds National Historical Park. 16

Figure 5. Field data collection locations from Ocmulgee Mounds National Historical Park overlaid on CIR imagery and visual imagery. 22

Figure 6. Vegetation map of the main section of Ocmulgee Mounds National Historical Park. 26

Figure 7. Vegetation map of the Lamar section of Ocmulgee Mounds National Historical Park. 27

Figure 8. Park vegetation classes organized by relative size. 28

Figure 9. Buffer classes organized by relative size found in Ocmulgee Mounds National Historical Park. 28

Figure 10. Accuracy Assessment data collection locations from Ocmulgee Mounds National Historical Park overlaid on visual imagery. 34

Figure C-1. Example of Cultivated Meadow Light. 50

Figure C-2. Map showing Cultivated Meadow Light (4048). 50

Figure C-3. Example of Loblolly Pine. 52

Figure C-4. Map showing Loblolly Pine (4232). 52

Figure C-5. Example of Smartweed—Cutgrass Beaver Pond. 54

Figure C-6. Map showing Smartweed—Cutgrass Beaver Pond (4290). 55

Figure C-7. Example of Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest. 57

Figure C-8. Map showing Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest (4606). 57

Figures (continued)

Page

Figure C-9. Example of Disturbed Herbaceous Vegetation. 59

Figure C-10. Map showing Disturbed Herbaceous Vegetation (4692). 60

Figure C-11. Example of Blackberry—Greenbriar Successional Shrubland Thicket. 61

Figure C-12. Map showing Blackberry—Greenbriar Successional Shrubland Thicket (4732). 61

Figure C-13. Example of Atlantic Coastal Plain Sugarberry—Green Ash Levee Forest. 63

Figure C-14. Map showing Atlantic Coastal Plain Sugarberry—Green Ash Levee Forest (4740). 63

Figure C-15. Example of Sweetgum—Tuliptree Brownwater Floodplain Forest. 65

Figure C-16. Map showing Sweetgum—Tuliptree Brownwater Floodplain Forest (7329). 66

Figure C-17. Example of Chinese Tallow Seasonally Flooded Forest. 68

Figure C-18. Map showing Chinese Tallow Seasonally Flooded Forest (7412). 68

Figure C-19. Example of Sweetgum—(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest. 70

Figure C-20. Map showing Sweetgum—(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest (7726). 70

Figure C-21. Example of American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest. 72

Figure C-22. Map showing American Sycamore—Sugarberry—Green Ash/Northern Spicebush— Possumhaw/Reflexed Sedge Forest (7730). 73

Figure C-23. Example of Atlantic Coastal Plain Black Willow—Green Ash Levee Forest. 75

Figure C–24. Map showing Atlantic Coastal Plain Black Willow—Green Ash Levee Forest (7734). 75

Figure C-25. Example of Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest. 77

Figure C-26. Map showing Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest (8585). 77

Tables

Page

Table 1. Land cover classes found within the park area of Ocmulgee Mounds National Historical Park during the initial NatureServe assessment based on the National Vegetation Classification System. 8

Table 2. Land cover/land use classes found within the buffer of Ocmulgee Mounds National Historical Park. 9

Table 3. Modifiers used throughout the park area and buffer of Ocmulgee Mounds National Historical Park. 10

Table 4. Data sets, descriptions, source, date, and scale imported into the Geodatabase. 13

Table 5. Community element global code (CEGL) classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Ocmulgee Mounds National Historical Park. 17

Table 6. Land cover classes found within the park area of Ocmulgee Mounds National Historical Park based on the National Vegetation Classification System. 20

Table 7. Field visits and number of data points collected for Ocmulgee Mounds National Historical Park. 21

Table 8. Land use/land cover class, frequency of occurrence, mean area, total area, and percentage of total area within the buffer area of Ocmulgee Mounds National Historical Park. 31

Table 9: Modifiers used throughout the park and buffer areas, including frequency of occurrence, mean area, and total area. 32

Table 10. Breakdown of how the AA plots are related to the vegetation polygons and 2011 imagery. 35

Table 11a. Confusion matrix for the accuracy assessment. 37

Table 11b. Accuracy and error for the confusion matrix. Overall accuracy is 80. Kappa is 77 38

Table A-1. Ocmulgee Mounds NHP flight line and photo numbers and photo center coordinates (UTM Zone 17, NAD83). 45

Table B-1. Field data acquired by L. Kruse and G. Burke in April and July 2008. 47

Table C-1. Attributes and Descriptions for Cultivated Meadow Light. 49

Table C-2. Attributes and Descriptions for Loblolly Pine. 51

Tables (continued)

Page

Table C-3. Attributes and Descriptions for Smartweed—Cutgrass Beaver Pond. 54

Table C-4. Attributes and Descriptions for Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest. 56

Table C-5. Attributes and Descriptions for Disturbed Herbaceous Vegetation. 58

Table C-6. Attributes and descriptions of Blackberry—Greenbriar Successional Shrubland Thicket. 60

Table C-7. Attributes and descriptions for Atlantic Coastal Plain Sugarberry—Green Ash Levee Forest. 62

Table C-8. Attributes and descriptions for Sweetgum—Tuliptree Brownwater Floodplain Forest. 65

Table C-9. Attributes and descriptions for Chinese Tallow Seasonally Flooded Forest. 67

Table C-10. Attributes and descriptions for Sweetgum-(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest. 69

Table C-11. Attributes and descriptions for American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest. 72

Table C-12. Attributes and descriptions for Atlantic Coastal Plain Black Willow—Green Ash Levee Forest. 74

Table C-13. Attributes and descriptions for Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest. 76

Table D-1. Data points acquired by J. Schmid, B. Cogdell, F. Barksdale, and B. Rosenblatt May, 2015. 81

Appendices

Page

Appendix A. Flight Line Information 45

Appendix B. NatureServe Vegetation Plot Locations and Notes 47

Appendix C. Photointerpretation Key 49

Appendix D. Accuracy Assessment 81

Executive Summary

The University of Georgia Department of Geography's Center for Geospatial Research (CGR), with the support of the National Park Service (NPS) Vegetation Mapping Inventory (VMI) Program, described and mapped vegetation at Ocmulgee Mounds National Historical Park (OCMU). Mapping was accomplished through collaboration with the NPS Southeast Coast Network (SECN), the North Carolina office of NatureServe (Durham, N.C.), and Atkins North America, Inc.

A final vegetation map for Ocmulgee Mounds NHP was created to represent the vegetation occurring within the park during 2011. This product represents the final of four steps necessary to produce an accurate vegetation map based upon aerial photographs. This includes the determination of the community element global (CEGL) codes (2008) and acquisition of aerial imagery (2011), using the aerial imagery, with 130 ground truthing points (2014), to create a draft vegetation map, performing an accuracy assessment (2015), and then using all the available information to create a final vegetation map (2017).

The total mapping area was 902.1 hectares (2,275.8 acres [ac]), encompassing the entire boundary of the park plus an additional 500-meter (1,640-foot [ft]) buffered area. The area now, including in Ocmulgee Mounds NHP, has been used by humans for over 17,000 years. This region was heavily deforested in the early 1900s but has recovered in recent decades. The current vegetation of Ocmulgee Mounds NHP shows evidence of previous anthropogenic influences, with many early successional forest species such as sweet gum (*Liquidambar styraciflua*) and box elder (*Acer negundo*) and the presence of invasive species, especially Chinese privet (*Ligustrum sinense*) and Chinese tallow (*Triadica sebifera*).

Because of the past land use history, using the National Vegetation Classification System (NVCS) to the association level was challenging. Determining CEGL codes was particularly difficult because the National Vegetation Classification System was designed for relatively undisturbed vegetation communities. Through the use of 16 NatureServe vegetation plots, color-infrared aerial photos, and data collected in the field, vegetation communities were delineated and assigned attributes. Using dominant vegetation classes and secondary vegetation classes, as well as modifiers to describe the diversity of species, detailed vegetation maps were created for Ocmulgee Mounds NHP. Polygons and attributes within the 500-meter (1,640-ft) buffer were created on a broader scale using a system based on the Anderson Level II classification scheme which includes anthropogenic and land use/land cover (LULC) classes. While within the park, the more detailed vegetation classes were used.

The most common class found in Ocmulgee Mounds NHP was Loblolly Pine (White Oak, Southern Red Oak, Post Oak) Southeastern Interior Forest (4232), covering approximately 18% of the park. The smallest class was Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest (8585) at less than 1%. The overall lack of a dominant class reflects the subtle topography and anthropogenic influences. A rigorous accuracy assessment was conducted on the 13 map classes within the boundary of OCMU representing floristic types within the NVCS. Results showed an 80% map accuracy and a kappa rating of 77% using 97 accuracy assessment points.

The products generated from this project include vegetation maps, a photointerpretation key, summary statistics of each vegetation class, and a detailed geodatabase with digital maps.

Acknowledgments

We would like to thank the OCMU staff for helping us with this project. They provided us with information regarding the historical context of the park, the presence of exotics, and current management practices. Lonnie Davis, Cultural Resources, shared his extensive knowledge of the history of Ocmulgee Mounds NHP. Jim Brannon always welcomed us to the park and shared his perspective from working there for more than 14 years. Alan Huckabee, a long-time volunteer at Ocmulgee NHP dedicated to exotic plant control, spent a morning in the field with us discussing exotic plant removal and other aspects of OCMU vegetation. Superintendent Jim David assured that park resources were available to us.

Introduction

Ocmulgee Mounds National Historical Park Vegetation Mapping Project

As part of the National Park Service (NPS) Vegetation Inventory Program (Schmoldt et al. 1994; Fancy et al. 2009), The University of Georgia Center for Geospatial Research (CGR) in the Department of Geography was asked to produce vegetation maps of eight park units in the NPS Southeast Coast Inventory and Monitoring Network (SECN) using mapping standards defined under the National Vegetation Classification System (NVCS; Jennings et al. 2009). Under Task Agreement # P13AC01319, CGR agreed to analyze existing leaf-on color infrared (CIR) aerial photography to develop photointerpretation keys, accuracy assessment study plans, final digital maps of vegetation, geodatabases and associated metadata in accordance with NPS vegetation mapping standards, and field verification surveys in accordance with standard mapping practices. The Ocmulgee Mounds National Historical Park (OCMU) Vegetation Mapping project was coordinated by the University of Georgia Center for Geospatial Research in the Department of Geography between 2014 and 2018, with assistance from the Southeast Coast Network, the North Carolina office of NatureServe (for the vegetation classification portion of the project), and Atkins North America, Inc. (for accuracy assessment).

While the National Vegetation Classification System intends to capture stable vegetation categories, either man-made or natural disturbances may change some areas during the seven years required to produce a vegetation map. For example, changes in non-tree dominated areas, which are typically wetlands in this region, may shift annually depending upon local weather, or cover by invasive exotics may change rapidly. More importantly, both of these natural and anthropogenic changes will likely continue in the future. Therefore, the vegetation map should be evaluated as a snapshot of the park in 2011.

Vegetation Mapping Inventory Program

The Vegetation Mapping Inventory (VMI) Program is an effort by the National Park Service to classify, describe, inventory, and map vegetation communities in more than 280 national park units across the United States. The primary objective of the Vegetation Mapping Inventory Program is to produce high-quality, standardized maps and associated data sets of vegetation and other land-cover occurring within parks. Since vegetation species and communities are unique from park to park, the inventory of these resources assists park managers on a wide array of management issues. For more information about the Vegetation Mapping Inventory Program, visit the program website (NPS 2015).

NPS Southeast Coast Inventory and Monitoring Network

National Park managers across the country need a broad-based understanding about the status and trends of park natural resources. The NPS Inventory & Monitoring Division (IMD) systematically gathers and analyzes information on the plants, animals, and ecosystems within parks. Parks use this information for planning, research, education, and to help guide decisions related to park management. Results are also shared with other agencies, researchers, and scientists. The IMD staff and networks share a set of common goals, established when the division was first launched.

- Inventory the natural resources under National Park Service stewardship to determine their nature and status.
- Monitor park ecosystems to better understand their dynamic nature and condition and to provide reference points for comparisons with other, altered environments.
- Establish natural resource inventory and monitoring as a standard practice throughout the National Park system that transcends traditional program, activity, and funding boundaries.
- Integrate natural resource inventory and monitoring information into National Park Service planning, management, and decision making.
- Share National Park Service accomplishments and information with other natural resource organizations and form partnerships for attaining common goals and objectives.

To accomplish these goals, more than 280 parks with significant natural resources were grouped into the 32 IMD networks, which were determined based on geography and shared natural resource characteristics. The network organization increases collaboration among parks, information sharing, and economies of scale in natural resource inventory and monitoring (NPS 2018a).

The Southeast Coast Network includes 17 parks with significant natural resources, in 15 administrative units. The network extends along the Atlantic Coast from the North Carolina-Virginia border southward to Cape Canaveral, Florida and inland to Atlanta, Georgia and the Alabama Coastal Plain. The network's purpose is to provide parks with data and information about their natural resources, and to help with information sharing in natural resource monitoring (NPS 2018b).

Location of Ocmulgee Mounds National Historical Park

Ocmulgee Mounds National Historical Park is located on the banks of the Ocmulgee River adjacent to Macon, Georgia (Figure 1). It encompasses approximately 285 hectares (702 ac) and was established in 1936 to protect cultural resources. The park has been a site of human habitation for over 17,000 years (Kelly 1938; Kelly et al. 1941). Artifacts from the early inhabitants, including Clovis points, tools, and pottery, have been found in the area. The site presently has one of the most extensive collections of archaeological artifacts in the United States (NPS 1991). The most visible features on the landscape are the ceremonial earthen mounds constructed by American Indians during the Mississippian Period between AD 900 and 1650. There are at least eight mounds, but perhaps as many as 12, within the boundaries of the park (Bigman 2012), including one mound with an unusual spiral ramp (NPS 1991). However, these mounds are not necessarily contemporaneous and likely represent different cultures (see https://www.nps.gov/ocmu/learn/historyculture/index.htm).

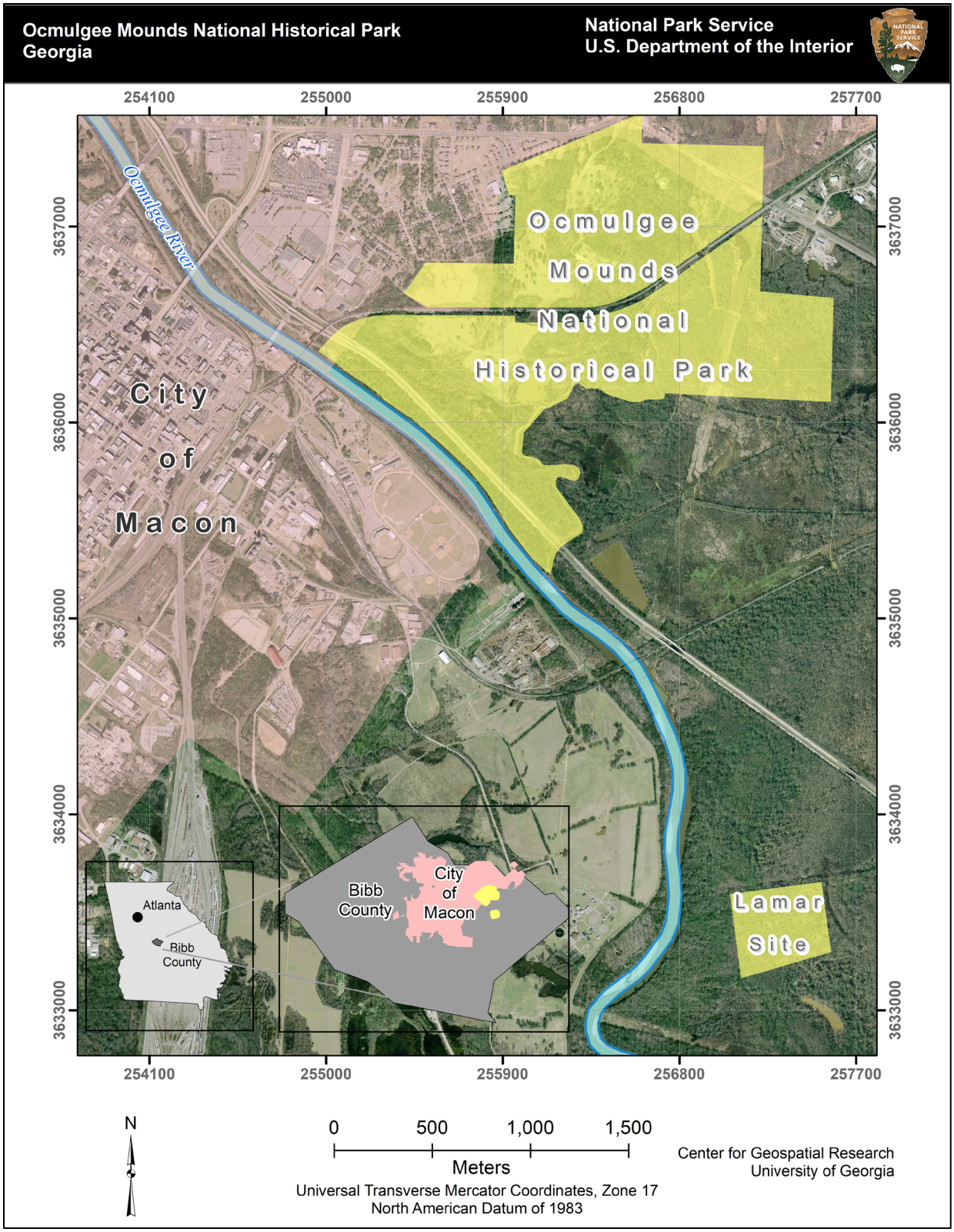


Figure 1. Location of Ocmulgee Mounds National Historical Park and its position relative to the State of Georgia, Bibb County, and the City of Macon.

The park is located at the fork of the Ocmulgee River and Walnut Creek. The terrain is mostly flat bottomland with elevations ranging from 280 feet (85.3 meters [m]) above mean sea level by the river to about 400 feet (122 m) above mean sea level in the highest point of the uplands (Figure 2). Ocmulgee Mounds NHP is bounded on the north and west by the urban area of Macon, Georgia and on the south and east by forests and wetlands. The park consists of two distinct areas: the main unit and the Lamar Tract. The main portion is 267 hectares (659.8 ac) and is the only portion currently open to visitors. Not only does this portion of Ocmulgee Mounds NHP preserve the largest earthen mounds, it also contains evidence of a British trading post dating to the 17th century, a mid-19th century country residence (the Dunlap House), and both Confederate and Union earthen works from the American Civil War (NPS 1991). The smaller Lamar Tract is 18.7 hectares (46.2 ac) and is located about 2 miles (3.2 kilometers [km]) southeast of the main portion.

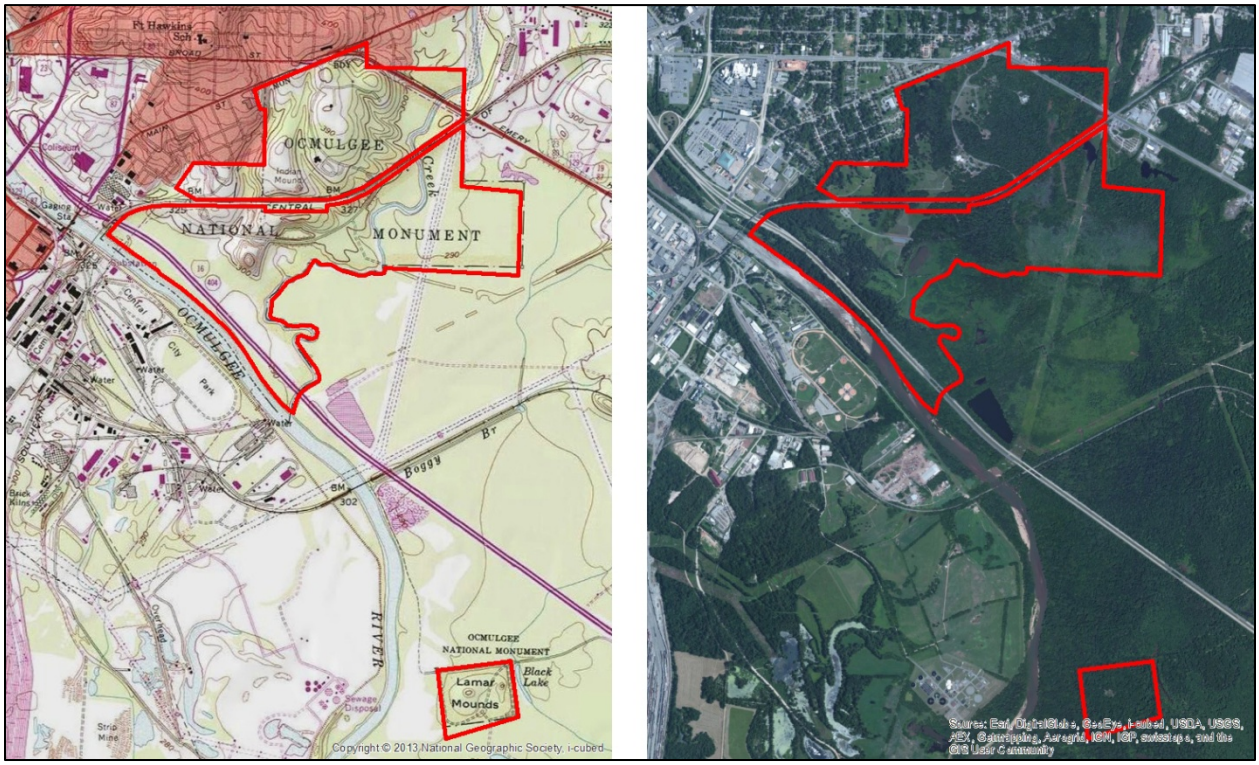


Figure 2. Topography of Ocmulgee Mounds National Historical Park (left) and its landscape context near Macon, Georgia along the Ocmulgee River (right). The park boundary is outlined in red.

In 2019 OCMU was redesignated and approved for an eventual expansion of its boundaries as land becomes available. The park is now known as Ocmulgee Mounds National Historic Park and will eventually add approximately 2,100 acres (849 hectares), quadrupling the size of the park from about 702 to 2,800 acres (284 to 1,133 hectares). The expansion would connect the two separate units of Ocmulgee NHP, expand the northern and eastern boundaries, and create a corridor along the Ocmulgee River connecting the park to Bond Swamp National Wildlife Refuge approximately 6 miles (9.7 km) to the south. The proposed expansion is in accordance with the original vision to

protect the Ocmulgee mounds (Marsh 1986), and its establishment would further protect the archaeological record of rich past cultures.

Vegetation Classification System

The task agreement for mapping required the National Vegetation Classification System (NVCS) be used for areas inside each park. The National Vegetation Classification System was developed by the Nature Conservancy (Anderson et al. 1998; Grossman et al. 1998). It is primarily based upon vegetation rather than climatic or edaphic factors. It emphasizes the existing natural vegetation and recognizes that vegetation communities form a continuum. The system has seven hierarchical levels so that vegetation can be described at multiple scales, depending upon the amount of information available. Higher levels can be broken down to lower levels as more information is available; conversely, lower levels can be aggregated to upper levels. The five upper levels (formation class, formation subclass, formation group, formation subgroup, and formation) describe vegetation physiognomy rather than actual species composition and are a modification of the UNESCO World Physiognomic Classification of Vegetation (UNESCO 1973). The two lowest levels (the alliance and association) are determined by floristic composition. The alliance level is determined by the species composition of the dominant or diagnostic species in the most prevalent stratum. A diagnostic species does not have to be dominant. For example, *Nyssa biflora* (swamp tupelo) is a characteristic species found in the Sweetgum–Tuliptree Brownwater Floodplain Forest but is not a dominant species. The association level is determined by diagnostic species in all strata (tree canopy, subcanopy, tall-shrub, short-shrub, herbaceous, non-vascular, vine/liana, and epiphyte), recognizing that each of these stratums may not occur in every association. The tallest stratum may not be the diagnostic/dominant stratum. The association level is assigned a unique community element global code (CEGL). The CEGL code for the vegetation association is the target vegetation classification specified in the task agreement.

The dominant species in the tallest stratum are always visible in leaf-on aerial photographs. If the tallest stratum is dense, with a closed canopy, then the shorter subcanopy and understory layers are obstructed from the camera's view and are not visible. In vegetation communities where the tallest stratum is open, other strata will be visible in the aerial photograph. In some cases, a CEGL code can be determined solely by identifying its location (e.g., along a ridge or on the south slope) and viewing the uppermost stratum. In other cases, a lower stratum (or strata) not visible in the aerial photography must be used to determine CEGL code. In such cases, it is impossible to use only aerial photographs recorded during leaf-on conditions to accurately determine the NVCS code at the association level. If it was not possible to determine the association-level class, a second vegetation was assigned as a supplement to the dominant vegetation code.

Prior to CGR's photointerpretation, NatureServe conducted field surveys in accordance with standard practices (Jennings et al. 2009) to create a list of NVCS CEGL codes for Ocmulgee Mounds NHP, see Table 1 (NatureServe 2009). Their detailed report includes a dichotomous key for separating the CEGL codes described for the park, see Appendix B. Many of the couplets in the dichotomous key relied upon differences in the dominant vegetation in the tallest stratum or the presence or absence of diagnostic species. However, some couplets relied upon lower strata which may not be evident in the

aerial photographs or edaphic factors[1] (e.g. soil pH) which would not be evident in leaf-on CIR photographs. The NatureServe report also includes comprehensive descriptions of diagnostic species for each community element global code, and additional information on both the global and local expressions of the vegetation community type.

Table 1. Land cover classes found within the park area of Ocmulgee Mounds National Historical Park during the initial NatureServe assessment based on the National Vegetation Classification System.

Code	Description
4232	Loblolly Pine (White Oak, Southern Red Oak, Post Oak) Southeastern Interior Forest
4290	Smartweed – Cutgrass Beaver Pond
4606	Loblolly Pine – Sweetgum – Swamp Tupelo Successional Swamp Forest
4740	Atlantic Coastal Plain Sugarberry – Green Ash Levee Forest
7329	Sweetgum – Tuliptree Brownwater Floodplain Forest
7726	Sweetgum – (Water Oak, Willow Oak) – Loblolly Pine / Elliott's Blueberry – Wax-myrtle Forest
7730	American Sycamore – Sugarberry -–Green Ash / Northern Spicebush – Possumhaw / Reflexed Sedge Forest
7734	Atlantic Coastal Plain Black Willow – Green Ash Levee Forest
8585	Upper East Gulf Coastal Plain Cherrybark Oak – Sweetgum Terrace Forest

In general, the National Vegetation Classification System is best suited to natural or semi-natural vegetation communities that have been relatively undisturbed long enough for vegetation communities to develop in accordance with the environmental and climatic conditions of the site (Anderson et al. 1998; Grossman et al. 1998). Areas that are regularly or extensively disturbed by logging, fire, wind damage, exotic insects, exotic vegetation, and human activities are not easily classified with the National Vegetation Classification System. For this reason, the University of Georgia Center for Geospatial Research augmented the NVCS classes identified by NatureServe as occurring in Ocmulgee Mounds NHP to include additional disturbed, managed, successional, and modified classes, along with alphanumerical modifiers to provide detailed information to users of the vegetation databases and maps. Modifiers to the NVCS classes reflected variations of a particular NVCS class that are characteristic for the local site, but atypical of the global NVCS description.

The task agreement also required mapping a 500-meter (1,640-ft) buffer around the park. The buffer area contained extensive areas of human influence; consequently, the NVCS system was not applicable. Buffer areas were therefore mapped using guidelines derived from the Anderson Level II

[1] Vegetation tends to reflect edaphic factors. Yet if the indicator vegetation is not visible in the aerial photograph, edaphic factors cannot be inferred.

classification system, which includes human influences and water categories (Anderson et al. 1976). Modifiers were also greatly utilized within the buffer to increase the knowledge base about what LULC categories surround Ocmulgee Mounds NHP, though different modifiers were generally used in the buffer compared to in the park.

In summary, the park was initially mapped to the association (CEGL) level of the NVCS, Table 1, while the buffer area was more appropriately mapped using Anderson Level II guidelines, Table 2. Modifiers to these classification systems were used, as appropriate, to ensure a meaningful classification system for this particular park, Table 3. The complete vegetation classification system used for Ocmulgee Mounds National Historical Park is provided in Final Vegetation Mapping and Summary Statistics later in this report.

Table 2. Land cover/land use classes found within the buffer of Ocmulgee Mounds National Historical Park.

Code	Description
11	Residential
12	Commercial and Services
13	Industrial
14	Transportation, Communications, and Utilities
17	Other Urban or Built-up Land
21	Cropland and Pasture
41	Deciduous Forest Land
42	Evergreen Forest Land
43	Mixed Forest Land
50	Major River
51	Streams and Canals
53	Reservoirs
61	Forested Wetland
62	Non-forested Wetlands

Table 3. Modifiers used throughout the park area and buffer of Ocmulgee Mounds National Historical Park.

Code	Description
BG3	Bare Ground — Greater than 75 percent
Exo	Exotics
FM1	Mixed Forest — Less than 25 percent
FM2	Mixed Forest — 25 to 75 percent
FM3	Mixed Forest — Greater than 75 percent
Gm3	Graminoids — Greater than 75 percent
GRC	Golf Course/Recreation Field
IS3	Impervious — Greater than 75 percent
PBB	Pine Bark Beetle
Sh3	Shrub — Greater than 75 percent
SS3	Shrub/Saplings — Greater than 75 percent
VG3	Vegetation — Greater than 75 percent
Wpl	Water — Greater than 75 percent
XLs	Exotics — Chinese Privet
XTs	Exotics — Chinese Tallow

Vegetation Mapping Workflow

The general workflow for this vegetation mapping followed a series of steps, including:

1. Define CEGL codes within the study area based upon plot-level ground data (completed by NatureServe)

2. Contact park staff to discuss their needs and concerns as applicable to the final vegetation map, obtain any existing background information on management activities to include in a GIS database (see below), and arrange access

3. Collect base data and construct a GIS foundation geodatabase

    a. Collect and inventory the aerial photographs

    b. If needed, scan and orthorectify the aerial photographs

    c. Obtain available GIS layers on exotic plant removal or prescribed burns that may affect vegetation communities

4. Create an initial photointerpretation key

    a. Overlay NatureServe Vegetation Survey points on photos

    b. Examine photos to understand signatures of vegetation communities as identified by ELCodes or CEGL number

5. Perform initial delineation of vegetation communities on CIR aerial photographs, supplemented by other leaf-off imagery (see Table 4) using photointerpretation from both stereo-pairs and 2D imagery by heads-up GIS methods

    a. Identify spectral signatures dissimilar to the example spectral signatures around the NatureServe ground plots so that vegetation can be evaluated in field visits

6. Field visits

    a. Schedule field trips to the site to visit specific areas where questions exist

    b. Verify vegetation communities present

    c. Reconcile photo signature with NatureServe CEGL code

    d. Refine classification as necessary with reference to field work and ongoing communication with park staff regarding results

    e. If needed, assign additional CEGL numbers or combine certain CEGL numbers if specific classes exist within the park that were not discovered by the NatureServe Vegetation Survey or were indiscernible through aerial interpretation

7. Refine and extend photointerpretation key and delineation of polygons
    a. As needed, print photos and vegetation polygons for review and refinement
8. Prepare draft deliverable products
    a. Prepare draft GIS files
    b. Clean up line work and attribute tables
    c. Compute statistics for vegetation polygons
    d. Prepare metadata for vegetation polygon files
    e. Finalize photointerpretation keys
9. Accuracy Assessment
    a. Using accuracy assessment guidelines points are chosen for a separate team to visit and quantify
    b. Overlay Accuracy Assessment data points on photos and draft vegetation maps
    c. Calculate percent accuracy and kappa for the polygons
10. Prepare final deliverable products
    a. Prepare final GIS files
    b. Clean up line work and attribute tables using accuracy assessment data as a guide
    c. Compute statistics for vegetation polygons
    d. Prepare metadata for vegetation polygon files
    e. Finalize photointerpretation keys

Note that steps 4–7 reflect an iterative, rather than a linear, process. Steps 1, 2, and 3 are self-explanatory; the detailed workflow for the other steps, as pertains to the mapping of Ocmulgee Mounds NHP, is described below. Additionally, while there were nine original CEGL codes used in step 1, four additional codes were added during the photointerpretation step. However during the accuracy assessment only the original nine codes were used.

Table 4. Data sets, descriptions, source, date, and scale imported into the Geodatabase.

Dataset	Description	Source	Date	Scale/Resolution
Contours	Statewide contours	Georgia GIS Clearinghouse	1996	1:100,000
Counties	County outlines for Bibb and Jones Counties	Georgia GIS Clearinghouse	2008	1:100,000
Park	Park and Buffer outlines	NPS Datastore and buffer analysis	2013	Unknown
Roads	Tiger Line Roads	Georgia GIS Clearinghouse	2006	1:12,000
Hydrology	Lakes and Rivers	–	–	–
DEM	USGS Digital Elevation Model	USGS National Map Viewer	2010	1/9 arc second
USGS 07 Imagery	Natural color orthoimagery in three bands	U.S. Geological Survey	2011	0.5 meters (1.6 ft)

Base Data and GIS Geodatabase Construction

Relevant publicly available GIS data sets that cover the study area were downloaded and archived on a local server in the University of Georgia Center for Geospatial Research. Data sets include roads, hydrology, boundary files (political and NPS), digital elevation models (DEMs), and additional aerial photographs. These data are available from sources such as the NPS Integrated Resource Management Applications (IRMA) portal, the Georgia GIS Data Clearinghouse, the U.S. Geological Survey National Map, and the National Oceanic and Atmospheric Administration Digital Coast websites. Trail network and exotic plant removal[2] data sets were also obtained. These layers are not publicly available and were obtained through NPS contacts. The data sets used to populate the foundation GIS database were from different sources, compiled for different reasons, and may not be in the same map projection. The task agreement specified that the spatial data be projected to the Universal Transverse Mercator (UTM) Coordinate System, North American Datum of 1983 (NAD83). Where necessary, data sets were projected to UTM Zone 17. Finally, a geodatabase in ArcGIS 10.2 format was created as a container to store and organize the data. Details of this database are presented in Figure 3 and Table 4.

[2] Ocmulgee Mounds National Historical Park has an extensive exotic plant management program, some of which is performed in-house while some is performed by an SECN exotic pest plant management team. We spoke with Dr. Lauren Serra of the Southeast Coast Exotic Plant Management Team on May 20, 2014 regarding any available GIS/GPS data. While such information has been collected, it was not readily available.

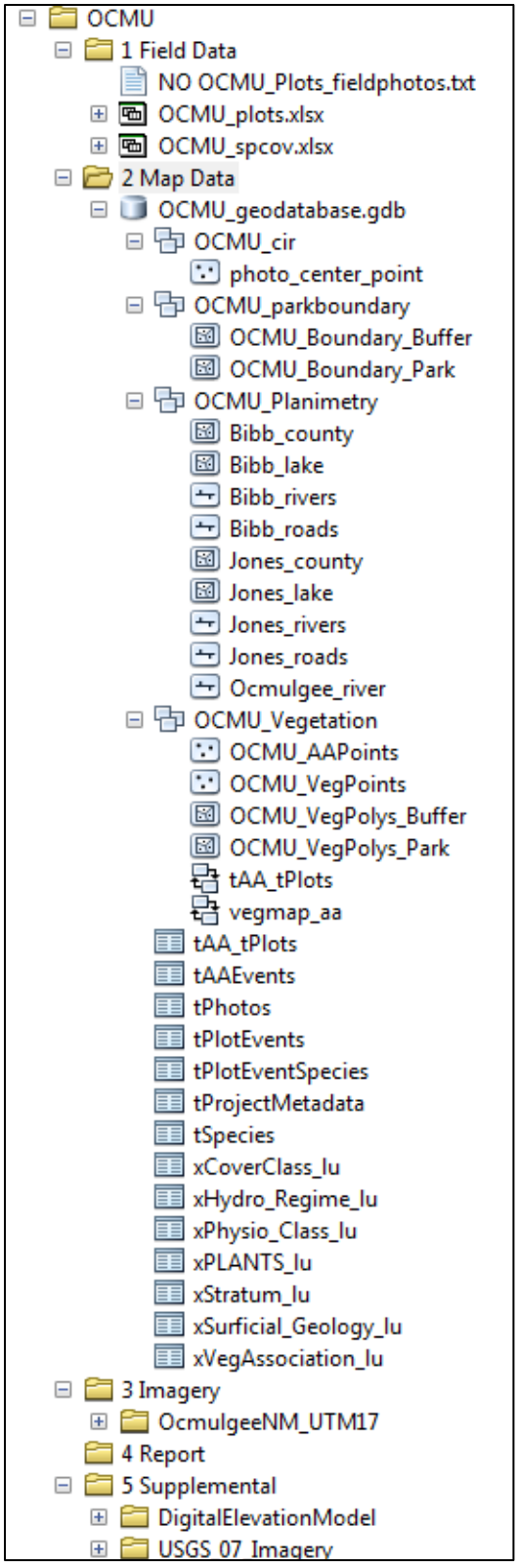


Figure 3. Foundation Geodatabase created for Ocmulgee Mounds National Historical Park.

Color infrared (CIR) aerial photographs of the park at 1:12,000 scale were acquired by Aero-Metric, Inc. on May 11, 2011. These photos were scanned and converted to digital orthophotographs at 0.3 meter (1 ft) resolution before they were delivered to the National Park Service. Digital orthophotographs and hardcopy photographs in both film transparency and paper print formats were provided to the University of Georgia Center for Geospatial Research. A total of 12 photos in two flight lines were required to cover Ocmulgee Mounds NHP (Figure 4; Appendix A).

The mapping area was split in two sections: park and buffer. The park was defined as the area within the prescribed park boundaries while the buffer pertained to the region within 500 meters (1,640 ft) outside of the park boundary. Detailed vegetation mapping using CEGL codes was performed within the park whereas more general mapping using a revised Anderson-type II hierarchical classification scheme was used in the buffer area.

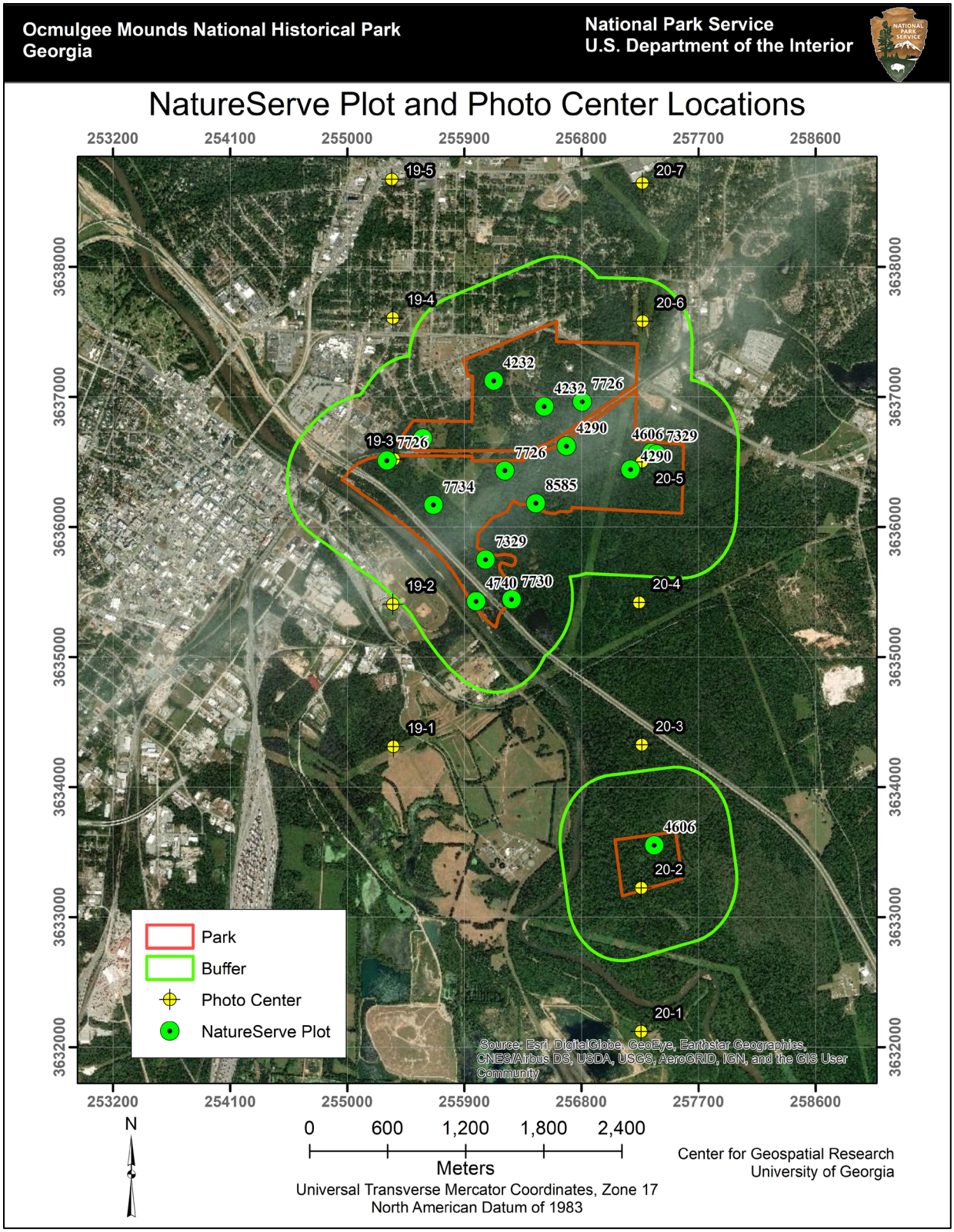


Figure 4. NatureServe vegetation plots and aerial photo center points for Ocmulgee Mounds National Historical Park.

Initial Photointerpretation Key and Vegetation Delineation

Classifying the different vegetation communities within the park was aided by the use of a photointerpretation key. The initial photointerpretation key was based upon the NCVS vegetation classes at the association level. These associates were determined by NatureServe through independent plot level vegetation surveys in accordance with standard NVCS field methods (Jennings et al. 2009). Plot sizes in Ocmulgee Mounds NHP ranged in size between 100 and 1,000 square meters (1,076 and 10,764 square miles [m^2]). Plot level species presence or abundance was used to assign a four-digit CEGL number. The results of the survey are reported as a list of point locations and CEGL codes, as well as descriptions and field notes (Appendix B). The vegetation associations for the park were determined by NatureServe from 16 plots. The University of Georgia Center for Geospatial Research visited 130 points to interpret the CIR signatures of these vegetation associations to delineate vegetation. The future accuracy assessment of CGR's vegetation map included 138 initial accuracy assessment points, 97 of which were used for analysis of the park.

The NatureServe vegetation plot points were overlaid on the CIR aerial photographs and the photo signature was examined. Most CEGL codes were represented at least once in the park, however some were not sampled at all (Table 5). Still others were represented by multiple point locations. As a result, multiple signatures exist for these codes. The National Vegetation Classification System recognizes that vegetation communities form a continuum both within and between CEGL codes; spectral signatures are also likely to reflect this natural variation.

Table 5. Community element global code (CEGL) classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Ocmulgee Mounds National Historical Park.

CEGL	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
4048	Cultivated Meadow	17	1.4	24.3	8.7%
4232	Loblolly Pine (White Oak, Southern Red Oak, Post Oak) Southeastern Interior Forest	14	3.7	51.5	18.4%
4290	Smartweed – Cutgrass Beaver Pond	25	0.7	17.2	6.1%
4606	Loblolly Pine – Sweetgum – Swamp Tupelo Successional Swamp Forest	7	1.8	12.8	4.6%
4692	Disturbed Herbaceous Vegetation	6	1.0	5.9	2.1%
4732	Blackberry – Greenbriar Successional Shrubland Thicket	10	1.0	9.7	3.5%
4740	Atlantic Coastal Plain Sugarberry – Green Ash Levee Forest	6	2.1	12.6	4.5%
7329	Sweetgum – Tuliptree Brownwater Floodplain Forest	10	1.7	17.4	6.2%

Table 5 (continued). Community element global code (CEGL) classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Ocmulgee Mounds National Historical Park.

CEGL	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
7412	Chinese Tallowtree Seasonally Flooded Forest	14	1.2	17.0	6.1%
7726	Sweetgum – (Water Oak, Willow Oak) – Loblolly Pine / Elliott's Blueberry – Wax-myrtle Forest	16	1.6	25.8	9.2%
7730	American Sycamore – Sugarberry -–Green Ash / Northern Spicebush – Possumhaw /Reflexed Sedge Forest	27	1.4	38.3	13.7%
7734	Atlantic Coastal Plain Black Willow–Green Ash Levee Forest	15	1.3	19.0	6.8%
8585	Upper East Gulf Coastal Plain Cherrybark Oak – Sweetgum Terrace Forest	3	1.0	3.0	1.1%
9998	Water	21	0.5	10.5	3.8%
9999	Human Influence	7	2.2	15.2	5.4%
Total	**–**	**198**	**–**	**280.1**	**100.0%**

The photointerpretation key was developed to assist in the extension of the signatures at the plot level to the remainder of the park. The key noted color, tree crown shapes and sizes, texture, context, and any other characteristics that could help to differentiate one community from the others on the spectral signature of the leaf-on CIR aerial photography. The orthophotographs were examined on-screen in heads-up mode using the ArcGIS software. Where needed, the hardcopy photographs were viewed in stereo/3D using a light table and a mirror stereoscope. This method is excellent for using relative heights of the trees and terrain to assist in determining the vegetation community and to delineate the boundaries of the individual features.

This key was later expanded to include more detailed descriptions of each class. The final key for Ocmulgee Mounds NHP was expanded from nine classes provided by NatureServe to a total of 13 categories based on visual cues found in the CIR imagery and data collected in the field (Appendix C). The four additional classes (4048, 4692, 4732, and 7412), were found using the NVCS hierarchy and species information collected in the field. Color (varying from green to pink to purple), tone (light to dark), and texture (fine to coarse) were used to describe the strength and intensity. Other categories were based on canopy structure such as pattern (open to dense canopy) and height (short to tall). The remaining categories were used to express how the different codes are interrelated. These include shape (elongated to broad), size (based on total area, average size, and standard deviations of the polygons in a given class), location (relative to specific areas in the park), association (communities typically found near the specific class), and comments (to express any hints or issues

that may arise). Also included are images taken from the field in order to provide a ground-level perspective that can be compared to the sample image chips taken from the airborne CIR images. The NatureServe summary of the vegetation association and its distribution both globally and within the park are included for each class following the visual cue description.

The CEGL codes are listed in ascending numerical order in the key. While the National Vegetation Classification System is hierarchical, the numbering system for the codes is not hierarchical. Thus, it is impossible to determine physiognomy, species composition, or edaphic factors (e.g. soil saturation or inundation, soil pH, slope) from the CEGL code alone.

Using ArcGIS software, standard GIS methods, and a minimum mapping unit (MMU) of 0.5 hectares (1.2 ac), preliminary lines were drawn to delineate areas of uniform signature. Where the vegetation communities were clearly identifiable, polygons were tagged with the appropriate CEGL code. Where confusion existed, the polygons were tagged with an 'unknown' code until field visits could determine the appropriate community element global code.

Field Surveys and Ground Truth

In developing the photointerpretation keys and delineating vegetation communities based upon their CIR signatures, a number of signatures were found that did not easily match the signatures from the NatureServe survey of 16 ground points. These areas required field visits to clarify vegetation communities.

Field work and ground truthing for Ocmulgee Mounds NHP took place in May and June 2014. Field visits were aimed at giving specific attention to representative habitats, rare and important communities, areas that had been managed, disturbed, or invaded, and plots previously surveyed by NatureServe to collect data on canopy species composition, diagnostic species for the National Vegetation Classification System, and terrain, similar to NatureServe's "Quick Plot" surveys.

Field crews carried paper field maps with the UTM grid coordinates, elevations, roads, rivers, initial vegetation polygons with CEGL codes, and points of interest superimposed on CIR photographs. They also used a Trimble Geo 6000 Xh Global Positioning System (GPS) handheld receiver loaded with similar GIS layers. On some trips, an Apple iPad 4 with a geoPDF (Wuthrich 2006; Pardue 2008) replaced paper field maps. The geoPDF gave the user both a higher level of detail of the original CIR compared paper maps, along with the ability to determine location in real time using the device's internal GPS relative to the overlay of the line work.

The Trimble GPS was used to record the location of each site sampled. The coordinates were later post-processed by differential correction using Trimble's Pathfinder Office Software and base station data from sites in Macon, Georgia. In some cases, base station data were only partially available, thereby necessitating use of multiple base stations in the Macon area for greater coverage. However, even when multiple base stations were used for a particular day, complete time coverage was not guaranteed. Some GPS locations could not be successfully differentially-corrected. Overall, post-processing produced a final accuracy of ± 1 to 5 meters (3.3 to 16.4 ft). Accuracy was higher in open areas than in closed canopy forested areas.

At each sampling site, researchers recorded GPS position, species data, canopy cover, and topography (e.g. relative slope and aspect) inside an area between 250 and 1,000 square meters (2,691 and 10,764 square feet [ft2]), based upon visual uniformity. Also noted were the presence of exotics, evidence of past or present human influence (e.g., agriculture, grazing, logging, mowing, exotic vegetation removal, old home sites), damage by insects, wild hogs, blow down, or fire. Prior to leaving a sampling location, researchers determined the primary association type, i.e. CEGL code (Grossman et al. 1994; Anderson et al. 1998; Grossman et al. 1998). Some sites were located in a mixed area indicative of an ecotone or an area of successional recovery. In such cases, secondary associations were determined in addition to dominant associations. Tertiary modifiers were often determined as well. For this reason all polygons have the possibility of having a secondary association and a modifier in addition to the required dominate association. In cases where researchers were unable to determine a clear match to a NVCS CEGL in the field, more detailed notes were taken to assign an appropriate CEGL or CGR-created class (e.g., a managed, damaged, human influence, or successional class) after further review of CIR signatures. The dominate associations used in Ocmulgee Mounds NHP can be found in Table 6 and the modifiers can be found back in Table 3.

Table 6. Land cover classes found within the park area of Ocmulgee Mounds National Historical Park based on the National Vegetation Classification System.

Code	Description
4048	Cultivated Meadow
4232	Loblolly Pine (White Oak, Southern Red Oak, Post Oak) Southeastern Interior Forest
4290	Smartweed – Cutgrass Beaver Pond
4606	Loblolly Pine – Sweetgum – Swamp Tupelo Successional Swamp Forest
4692	Disturbed Herbaceous Vegetation
4732	Blackberry – Greenbriar Successional Shrubland Thicket
4740	Atlantic Coastal Plain Sugarberry – Green Ash Levee Forest
7329	Sweetgum – Tuliptree Brownwater Floodplain Forest
7412	Chinese Tallowtree Seasonally Flooded Forest
7726	Sweetgum – (Water Oak, Willow Oak) – Loblolly Pine / Elliott's Blueberry – Wax-myrtle Forest
7730	American Sycamore – Sugarberry -–Green Ash / Northern Spicebush – Possumhaw / Reflexed Sedge Forest
7734	Atlantic Coastal Plain Black Willow – Green Ash Levee Forest
8585	Upper East Gulf Coastal Plain Cherrybark Oak – Sweetgum Terrace Forest
9998	Water
1111	Human Influence

The GPS points collected in the field were superimposed on CIR images in ArcMap. Field points were used in conjunction with the aerial photographs to refine vegetation delineation and assigned classification attributes (dominant CEGL, secondary CEGL, and modifiers, as appropriate). Additional field visits were conducted during the iterative interpretation process on an as-needed basis in order to refine interpretations, identify communities with unusual signatures, and resolve any questions. Maps were updated between field visits to reflect the ongoing process of photointerpretation of vegetation communities. Any areas visited that were already classified were checked for accuracy throughout the mapping process.

A total of five field visits or investigations and 130 discrete point locations were collected at Ocmulgee Mounds NHP (Table 7 and Figure 5). The number of sites visited in a single day ranged from 17 to 35 and was often influenced by terrain, weather, and point of interest density, crossing some of the creeks and rivers was a particular challenge. Usually, if more than two people were in the field, two independent field teams worked simultaneously to cover more area.

Table 7. Field visits and number of data points collected for Ocmulgee Mounds National Historical Park.

Date (2014)	Team Member(s)	Number of Data Points
May 13	N. K. O'Hare, D. L. Cotten, B. P. Adams	17
May 16	D. L. Cotten, B. P. Adams	35
May 26	N. K. O'Hare	23
June 5	N. K. O'Hare, D. L. Cotten, B. P. Adams	24
June 17	N. K. O'Hare, D. L. Cotten, B. P. Adams, M. Madden	31
Total	**–**	**130**

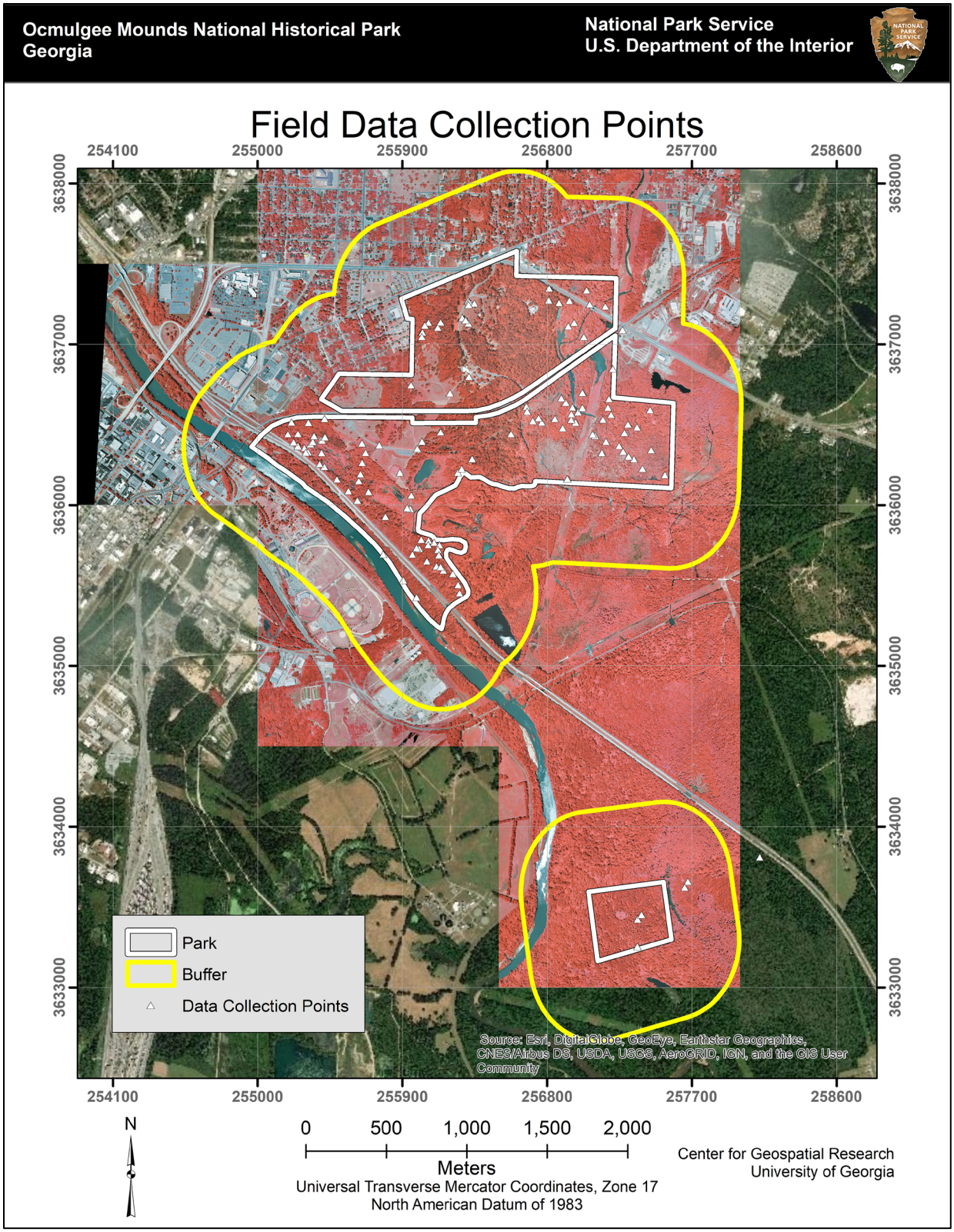


Figure 5. Field data collection locations from Ocmulgee Mounds National Historical Park overlaid on CIR imagery and visual imagery.

Photointerpretation and GIS Methods

The industry-standard GIS software, ArcGIS, offers a variety of methods and procedures to do most common mapping tasks. For the purposes of this project, photointerpretation was performed using heads-up digitizing methods in ArcGIS 10.2 using the CIR digital orthophotographs as the primary source material. Lines were drawn on-screen delineating the boundaries between different classes of vegetation. Where ecotones between features were broad, the line was drawn in the middle of the transition area. While the minimum mapping unit for this project was one half of a hectare (1.2 ac), features smaller than this threshold that were distinct and could be easily mapped were delineated.

As vegetation areas were delineated with vector lines, points were digitized within each delineated area. These points were assigned attribute information such as the dominate vegetation (a CEGL value if located within the park or an Anderson-type code for the buffer), secondary vegetation, a modifier, the interpreter's initials, the date, the confidence of the classification, and other relevant information.

After the line work was completed and points attributed, the lines were converted to polygons and the attributes assigned to each polygon by joining the tables of the point features and polygons based on spatial location. In this operation, the attributes of the point closest to the polygon were assigned to that polygon. A 'distance' field was also assigned which indicates the distance of the point location from the polygon. If the distance was zero, the point was inside the polygon. Any other value greater than zero meant that the point used to populate the attribute fields was outside of the polygon. Consequently, the 'distance > 0' values were used as flags to select and examine polygons that were not properly attributed. Where necessary, additional points were added to the database to complete the map. The process was repeated until all polygons were properly attributed.

The initial draft maps were plotted at large scale on 'E-size' (34 × 4 inches [86.4 × 10.2 centimeters {cm}]) paper such that the hollow polygons with their respective CEGL labels were overlaid on the original aerial photographs. Each polygon was individually inspected by a person not directly involved in the original mapping to make sure that that the line work followed the vegetation feature properly, and that the CEGL codes were consistent with spectral signature. Edits were marked on the hardcopy maps and then applied to the database within ArcGIS. This review process was repeated to ensure completeness.

Additional editing and refinement was performed as necessary using information collected during the field surveys.

Final Vegetation Mapping and Summary Statistics

The Final Vegetation Mapping product (Figures 6, 7) consisted of 13 distinct NVCS CEGL association level vegetation communities were found in the park (Table 6, Figure 8). In the buffer zone, there were 14 distinct Anderson Level II codes (Table 2, Figure 9). Additionally, modifiers were used to further enhance classification (Table 3). These modifiers were generated by the University of Georgia Center for Geospatial Research and used both within the park and the buffer to provide additional information regarding percent coverage, the presence of invasive species, or areas with a large human influence.

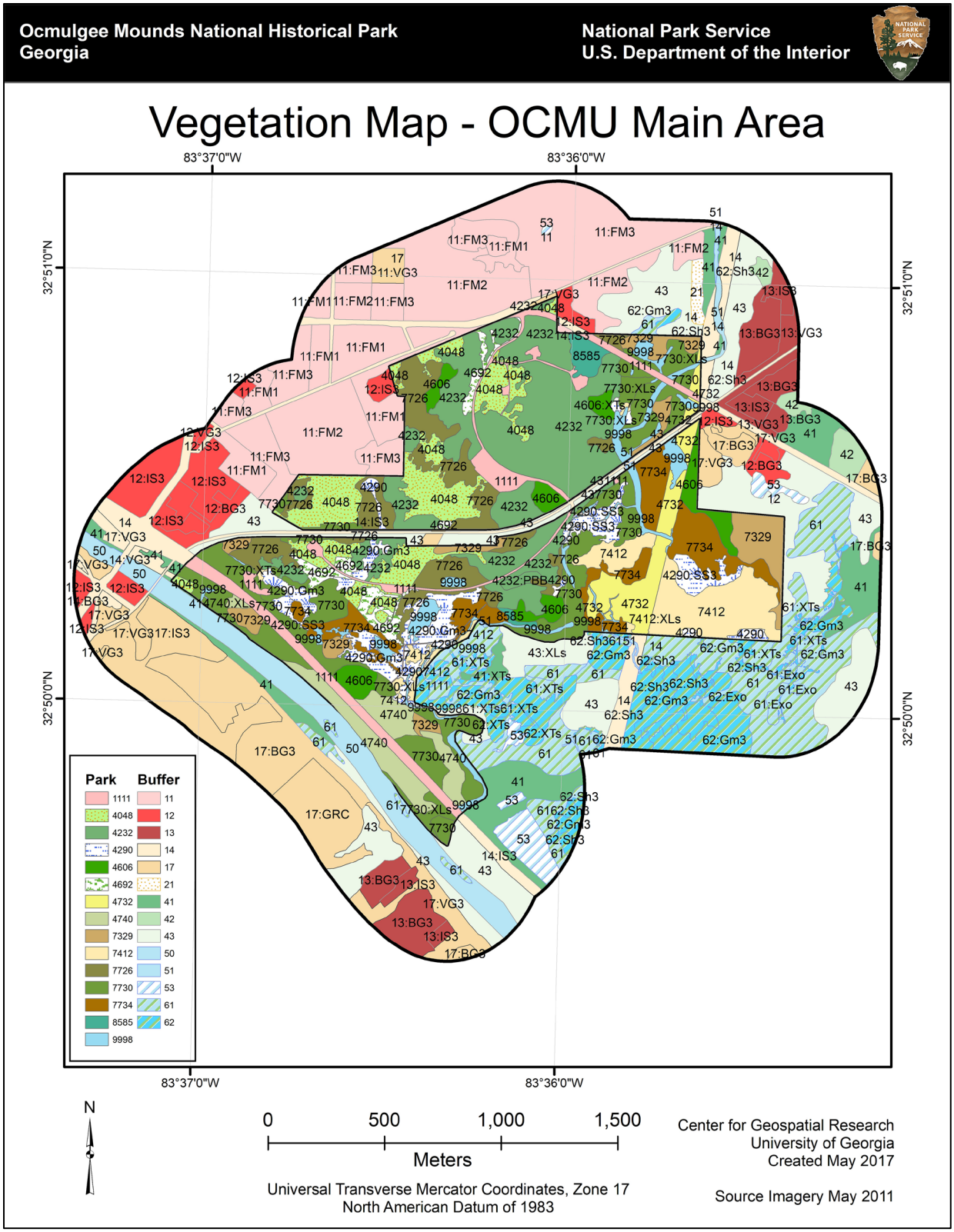


Figure 6. Vegetation map of the main section of Ocmulgee Mounds National Historical Park.

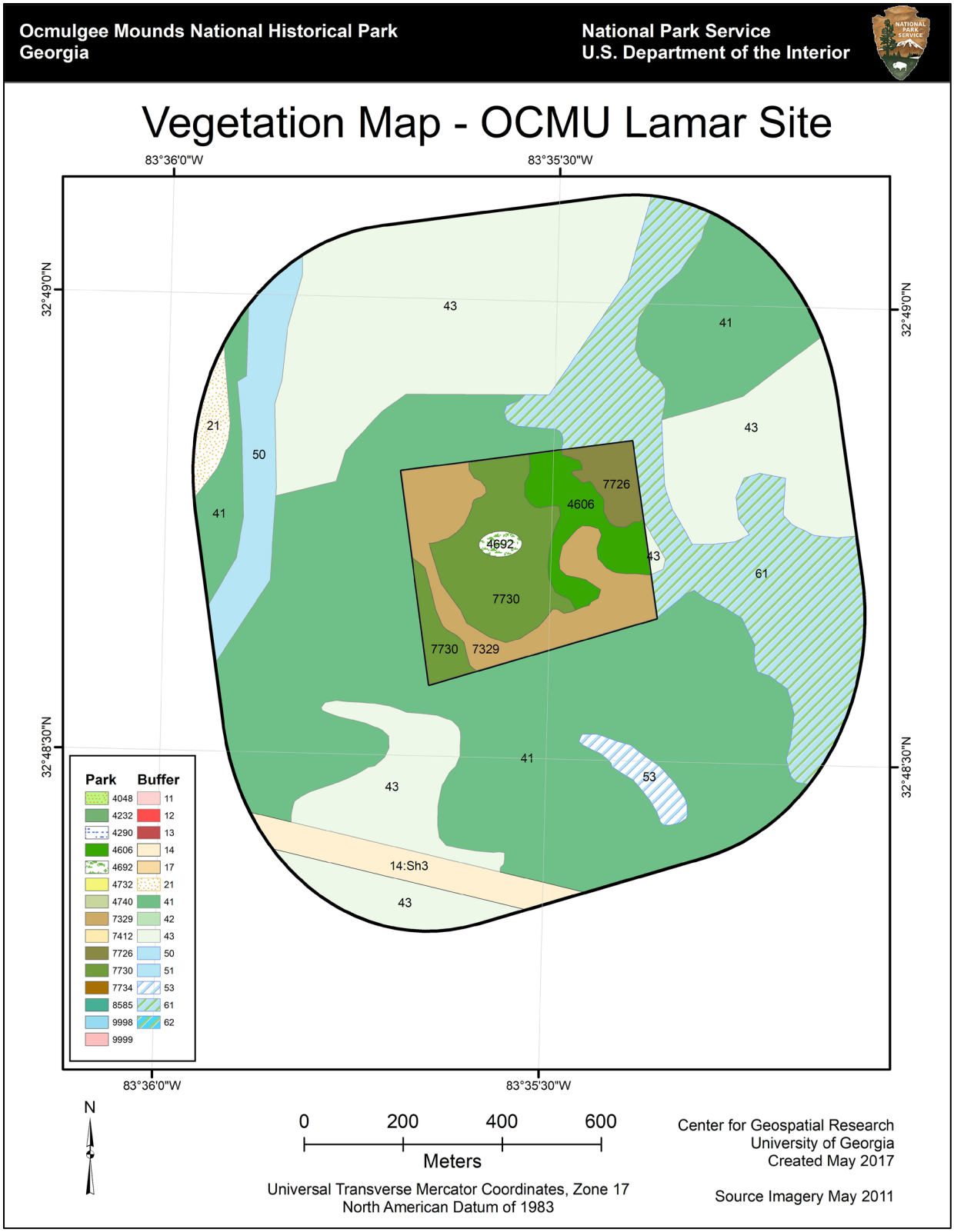


Figure 7. Vegetation map of the Lamar section of Ocmulgee Mounds National Historical Park.

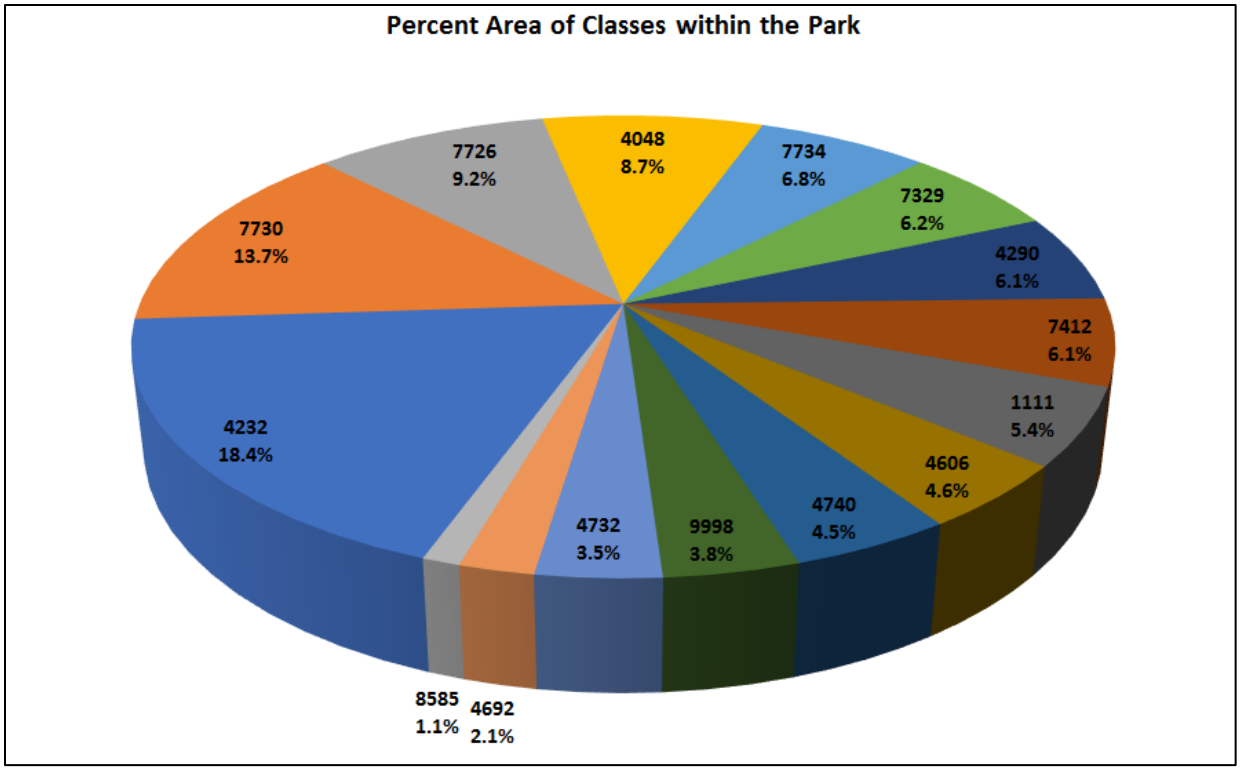


Figure 8. Park vegetation classes organized by relative size.

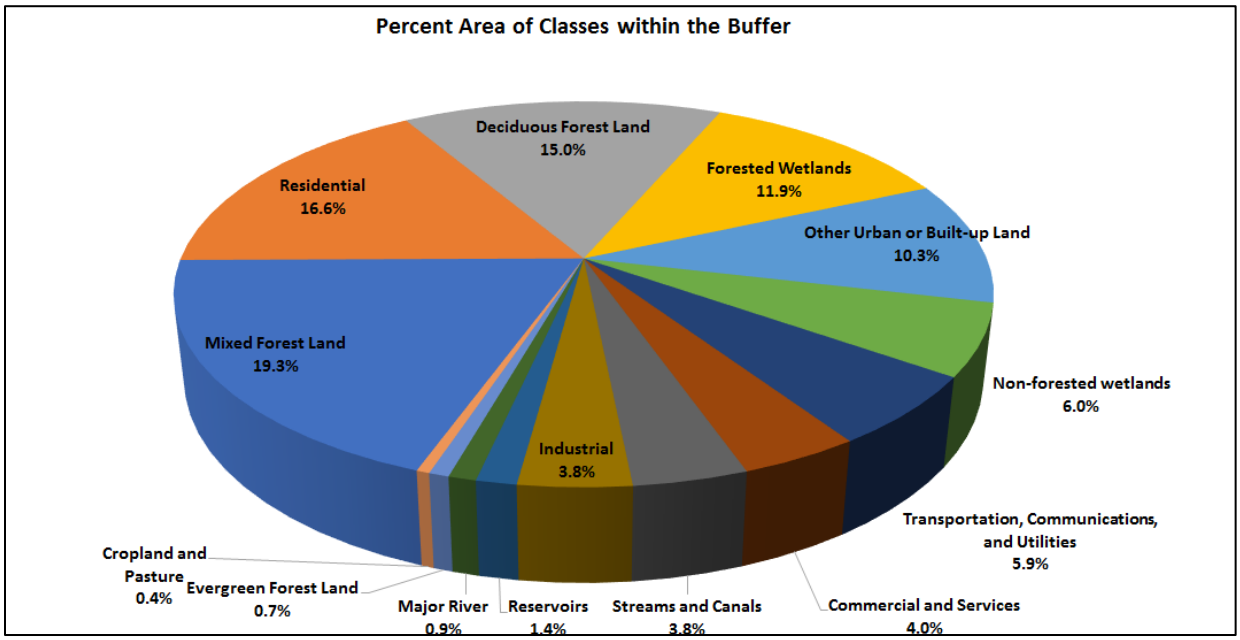


Figure 9. Buffer classes organized by relative size found in Ocmulgee Mounds National Historical Park.

The most common class found in Ocmulgee Mounds National Historical Park was Loblolly Pine (White Oak, Southern Red Oak, Post Oak) Southeastern Interior Forest (4232), covering approximately 18% of the park. The second most common class was American Sycamore—

Sugarberry—Green Ash / Northern Spicebush—Possumhaw /Reflexed Sedge Forest (7730), at 14%. The smallest class was Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest (8585) at less than 1%. The overall lack of a dominant class reflects the subtle topography and anthropogenic influences.

Within the buffer region of Ocmulgee Mounds NHP, Mixed Forests dominate the landscape, encompassing nearly 20% of the total buffer area. Residential and Deciduous Forest Land are the second and third most common classes with 16% and 15% of the area, respectively. Cropland and Pasture make up the smallest percentage of area at 0.4%.

Modifiers were utilized throughout the park and buffer regions to further enhance the classification system. The modifier system was based on insect infestation, the presence of exotic plants, or other classification system. This other class can include vegetation, mixed forest, or impervious surface coverage based on a scaling system. Where used, the scaling system is based on percent coverage of the specific modifier, with 1 for less than 25%, 2 for greater than 25% but less than 75%, and 3 for coverage greater than 75%.

Accuracy Assessment

Point Selection

As a part of the total mapping effort, a separate accuracy analysis of the thematic contents of the vegetation maps is required. Only classes with CEGL codes assigned and only polygons that fall within the prescribed park boundary are evaluated. To accomplish this, a set of points is selected to represent the distribution and rarity of the mapped vegetation classes. The number of accuracy assessment (AA) sample points per class depends on the total area (in hectares) of the particular vegetation class within the map area, according to the rule set established by the NPS for this purpose (Lea and Curtis 2010):

- Classes with < 8.33 ha
    - 5 points per class
- Classes with ≥ 8.33 AND < 50 ha
    - number of points is 0.6 × the area in ha
- Classes with ≥ 50 ha
    - 30 points per class

Protocol dictates that the points be randomly distributed and stratified by class. For example, if 30 points are required for a particular class, those 30 points should be randomly distributed within all of the polygons of that particular class. The distribution of classes, the number of polygons, and the areas of each class is given in Table 8. Modifiers used throughout the park and buffer areas, including frequency of occurrence, mean area, and total area are given in Table 9.

Table 8. Land use/land cover class, frequency of occurrence, mean area, total area, and percentage of total area within the buffer area of Ocmulgee Mounds National Historical Park.

Class	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
Residential	21	4.9	103.1	16.6
Commercial and Services	15	1.7	25.0	4.0
Industrial	11	2.1	23.4	3.8
Transportation, Communications, and Utilities	16	2.3	36.7	5.9
Other Urban or Built-up Land	18	3.6	64.0	10.3
Cropland and Pasture	2	1.4	2.7	0.4
Deciduous Forest Land	15	6.2	93.5	15.0
Evergreen Forest Land	3	1.4	4.2	0.7

Table 8 (continued). Land use/land cover class, frequency of occurrence, mean area, total area, and percentage of total area within the buffer area of Ocmulgee Mounds National Historical Park.

Class	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
Mixed Forest Land	23	5.2	120.1	19.3
Major River	3	1.9	5.7	0.9
Streams and Canals	13	1.8	23.8	3.8
Reservoirs	6	1.4	8.4	1.4
Forested Wetland	31	2.4	73.9	11.9
Nonforested Wetlands	25	1.5	37.4	6.0
Total	**202**	**–**	**621.95**	**100.0**

Table 9. Modifiers used throughout the park and buffer areas, including frequency of occurrence, mean area, and total area.

Code	Description	Frequency	Mean Area (ha)	Total Area (ha)
BG3	Bare Ground — Greater than 75 percent	13	3.3	42.5
Exo	Exotics	4	0.5	2.1
FM1	Mixed Forest — Less than 25 percent	7	3.1	21.4
FM2	Mixed Forest — 25 to 75 percent	6	6.4	38.1
FM3	Mixed Forest — Greater than 75 percent	8	5.5	43.6
Gm3	Graminoids — Greater than 75 percent	30	1.2	36.1
GRC	Golf Course/Recreation Field	1	10.4	10.4
IS3	Impervious — Greater than 75 percent	20	3.1	63.0
PBB	Pine Bark Beetle	1	0.7	0.7
Sh3	Shrub — Greater than 75 percent	15	1.4	20.3
SS3	Shrub/Saplings — Greater than 75 percent	7	0.9	6.6
VG3	Vegetation — Greater than 75 percent	18	1.2	21.8
Wpl	Water — Greater than 75 percent	1	0.1	0.1
XLs	Exotics — Chinese Privet	14	0.9	13.2
XTs	Exotics — Chinese Tallow	16	0.9	14.4
Total	**–**	**161**	**–**	**334.2**

Point Acquisition

The Accuracy Assessment points were collected in May of 2015 by J. Schmid, B. Cogdell, F. Barksdale, and B. Rosenblatt. Figure 10 shows the locations of these points and Appendix D has the detailed information gathered at each of the 138 half a hectare (1.2 ac) accuracy assessment plot locations. While the photointerpretation stage added four additional classes to the park, the accuracy assessment only used the original nine classes found during the initial survey.

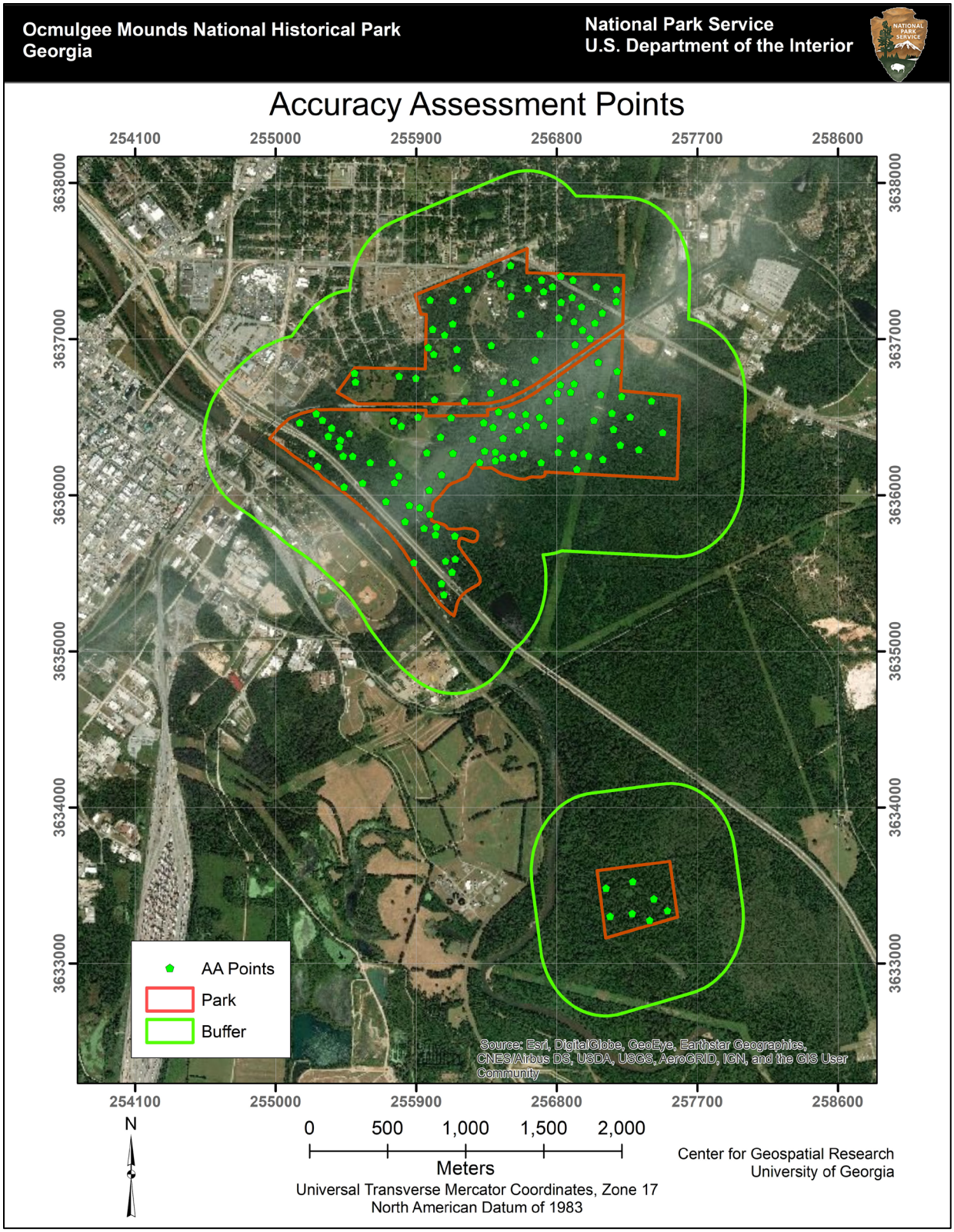


Figure 10. Accuracy Assessment data collection locations from Ocmulgee Mounds National Historical Park overlaid on visual imagery.

Accuracy of Vegetation Map

Once the accuracy assessment plot data were received, they were overlaid on top of the draft vegetation maps to determine the accuracy of the map. This process entailed determining whether predicted vegetation classes matched observed accuracy assessment plots. To ensure the most accurate assessment was made, all of the AA plots went through a series of quality assurance and quality control (QA/QC) processes that considered numerous factors in determining if the accuracy assessment plots were placed in locations representative of their polygons. Plots that were deemed unrepresentative of the polygons in question were removed from the final accuracy analysis. The different QA/QC categories are presented in Table 10 and the final accuracy assessment is presented in Table 11a–b in the Quality Assurance of AA Plots subsection below.

Table 10. Breakdown of how the AA plots are related to the vegetation polygons and 2011 imagery.

Type	Code	Number	Status for Final Analysis
Perfect match – primary codes matched	L1	53	Retained
Poor fit deemed by AA field observations	L2	5	Kicked out
Non-existing classes – code that was added after initial NatureServe assessment	L2a	16	Kicked out
Alternate/Secondary Code match	L3	5	Retained
Spatial errors – points were too close to boundaries	M1	7	Kicked out
Key discrepancies – disagreements between AA, NatureServe, and/or imagery	M2	11	Kicked out
Temporal errors – changes since images were acquired	M3	2	Kicked out
Incorrect Match	M5	19	Retained
Changed Polygon	C1	20	Retained (11 polygons adjusted; 3 polygons added)
Total	–	138	97 used for analysis

Quality Assurance of AA Plots

The AA plots were divided into seven categories to better understand the issues that arose in this specific park (Table 10): “perfect match” (L1) if AA plots were assigned the exact same CEGL code as the polygon that they fell in, if the AA plot was labeled as a “poor fit” by the AA field observations thus deeming the plot difficult to classify (L2), if the AA plot was in a polygon that consisted of a CEGL code that was added after the initial NatureServe assessment (L2a), if a secondary class determined by the photo interpretation method matched the accuracy assessment point (L3), if the plot was within 20 meters (65.6 ft) of a polygon boundary placing it in an ecotone region (M1), if the AA plot description greatly differed from the imagery (M2), and if invasives or successional areas influenced the AA plot since the imagery and AA points differed by four years (M3).

The AA point locations were randomly selected within a given polygon, therefore, there was no guarantee that they landed in a location representative of either the polygon or of the plant associations included within the polygon's map unit. For example, an AA point could easily land in a small gully, an inclusion that is too small to map, i.e. less than the minimum mapping unit (0.5 hectares [1.2 ac]), or an ecotone where trees are invading a shrub land. To account for these situations, field observers were tasked with determining not only the vegetation within the AA sample area, but the surrounding area as well. An AA plot would be deemed a poor fit (L2) in cases where the assigned AA location was not easily classified by one of the designated vegetation classes. These instances included AA plots that fell inside of an ecotone or inclusion, or in an anomalous situation such as in a gully or sandy area (McManamay et al. 2012).

The AA plots labeled as non-existing class refer to those that fell within polygons of a CEGL code not included in the initial NatureServe assessment. There were four CEGL codes added to the OCMU Vegetation Mapping Project (4048, 4692, 4732, and 7412) by the University of Georgia Center for Geospatial Research following ground-truthing, photo interpretation, and during the creation of the draft map. These added CEGL classes were not used as assignment options to the AA field observers, and therefore couldn't be correctly assigned during the AA process. If an AA point landed in one of these polygons, they were deemed non-existing class (L2a) and not included in the final accuracy assessment.

The AA plots that were found to overlap other polygons (within 20 meters [65.6 ft] of a polygon boundary) or were within an area smaller than the minimum mapping unit were labeled "spatial mismatch" (M1). Plots that fall in these regions are difficult to classify and can be easily misinterpreted due to the dynamic nature of this park and the transitional qualities of these areas, therefore those seven points were removed accordingly.

Discrepancies between what could be seen from an aerial perspective versus the ground perspective were also considered, in addition to plot locations that disagreed with a nearby NatureServe (within 40 meters [131.2 ft]) vegetation plot. These AA plots were labeled "key mismatches" (M2). These 11 instances were removed since the accuracy assessment was done four years after the aerial imagery was flown and some areas in the park changed vegetation classes over that time. Discrepancies such as these were expected since the park has many successional classes and wetland regions.

There were numerous locations that showed only emergent vegetation when the imagery was acquired yet during the accuracy assessment there was a well-developed short canopy, thus causing a class discrepancy. These AA plots were labeled "temporal mismatches" (M3) and the two instances were removed from the analysis.

Finally, to ensure the most effective map was created, 11 polygons were adjusted based on the new information provided by the AA plots. All available data was used to create a final vegetation classification for Ocmulgee Mounds National Historical Park and the confusion matrix for the park is shown in Table 11a–b. Overall 41 AA points were removed (L2, M1, M2, and M3) based on the points lying in locations that were deemed unrepresentative of the polygon or imagery from 2011.

This left 97 AA points that were used to assess the map based on the 2011 imagery. The overall assessment showed an 80% accuracy and a kappa rating of 77% using the 97 AA points.

Table 11a. Confusion matrix for the accuracy assessment. The rows are the expected vegetation class as predicted by the photo interpretation conducted by the UGA Center for Geospatial Research, and the columns are the observed vegetation class at the AA point.

Vegetation Class	4232	4290	4606	4740	7329	7412	7726	7730	7734	8585	Total
4232	22	0	0	0	0	0	0	0	0	0	**22**
4290	0	6	0	0	0	0	0	0	0	0	**6**
4606	1	0	3	0	0	0	1	0	0	1	**6**
4740	0	0	1	5	0	0	0	0	0	0	**6**
7329	0	0	1	0	8	0	1	0	1	0	**11**
7412	0	0	0	0	0	0	0	0	1	0	**1**
7726	0	0	0	0	1	0	9	0	0	4	**14**
7730	0	0	0	2	1	0	0	16	3	0	**22**
7734	0	0	0	0	0	0	0	0	8	0	**8**
8585	0	0	0	0	0	0	0	0	0	1	**1**
Total	**23**	**6**	**5**	**7**	**10**	**0**	**11**	**16**	**13**	**6**	**97**

Table 11b. Accuracy and error for the confusion matrix. Overall accuracy is 80. Kappa is 77.

Accuracy / error type	4232	4290	4606	4740	7329	7412	7726	7730	7734	8585
Producer Accuracy	96[a]	100[a]	60[b]	71[a]	80[a]	0[b]	82[a]	100[a]	62[b]	17[b]
Omission Error	4	0	40	29	20	0	18	0	38	83
User Accuracy	100[a]	100[a]	50[b]	83[a]	73[a]	0[b]	64[b]	73[a]	100[a]	100[a]
Commission Error	0	0	50	17	27	100	36	27	0	0

[a] Green represents accuracy greater than or equal to 70%

[b] Red represents accuracy less than 70%

Potential Improvements

During the analysis of this park a few key issues were identified that could increase the efficiency and effectiveness of this process. These issues, which will be described in more detail below, involve supplying the AA surveyors with basic data, including the CIR imagery used for photointerpretation, polygon boundaries (unlabeled), and NatureServe plot information.

The largest errors associated with the AA plots in Ocmulgee Mounds NHP were based on spatial mismatches. If the AA surveyors were provided digital copies of the aerial photographs, in GeoPDF form, they could see the vegetation from an aerial perspective, thus providing a broader context of the area in question. Using the GeoPDF format, blank polygon files could be provided to reduce errors caused by AA plots that are within 20 meters (65.6 ft; or many times even less) to a polygon boundary, or located in areas that have drastically changed since the imagery was acquired. These areas are very difficult to classify and typically represent a very gradual change between vegetation classes that could span 10's of meters. By utilizing this technique even more errors can be reduced: 9 of 138 (M1and M3) for Ocmulgee Mounds NHP were attributed to these errors.

Accuracy assessment surveyors should have access to the Nature Serve Plot locations and information, this would allow them to better understand the system the photo interpretation was based upon. There were a few instances that have a Nature Serve and AA point within 40 meters (131.2 ft) of each other that assign conflicting classes. There were 11 points removed due to the AA points disagreeing with nearby, less than 50 meters (164 ft), vegetation plots or containing features that were nonexistent in the aerial imagery (M2).

Overall using these simple additions up to 14% more points could have been used in the accuracy assessment of the park.

Conclusions

A final vegetation map for Ocmulgee Mounds National Historical Park was created to represent the vegetation occurring within the park during 2011. This product represents the final of four steps necessary to produce an accurate vegetation map based upon aerial photographs. This includes the determination of the CEGL codes (2008) and acquisition of aerial imagery (2011), using aerial imagery, with ground truthing (2014), to create a draft vegetation map, performing an accuracy assessment (2015), and then using all the available information to create a final vegetation map (2017).

Ocmulgee Mounds NHP has a 17,000-year history of human use. Images from Froeschauer (1989) show that large areas adjacent to the railroad and mounds were completely deforested in the early 1900s; other areas were likely also deforested. Broad-scale vegetation maps from the 1970s (Froeschauer 1989) show a very different landscape pattern. The vegetation communities reflect this anthropogenic influence, since many of the forested areas are dominated by early successional species such as *Liquidambar styraciflua* (sweet gum) and *Acer negundo* (box elder).

While the National Vegetation Classification System intends to capture stable vegetation categories, either man-made or natural disturbances may change some areas during the seven years required to produce a vegetation map. For example, changes in non-tree dominated areas, which are typically wetlands in this region, may shift annually depending upon local weather, or cover by invasive exotics may change rapidly. More importantly, both of these natural and anthropogenic changes will likely continue in the future. Therefore, the vegetation map should be evaluated as a snapshot.

As a result of the extensive past land use history, applying the National Vegetation Classification System scheme to the association (CEGL) level was challenging. The present vegetation of Ocmulgee Mounds NHP likely reflects both direct and indirect influences of human habits and land use. The direct influences are related to land use during the past 100 to 200 years, including broad-scale land clearing, agriculture, and selective timbering. Indirect influences include: altered hydrology, which is particularly important in lowland areas such as OCMU; altered nutrient cycles; and colonization by exotic plant species. The indirect influences may shift the normal vegetative successional patterns (Davis et al. 2005; Thompson et al. 2011; Thompson et al. 2013). The wide-distribution of two invasive exotic pest plants are indicative of direct and indirect influence of land-use history on current vegetation, Chinese privet and Chinese tallow. Chinese privet (*Ligustrum sinense*) is dominant in the understory of many forested areas, forming an impenetrable understory in some places. Chinese tallow (*Triadica sebifera*) is transforming open, graminoid wetlands typical of lowland areas to savannas. Since trees have higher evapotranspiration than graminoids, Chinese tallow invasion may alter the hydrology of invaded wetlands. As noted above, the National Vegetation Classification System is not readily applicable to disturbed communities. Overall, the land use history of the park presented challenges in applying the National Vegetation Classification System.

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Appendix A. Flight Line Information

Table A-1. Ocmulgee Mounds NHP flight line and photo numbers and photo center coordinates (UTM Zone 17, NAD83). Photos were acquired by Aero-Metric at 1:12,000 scale on May 1, 2011.

Flight line	Photo	Easting	Northing
19	1	255355.8	3634312
19	2	255351.3	3635405
19	3	255359.6	3636521
19	4	255351.8	3637607
19	5	255342.8	3638673
20	1	257258.9	3632122
20	2	257260.7	3633226
20	3	257265.0	3634327
20	4	257243.2	3635420
20	5	257265.0	3636501
20	6	257270.5	3637582
20	7	257269.6	3638644

Appendix B. NatureServe Vegetation Plot Locations and Notes

Table B-1. Field data acquired by L. Kruse and G. Burke in April and July 2008.

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
OCMU001	32.8434	-83.6015	Loblolly – Sweetgum – Water Oak Forest	4232	–	Broad-leaved	Mixed evergreen/ cold-deciduous	Forest
OCMU002	32.8438	-83.5984	Hardwood Mesic Drain Forest	7726	–	Broad-leaved	Cold-deciduous	Forest
OCMU003	32.8394	-83.6143	Water Willow Oak Lowland Terrace	7726	–	Broad-leaved	Cold-deciduous	Forest
OCMU004	32.8451	-83.6057	Loblolly Forest	4232	–	Needle-leaved	Evergreen	Forest
OCMU005	32.8410	-83.6114	Lawn/Meadow	–	–	Graminoid	Herb - perennial	Herbaceous
OCMU006	32.8367	-83.6020	Rich Sweetgum – Hornbeam-Slope Forest	8585	–	Broad-leaved	Cold-deciduous	Forest
OCMU007	32.8389	-83.6046	Lowland Deciduous Hardwood Forest	7726	–	Broad-leaved	Cold-deciduous	Forest
OCMU008	32.8298	-83.6067	Sugarberry, Water Oak Floodplain Terrace	4740	–	Broad-leaved	Cold-deciduous	Forest
OCMU009	32.8300	-83.6038	Lowland Deciduous Forest – Floodplain Terrace	7730	Trails/Roads, logging, beaver	Broad-leaved	Cold-deciduous	Forest
OCMU010	32.8327	-83.6060	Sweetgum – Poplar – Elm Floodplain Forest	7329	Erosion, exotic plants, area appears rooted as by hogs	Broad-leaved	Cold-deciduous	Forest
OCMU011	32.8132	-83.5916	Lowland Wet Pine – Hardwood	4606	–	Mixed	Cold-deciduous	Forest

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
OCMU012	32.8364	-83.6104	Bottomland Alluvial Terrace	7734	Hog rooting within plot	Broad-leaved	Cold-deciduous	Forest
OCMU013	32.8407	-83.5996	Floodplain Leersia Wetland	4290	–	Graminoid	Herb-perennial	Herbaceous
OCMU014	32.8392	-83.5943	Leersia Alluvial Wetland	4290	–	Graminoid	Herb-perennial	Herbaceous
OCMU015	32.8404	-83.5926	Mesic Pine – Sweetgum Forest	4606	–	Broad-leaved	Cold-deciduous	Forest
OCMU016	32.8403	-83.5922	Lowland Alluvial Hardwood Forest	7329	–	Broad-leaved	Cold-deciduous	Forest

Appendix C. Photointerpretation Key

The photointerpretation key describes the attributes of the color infrared (CIR) images used to delineate the vegetation association community element global (CEGL) codes found within the park. For each community element global code, a color infrared image chip from within the park is included. For most CEGL codes, we also included a ground based digital photo of the vegetation, taken within the park. The standard visual cues to interpret and distinguish vegetation are described, including color, tone, texture, and pattern. When applicable, we also include comments on location within the park or topographic position. If there were other vegetation associations within the park that appeared similar on the CIR photographs, traits used to distinguish between similar vegetation associations are described.

The Vegetation Description for the community element global codes within the park was copied directly from NatureServe (2009) to provide plot level information on species composition, dominance, characteristic species, and percent estimate of vegetation cover in understory, midstory, or canopy. It also includes the Global Description and geographic distribution. A separate literature cited section of the references from NatureServe (2009) text that was directly copied into the photointerpretation key is included at the end of this appendix.

Cultivated Meadow Light

Attributes, descriptions, a photo, and a map are shown in Table C-1, and Figures C-1 and C-2.

Table C-1. Attributes and Descriptions for Cultivated Meadow Light.

Attribute	Description
CEGL Code	4048
Community Name	Cultivated Meadow Light
Color	Green/gray with pink
Tone	Light
Texture	Fine to medium
Pattern	Thin
Height	Very short
Shape	Some straight edges following roads and/or boundaries.
Size	Very common class; medium average size with large variations possible.
Location	Graminoid/Herbaceous (lacking any shrubs or trees) found near cultural sites and transportation.
Association	4692, 4290
Comments	Similar to 4692 but with less pink. Also similar to 4092 but contains mowing lines.



Figure C-1. Example of Cultivated Meadow Light.

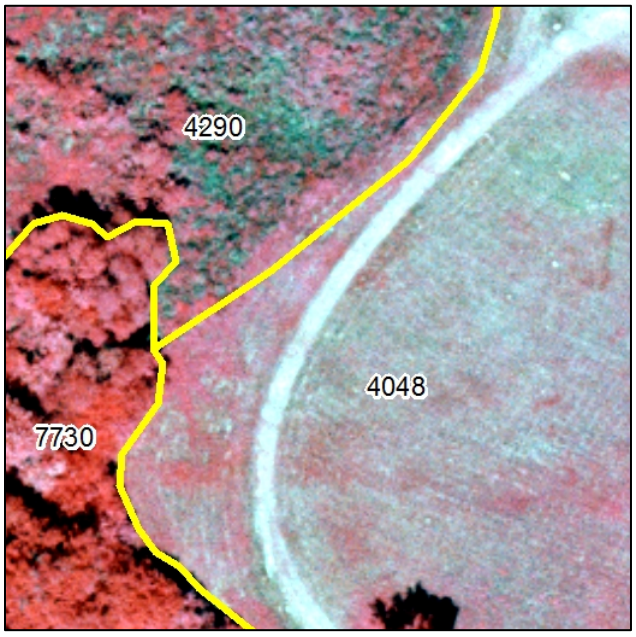


Figure C-2. Map showing Cultivated Meadow Light (4048).

Summary

This association includes grassland pastures and hayfields, more-or-less cultural, though sometimes no longer actively maintained. It is currently defined for the Central and Southern Appalachians, Ozarks, Ouachita Mountains, and parts of the Piedmont and Interior Low Plateau, but it is possible throughout much of the eastern United States and southern Canada. The dominant species in this type are the European "tall or meadow fescues" of uncertain and controversial generic placement. Several other exotic grasses (*Agrostis gigantea, Dactylis glomerata, Holcus lanatus, Phleum pratense*, and *Poa pratensis*, for example) are common associates. These communities are sometimes nearly

monospecific but can also be very diverse and contain many native as well as exotic species of grasses, sedges, and forbs. Exotic forbs include the legumes *Lespedeza cuneata, Trifolium campestre, Trifolium hybridum, Trifolium pratense,* and *Trifolium repens*, as well as *Achillea millefolium, Calystegia sepium, Daucus carota, Leucanthemum vulgare, Oxalis stricta*, and *Plantago lanceolata*. Common native herbs include *Apocynum cannabinum, Desmodium canescens, Dichanthelium clandestinum, Erigeron annuus, Fragaria virginiana, Potentilla simplex, Solanum carolinense, Solidago canadensis*, and *Verbesina occidentalis*.

Loblolly Pine

Attributes, descriptions, a photo, and a map are shown in Table C-2, and Figures C-3 and C-4.

Table C-2. Attributes and Descriptions for Loblolly Pine.

Attribute	Description
CEGL Code	4232
Community Name	Loblolly Pine – (White Oak, Southern Red Oak, Post Oak) Southeastern Interior Forest
Color	Purple with red components
Tone	Medium to dark
Texture	Coarse
Pattern	Moderate to dense canopy
Height	Tall
Shape	Very expansive and broad.
Size	The most common class; the largest average size with very large variation possible.
Location	Pine dominated forest found on slopes or ridge tops that are never flooded.
Association	4606 and 7726
Comments	Easily distinguishable in OCMU because it is dominated by pines.



Figure C-3. Example of Loblolly Pine.

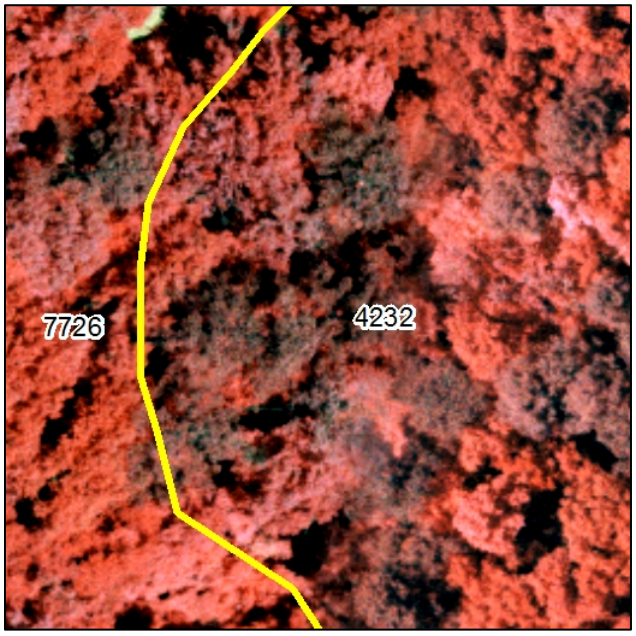


Figure C-4. Map showing Loblolly Pine (4232).

Summary

Ocmulgee Mounds National Historical Park Vegetation

The moderate (50–60% cover) tree canopy, 20–35 meters (65.6–114.8 feet [ft]) tall, is dominated exclusively by *Pinus taeda* (loblolly pine), while the moderately sparse (20–40%) subcanopy (15–20 meters [49.2–65.6 ft]) is made up of various combinations of *Quercus falcata* (southern red oak), *Quercus nigra* (water oak), *Quercus phellos* (willow oak), and *Ulmus alata* (winged elm). The sparse to moderate (20–60%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) and very sparse to moderately dense (5–70%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are dominated by *Liquidambar styraciflua* (sweetgum), *Magnolia grandiflora* (southern magnolia), *Quercus falcata* (southern red oak), *Quercus nigra* (water oak), and *Ulmus alata* (winged elm). Additional shrubs include *Asimina parviflora*

(smallflower pawpaw), *Ilex vomitoria* (yaupon), *Prunus caroliniana* (Carolina laurelcherry), *Sassafras albidum* (sassafras), and others. Vines of *Vitis rotundifolia* (muscadine) are particularly prominent in the shrub and herb layers. The sparse (20–40%), generally species-poor herbaceous layer is made up of tree and shrub seedlings along with additional vines of *Lonicera japonica* (Japanese honeysuckle) (exotic), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax bona-nox* (saw greenbrier), and *Toxicodendron radicans* (eastern poison-ivy). Herbs found in small amounts include *Andropogon virginicus* (broomsedge bluestem), *Asplenium platyneuron* (ebony spleenwort), *Mitchella repens* (partridgeberry), *Piptochaetium avenaceum* (blackseed speargrass), and *Rubus argutus* (sawtooth blackberry).

Global Vegetation

Stands of this mixed oak-pine upland forest association are dominated by a combination of various oaks and other hardwoods with *Pinus* (pine) spp. *Pinus taeda* (loblolly pine) or *Pinus virginiana* (Virginia pine) are usually present or codominant, being generally less abundant in more mature stands. *Quercus falcata* (southern red oak) is characteristic, but other oaks are also present, including *Quercus alba* (white oak), *Quercus stellata* (post oak), *Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), *Quercus marilandica* (blackjack oak), and *Quercus phellos* (willow oak), along with *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Nyssa sylvatica* (blackgum), *Pinus echinata* (shortleaf pine), and *Quercus nigra* (water oak). The subcanopy may include *Acer rubrum* (red maple), *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory), *Cornus florida* (flowering dogwood), *Oxydendrum arboreum* (sourwood), *Prunus serotina* (black cherry), and *Ulmus alata* (winged elm), as well as smaller oaks, particularly *Quercus velutina* (black oak). The shrub layers may include *Fagus grandifolia* (American beech), *Vaccinium arboreum* (farkleberry), and *Vaccinium pallidum* (Blue Ridge blueberry), with *Asimina parviflora* (smallflower pawpaw), *Cercis canadensis* (eastern redbud), *Cornus florida* (flowering dogwood), *Diospyros virginiana* (common persimmon), *Euonymus americanus* (strawberry bush), *Sassafras albidum* (sassafras), *Toxicodendron radicans* (eastern poison-ivy), *Vaccinium pallidum* (Blue Ridge blueberry), and *Viburnum acerifolium* (mapleleaf viburnum). The herbaceous layer may include *Andropogon virginicus* (broomsedge bluestem), *Asplenium platyneuron* (ebony spleenwort), *Chimaphila maculata* (striped prince's pine), *Coreopsis major* (greater tickseed), *Dichanthelium* (rosette grass) spp., *Gaultheria procumbens* (eastern teaberry), *Mitchella repens* (partridgeberry), and *Polystichum acrostichoides* (Christmas fern). Typical vines include *Bignonia capreolata* (crossvine), *Decumaria barbara* (woodvamp), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax* (greenbrier) spp., *Toxicodendron radicans* (eastern poison-ivy), *Vitis aestivalis* (summer grape), and *Vitis rotundifolia* (muscadine). The presence of invasive exotics such as *Lonicera japonica* (Japanese honeysuckle) and *Ligustrum* (privet) *sinense* may be common.

Smartweed—Cutgrass Beaver Pond

Attributes, descriptions, a photo, and a map are shown in Table C-3, and Figures C-5 and C-6.

Table C-3. Attributes and Descriptions for Smartweed—Cutgrass Beaver Pond.

Attribute	Description
CEGL Code	4290
Community Name	Smartweed – Cutgrass Beaver Pond
Color	Pink with green
Tone	Light
Texture	Very smooth
Pattern	Thin to scattered
Height	Very short
Shape	Irregular
Size	Uncommon class; very small average size with very little variation.
Location	Graminoid/Herbaceous (lacking many shrubs or trees); wet, low lying areas.
Association	7730, 7712
Comments	Similar to 4048, 4692, and 4732, but does not contain mowing lines (4048 and 4092) and is smoother than 4732.



Figure C-5. Example of Smartweed—Cutgrass Beaver Pond.

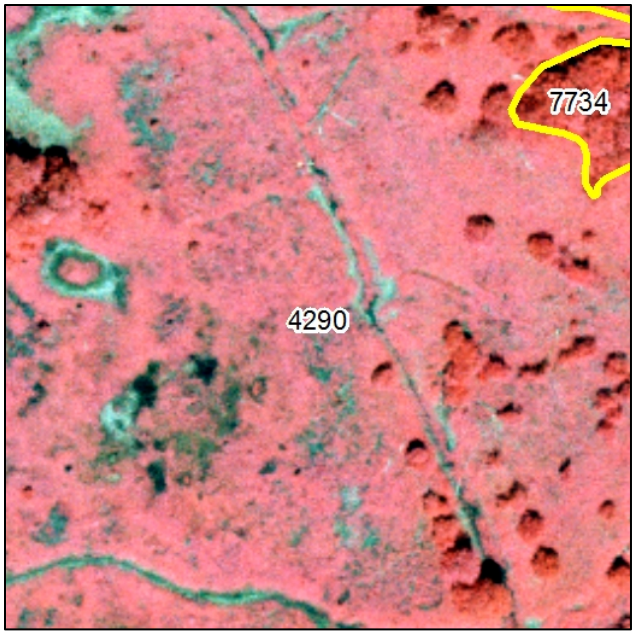


Figure C-6. Map showing Smartweed—Cutgrass Beaver Pond (4290).

Summary

Ocmulgee Mounds National Historical Park Vegetation

This graminoid-dominated community is defined by the completely closed (100% cover) herbaceous layer, dominated exclusively by *Leersia oryzoides* (rice cutgrass). Additional important herbs include *Carex lupulina* (hop sedge), *Panicum hemitomon* (maidencane), *Polygonum setaceum* (bog smartweed), *Solidago altissima*, and the invasive exotics *Echinochloa crus-galli* (barnyardgrass), *Microstegium vimineum* (Nepalese browntop), *Murdannia keisak* (wartremoving herb), and *Paspalum urvillei* (Vasey's grass). There is also a very sparse (10–20%) emergent shrub layer (2–5 meters [6.6–16.4 ft] tall) of *Salix nigra* (black willow) and *Sesbania punicea* (rattlebox). Other herbs include *Boehmeria cylindrica* (small-spike false nettle), *Cyperus pseudovegetus* (marsh flatsedge), *Eupatorium serotinum* (lateflowering thoroughwort), *Juncus effusus* (common rush), *Ludwigia decurrens* (wingleaf primrose-willow), *Mikania scandens* (climbing hempvine), *Polygonum sagittatum*, and many others. A total of nine exotic species were recorded from two plots, many of them found in significant numbers. Yearly flooding dynamics may shift the dominance of *Leersia oryzoides* (rice cutgrass) toward other species.

Global Vegetation

Stands of this vegetation are dominated by some combination of *Polygonum punctatum* (dotted smartweed), *Polygonum hydropiperoides* (swamp smartweed), *Leersia lenticularis* (catchfly grass), *Leersia oryzoides* (rice cutgrass), and/or *Leersia virginica* (whitegrass). Other herbaceous species which may be present include *Polygonum densiflorum* (denseflower knotweed), *Saururus cernuus* (lizard's-tail), *Proserpinaca* (mermaidweed) sp., *Sparganium americanum* (American bur-reed), *Typha latifolia* (broadleaf cattail), *Scirpus cyperinus* (woolgrass), *Lobelia cardinalis* (cardinalflower), *Onoclea sensibilis* (sensitive fern), *Penthorum sedoides* (ditch stonecrop),

Boehmeria cylindrica (small-spike false nettle), *Sambucus canadensis* (common elderberry), *Bidens aristosa* (bearded beggarticks), and *Xanthium strumarium* (rough cockleburr). Scattered individuals of *Cephalanthus occidentalis* (common buttonbush) and *Acer saccharinum* (silver maple) or other woody plants may be present. Examples which have become dried-out (through drought and/or beaver dam failure) may exhibit greater dominance by *Leersia* (cutgrass) rather than *Polygonum* (knotweed). The combination of *Polygonum punctatum - Leersia virginica* was first noted, but the combination of *Polygonum hydropiperoides* (swamp smartweed) and *Leersia lenticularis* (catchfly grass) has also been observed in the Oconee National Forest. At Ocmulgee Mounds NHP near Macon, Georgia, *Leersia oryzoides* (rice cutgrass) was the sole dominant at the time of sampling.

Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest

Attributes, descriptions, a photo, and a map are shown in Table C-4, and Figures C-7 and C-8.

Table C-4. Attributes and Descriptions for Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest.

Attribute	Description
CEGL Code	4606
Community Name	Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest
Color	Red to purple
Tone	Medium to dark
Texture	Moderately coarse
Pattern	Moderate to dense
Height	Medium to tall
Shape	Very patchy
Size	One of the most common classes; very large patches with large variations possible.
Location	Mesic mixed forest found on or near lower slopes.
Association	4232, 7726
Comments	Usually found as a transition between 4232 and 7726, and located in more upland regions compared to 7726.



Figure C-7. Example of Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest.

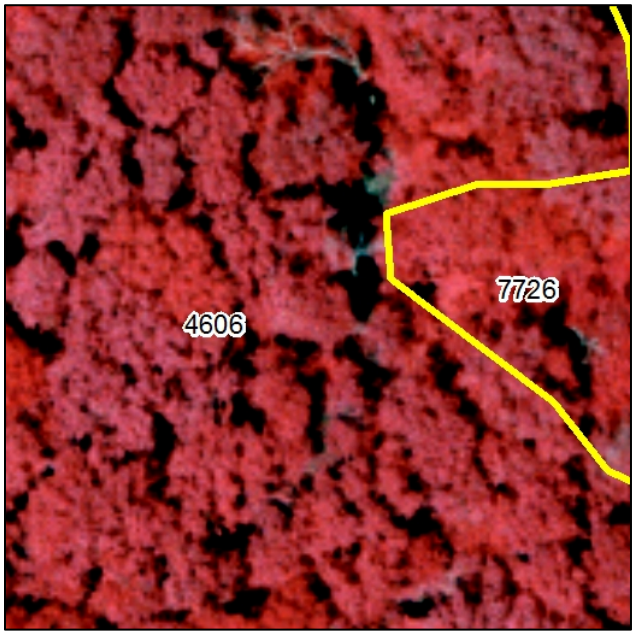


Figure C-8. Map showing Loblolly Pine—Sweetgum—Swamp Tupelo Successional Swamp Forest (4606).

Summary

Ocmulgee Mounds National Historical Park Vegetation

The moderate (40–60% cover) tree canopy, 20–50 meters (65.6–164 ft) tall, is codominated by *Liquidambar styraciflua* (sweetgum) and *Pinus taeda* (loblolly pine); *Fraxinus pennsylvanica* (green ash) and *Quercus nigra* (water oak) may also be present. The sparse (20%) subcanopy (10–20 meters [32.8–65.6 ft]) includes canopy species and *Ulmus alata* (winged elm). The dense (70–90%) tall-shrub layer (5–10 meters [16.4–32.8 ft) is dominated by the invasive exotic *Ligustrum sinense* (Chinese privet); additional tall shrubs may include *Acer negundo* (box elder), *Arundinaria gigantea* (giant cane), *Carpinus caroliniana* (American hornbeam), and canopy tree saplings. Due to the dense

tall-shrub layer, the short-shrub layer (1–2 meters [3.3–6.6 ft]) and herbaceous layer are very sparse (5% and 10% cover, respectively). *Sabal minor* (dwarf palmetto) is a common short shrub, and herbs include *Arisaema triphyllum* (Jack in the pulpit), *Athyrium filix-femina* (common ladyfern), *Boehmeria cylindrica* (small-spike false nettle), *Carex* (sedge) spp., *Dioscorea quaternata* (fourleaf yam), *Mikania scandens* (climbing hempvine), *Onoclea sensibilis* (sensitive fern), and *Polygonum setaceum* (bog smartweed). Vines are abundant and may be found trailing along the ground or climbing into the upper layers. Common species include *Berchemia scandens* (Alabama supplejack), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine).

Global Vegetation

The canopy is dominated by some combination of *Pinus taeda* (loblolly pine), *Liquidambar styraciflua* (sweetgum), and *Nyssa biflora* (swamp tupelo). A mixture of other bottomland hardwood species may be present which includes *Diospyros virginiana* (common persimmon), *Quercus nigra* (water oak), *Acer rubrum* (red maple), *Quercus michauxii* (swamp chestnut oak), *Quercus laurifolia* (laurel oak), *Ulmus alata* (winged elm), *Carya cordiformis* (bitternut hickory), *Ulmus americana* (American elm), *Quercus pagoda* (cherrybark oak), *Celtis laevigata* (sugarberry), *Quercus phellos* (willow oak), *Fagus grandifolia* (American beech), *Carya alba* (mockernut hickory), and others. *Asimina triloba* (pawpaw) may be prominent in the understory with *Ilex decidua* (possumhaw), *Carpinus caroliniana* (American hornbeam), *Crataegus viridis* (green hawthorn), *Crataegus spathulata* (littlehip hawthorn), *Ilex opaca* (American holly), *Arundinaria gigantea* (giant cane), and other species. Vines such as *Vitis rotundifolia* (muscadine), *Vitis aestivalis* (summer grape), *Smilax* (greenbrier) spp., *Cocculus carolinus* (Carolina coralbead), and *Berchemia scandens* (Alabama supplejack) may be important, and the herbaceous layer likely includes *Boehmeria cylindrica* (small-spike false nettle), *Carex* (sedge) spp., and scattered ferns such as *Onoclea sensibilis* (sensitive fern). At Ocmulgee Mounds National Historical Park near Macon, Georgia, *Ligustrum sinense* (Chinese privet) can dominate the shrub layer.

Disturbed Herbaceous Vegetation

Attributes, descriptions, a photo, and a map are shown in Table C-5, and Figures C-9 and C-10.

Table C-5. Attributes and Descriptions for Disturbed Herbaceous Vegetation.

Attribute	Description
CEGL Code	4692
Community Name	Disturbed Herbaceous Vegetation
Color	Pink with green/gray
Tone	Light
Texture	Smooth to medium
Pattern	Thin

Table C-5 (continued). Attributes and Descriptions for Disturbed Herbaceous Vegetation.

Attribute	Description
Height	Very short
Shape	Patchy
Size	Rare class; small average size with very little variation.
Location	Graminoid/Herbaceous (lacking many shrubs or trees) found on or near cultural sites and transportation.
Association	4048, 4290
Comments	Similar to 4048 but contains more pink regions. Also similar to 4092 but generally not as smooth.



Figure C-9. Example of Disturbed Herbaceous Vegetation.

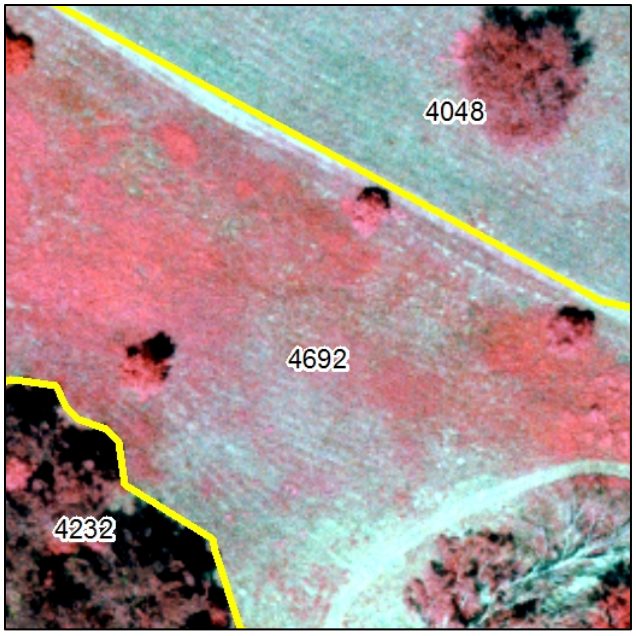


Figure C-10. Map showing Disturbed Herbaceous Vegetation (4692).

Summary

Some of the codominant plant species include *Panicum anceps* (beaked panicgrass), *Juncus effusus* (common rush), *Dichanthelium scoparium* (velvet panicum), *Solidago canadensis* (Canada goldenrod), *Symphyotrichum dumosum* (rice button aster), *Tripsacum dactyloides* (eastern gamagrass), and *Vernonia gigantea* (giant ironweed).

Blackberry—Greenbriar Successional Shrubland Thicket

Attributes, descriptions, a photo, and a map are shown in Table C-6, and Figures C-11 and C-12.

Table C-6. Attributes and descriptions of Blackberry—Greenbriar Successional Shrubland Thicket.

Attribute	Description
CEGL Code	4732
Community Name	Blackberry—Greenbriar Successional Shrubland Thicket
Color	Gray and pink
Tone	Medium
Texture	Medium to coarse
Pattern	Thin
Height	Short
Shape	Elongated, typically with straight edges.
Size	Uncommon class; very small average size with small variations.

Table C-6 (continued). Attributes and descriptions of Blackberry—Greenbriar Successional Shrubland Thicket.

Attribute	Description
Location	Shrub land found in wet areas near power lines.
Association	4290
Comments	Similar to 4048 and 4692 but does not have mowing lines and has a coarser texture. Also similar to 4092 but generally not as smooth.



Figure C-11. Example of Blackberry—Greenbriar Successional Shrubland Thicket.

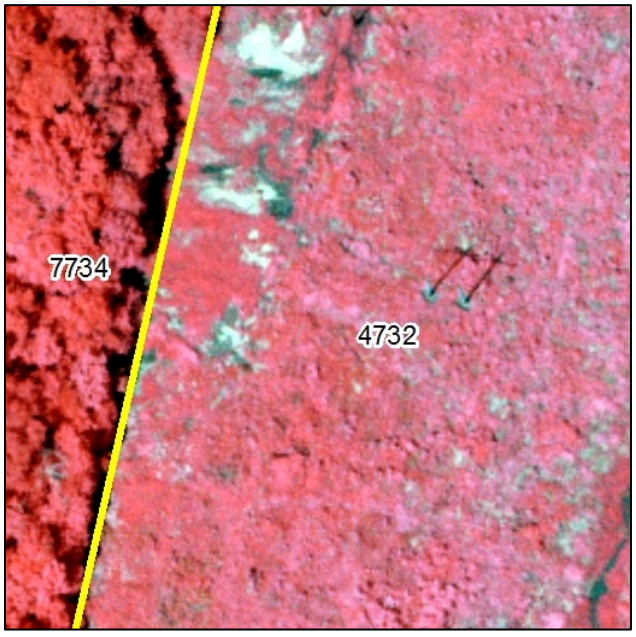


Figure C-12. Map showing Blackberry—Greenbriar Successional Shrubland Thicket (4732).

Summary

Global Vegetation

Stands of this association are dominated by greenbrier species (*Smilax glauca* (cat greenbrier), *Smilax rotundifolia* (roundleaf greenbrier)) and blackberries/dewberries (*Rubus argutus* (sawtooth blackberry), *Rubus trivialis* (southern dewberry)). They also contain a great variety of tree saplings and other woody species (e.g., *Quercus* (oak) spp., *Liquidambar styraciflua* (sweetgum), *Acer rubrum* (red maple), *Rhus copallinum* (flameleaf sumac)). Some herbs in central Tennessee examples may include *Solidago* (goldenrod) spp., *Asteraceae* spp., *Helianthus* (sunflower) spp., *Hypericum* (St. Johnswort) spp., *Potentilla simplex* (common cinquefoil); grasses may include *Andropogon* (bluestem) spp., *Dichanthelium* (rosette grass) spp., *Panicum* (panicgrass) spp., *Schizachyrium scoparium* (little bluestem), *Lolium* (ryegrass) spp., and *Sorghastrum nutans* (Indiangrass). Communities that are surrounded by relatively intact ecosystems will tend to have more native species. Those surrounded by old fields or fragmented by development tend to have *Lonicera japonica* (Japanese honeysuckle) as a codominant vine overtopping much of the blackberry and greenbrier.

Atlantic Coastal Plain Sugarberry—Green Ash Levee Forest

Attributes, descriptions, a photo, and a map are shown in Table C-7, and Figures C-13 and C-14.

Table C-7. Attributes and descriptions for Atlantic Coastal Plain Sugarberry—Green Ash Levee Forest.

Attribute	Description
CEGL Code	4740
Community Name	Atlantic Coastal Plain Sugarberry – Green Ash Levee Forest
Color	Pink to red
Tone	Light to dark
Texture	Moderately coarse
Pattern	Medium to dense
Height	Medium to tall
Shape	Elongated with some patchy spots.
Size	Common class; large average area with very large variations possible.
Location	Mesic forest found near Ocmulgee River and other lowland areas.
Association	7730
Comments	Difficult to distinguish from 7726 in summer CIR. Understory exotics can cause confusion with 7730.



Figure C-13. Example of Atlantic Coastal Plain Sugarberry—Green Ash Levee Forest.

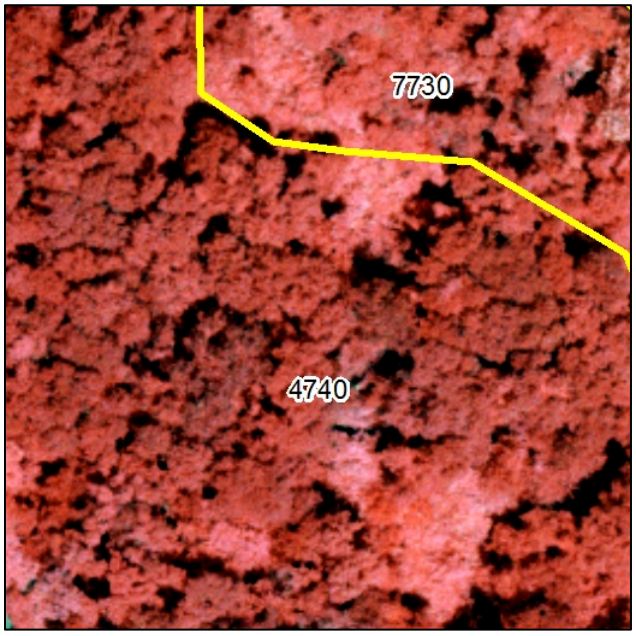


Figure C-14. Map showing Atlantic Coastal Plain Sugarberry—Green Ash Levee Forest (4740).

Summary

Ocmulgee Mounds National Historical Park Vegetation

The dense (80% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is codominated by *Celtis laevigata* (sugarberry) and *Quercus nigra* (water oak), and the sparse (30%) subcanopy (15–20 meters [49.2–65.5 ft]) is dominated by *Ulmus rubra* (slippery elm). The completely closed (100%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is dominated by the exotic invasive *Ligustrum sinense* (Chinese privet). As a result of this dense shrub layer, the short-shrub and herbaceous layers are very sparse but include small amounts of *Cocculus carolinus* (Carolina coralbead), *Asplenium platyneuron* (ebony spleenwort), *Carex caroliniana* (Carolina sedge), *Myosotis macrosperma* (largeseed forget-me-not), and *Galium* (bedstraw) sp. Vines may be found trailing along the ground or climbing into

the upper layers and include *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), *Cocculus carolinus* (Carolina coralbead), and *Vitis rotundifolia* (muscadine).

Global Vegetation

This forest has been documented as occurring in two more-or-less distinct phases (Rice and Peet 1997). Both phases have closed canopies codominated by *Acer negundo* (box elder), *Celtis laevigata* (sugarberry), *Fraxinus pennsylvanica* (green ash), *Liquidambar styraciflua* (sweetgum), and *Ulmus americana* (American elm). Subcanopies range from dense to sparse and are dominated by *Asimina triloba* (pawpaw). One of the phases (the *Asimina triloba* (pawpaw) phase) has a more well-developed understory stratum of *Asimina triloba* (pawpaw) than the other, although it is at least 'frequent' in the other, lower-density phase (Rice and Peet 1997). The other phase is called the *Carex grayi - Carex louisianica* Phase, and its understory is often a continuous, dense mixture of *Carex* (sedge) species. The relative abundance and diversity of understory herbs are inversely related to the abundance of *Asimina triloba* (pawpaw); however, *Arundinaria gigantea* (giant cane) often has a higher abundance under *Asimina* (pawpaw). Vines are also common, and important species include *Toxicodendron radicans* (eastern poison-ivy), *Parthenocissus quinquefolia* (Virginia creeper), and *Smilax rotundifolia* (roundleaf greenbrier). In the Congaree Swamp National Monument, South Carolina, the mostly closed canopy of this community is dominated by *Celtis laevigata* (sugarberry), *Juglans nigra* (black walnut), *Acer negundo* (box elder), *Liquidambar styraciflua* (sweetgum), and *Ulmus americana* (American elm). These species are important in the well-developed subcanopy also. These occurrences differ from the Roanoke River occurrences by having a lesser amount of tree importance contributed by *Fraxinus pennsylvanica* (green ash) and by having substantial amounts of *Juglans nigra* (black walnut). A variety of other tree species are possible in these strata; these species include *Fraxinus pennsylvanica* (green ash), *Platanus occidentalis* (American sycamore), *Quercus laurifolia* (laurel oak), *Diospyros virginiana* (common persimmon), *Carya cordiformis* (bitternut hickory), *Quercus pagoda* (cherrybark oak), *Morus rubra* (red mulberry), and others. The shrub layer ranges from sparse to well-developed and is dominated by *Asimina triloba* (pawpaw) with *Lindera benzoin* (northern spicebush), *Ilex decidua* (possumhaw), and likely other species present as well. The moderately dense understory is dominated by *Elymus virginicus* (Virginia wildrye). Other typical species include *Carex grayi* (Gray's sedge), *Carex retroflexa* (reflexed sedge), *Chasmanthium latifolium* (Indian woodoats), *Elephantopus carolinianus* (Carolina elephantsfoot), *Leersia lenticularis* (catchfly grass), *Polygonum virginianum* (jumpseed), *Sanicula canadensis* (Canadian blacksnakeroot), *Carex bromoides* (bromelike sedge), *Glyceria striata* (fowl mannagrass), *Laportea canadensis* (Canadian woodnettle), and others. The vine stratum is moderate, and many species are possible. Among these are *Bignonia capreolata* (crossvine), *Berchemia scandens* (Alabama supplejack), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax bona-nox* (saw greenbrier), *Smilax tamnoides* (bristly greenbrier), *Vitis rotundifolia* (muscadine), *Matelea carolinensis* (maroon Carolina milkvine), *Cocculus carolinus* (Carolina coralbead), and *Vitis vulpina* (frost grape). The exotics *Ligustrum sinense* (Chinese privet), *Melia azedarach* (Chinaberrytree), *Lonicera japonica* (Japanese honeysuckle), and *Microstegium vimineum* (Nepalese browntop) are present in some occurrences of this community. At Ocmulgee Mounds National Historical Park near Macon, Georgia, this community is documented with nearly 100% cover of *Ligustrum sinense* (Chinese privet) in the shrub strata and thus a sparse, species poor herbaceous layer.

Sweetgum—Tuliptree Brownwater Floodplain Forest

Attributes, descriptions, a photo, and a map are shown in Table C-8, and Figures C-15 and C-16.

Table C-8. Attributes and descriptions for Sweetgum—Tuliptree Brownwater Floodplain Forest.

Attribute	Description
CEGL Code	7329
Community Name	Sweetgum – Tuliptree Brownwater Floodplain Forest
Color	Pink to red
Tone	Medium to dark
Texture	Moderately coarse
Pattern	Sparse to dense
Height	Medium to tall
Shape	Patchy and somewhat elongated
Size	Uncommon class; large sized patches with some variation.
Location	Mesic forest; Near water features in low lying areas.
Association	7730, 4740
Comments	Difficult to distinguish from 7726 in summer CIR but usually found in regions more susceptible to flooding.



Figure C-15. Example of Sweetgum—Tuliptree Brownwater Floodplain Forest.

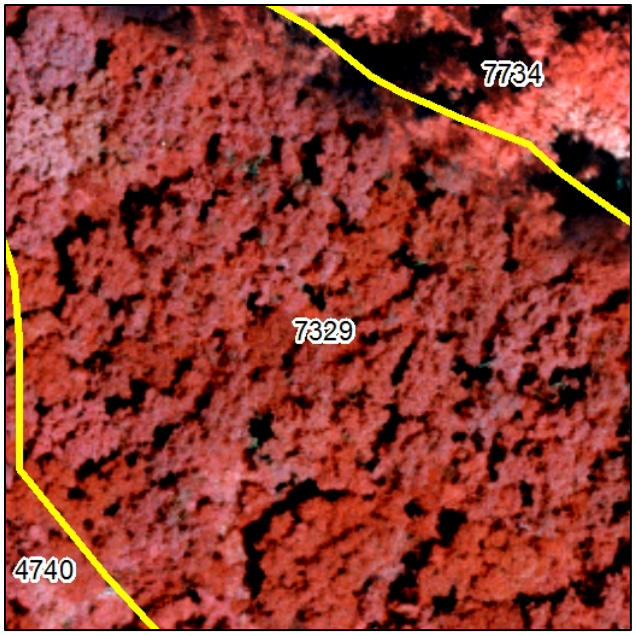


Figure C-16. Map showing Sweetgum—Tuliptree Brownwater Floodplain Forest (7329).

Summary

Ocmulgee Mounds National Historical Park Vegetation

The sparse to dense (30–80% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is dominated by *Liquidambar styraciflua* (sweetgum); one stand is codominated by *Populus deltoides* (eastern cottonwood). The sparse to moderate (30–50%) subcanopy (10–20 meters [32.8–65.6 ft]) may include *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Platanus occidentalis* (American sycamore), *Ulmus alata* (winged elm), and/or *Ulmus rubra* (slippery elm). *Acer negundo* (box elder), *Acer rubrum* (red maple), *Carpinus caroliniana* (American hornbeam), *Celtis laevigata* (sugarberry), and *Crataegus viridis* (green hawthorn) are dominants in the sparse to moderately dense (30–70%) tall-shrub layer (5–10 meters [16.4–32.8 ft]), while *Sabal minor* (dwarf palmetto) may dominate the very sparse (10–20%) short-shrub layer (1–2 meters [3.3–6.6 ft]). Additional shrubs include *Arundinaria gigantea* (giant cane), *Cornus foemina* (stiff dogwood), *Ilex ambigua* (Carolina holly), and the invasive exotic *Ligustrum sinense* (Chinese privet). The very sparse (10–20%) herbaceous layer may include *Arisaema dracontium* (green dragon), *Arisaema triphyllum* (Jack in the pulpit), *Boehmeria cylindrica* (small-spike false nettle), *Carex* (sedge) spp., *Dioscorea quaternata* (fourleaf yam), *Leersia virginica* (whitegrass), *Onoclea sensibilis* (sensitive fern), *Polygonum virginianum* (jumpseed), and others. Vines may be found trailing along the ground or climbing into the upper layers. Common species include *Ampelopsis arborea* (peppervine), *Berchemia scandens* (Alabama supplejack), *Mikania scandens* (climbing hempvine), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine).

Global Vegetation

In addition to *Liquidambar styraciflua* (sweetgum) and *Liriodendron tulipifera* (tuliptree), the canopy may contain *Nyssa biflora* (swamp tupelo) (which is a characteristic species of this type in the Coastal Plain (Jones et al. 1981)) and *Acer rubrum* (red maple). An atypical example on the Ocmulgee River at the fall-line of Georgia (Ocmulgee Mounds NHP) has a canopy codominated by *Populus deltoides* (eastern cottonwood). The subcanopy is well-developed and contains canopy species along with *Carpinus caroliniana* (American hornbeam), *Ilex opaca* var. *opaca* (American holly), *Persea palustris* (swamp bay), *Acer barbatum* (southern sugar maple), *Cornus florida* (flowering dogwood), *Diospyros virginiana* (common persimmon), *Frangula caroliniana* (Carolina buckthorn), *Quercus phellos* (willow oak), *Quercus nigra* (water oak), and *Viburnum nudum* var. *nudum* (possumhaw). Some examples may contain *Pinus taeda* (loblolly pine) or *Ulmus rubra* (slippery elm). Shrubs and vines may include *Arundinaria gigantea* (giant cane), *Berchemia scandens* (Alabama supplejack), *Crataegus viridis* (green hawthorn), *Decumaria barbara* (woodvamp), *Ilex ambigua* (Carolina holly), *Itea virginica* (Virginia sweetspire), *Leucothoe axillaris* (coastal doghobble), *Sabal minor* (dwarf palmetto), *Smilax laurifolia* (laurel greenbrier), *Toxicodendron radicans* (eastern poison-ivy), *Campsis radicans* (trumpet creeper), *Parthenocissus quinquefolia* (Virginia creeper), and *Vitis rotundifolia* (muscadine). Herbs may include *Boehmeria cylindrica* (small-spike false nettle), *Mitchella repens* (partridgeberry), *Carex* (sedge) spp., *Polystichum acrostichoides* (Christmas fern), *Onoclea sensibilis* (sensitive fern) and *Woodwardia areolata* (netted chainfern; Jones et al. 1981).

Chinese Tallow Seasonally Flooded Forest

Attributes, descriptions, a photo, and a map are shown in Table C-9, and Figures C-17 and C-18.

Table C-9. Attributes and descriptions for Chinese Tallow Seasonally Flooded Forest.

Attribute	Description
CEGL Code	7412
Community Name	Chinese Tallow Seasonally Flooded Forest
Color	Pink
Tone	Light
Texture	Very smooth
Pattern	Homogenous
Height	Short to medium
Shape	Various shapes
Size	Common class; medium sized patches with large variation.
Location	Mesic forest found near water, or seasonally flooded regions.

Table C-9 (continued). Attributes and descriptions for Chinese Tallow Seasonally Flooded Forest.

Attribute	Description
Association	7730,7734
Comments	Difficult to distinguish from 7734, but generally has more of a homogenous canopy.



Figure C-17. Example of Chinese Tallow Seasonally Flooded Forest.

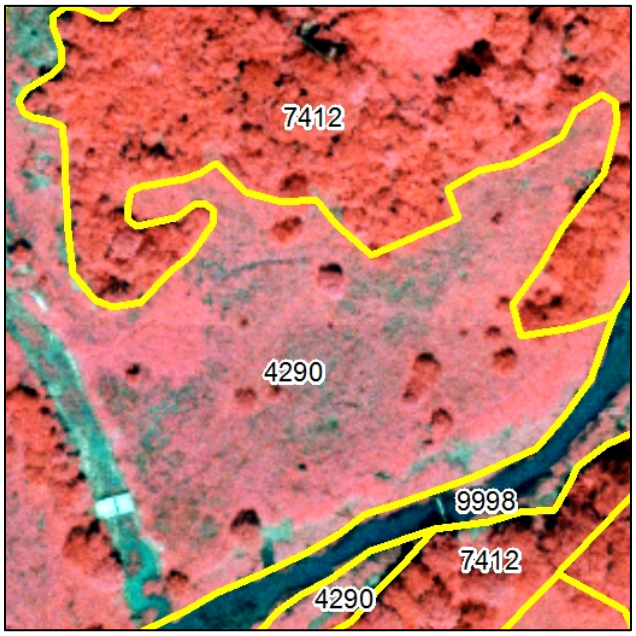


Figure C-18. Map showing Chinese Tallow Seasonally Flooded Forest (7412).

Summary

This wetland forest type is broadly defined to cover a variety of sites strongly dominated by the exotic tree *Triadica sebifera* (= *Sapium sebiferum*) (Euphorbiaceae). Other wetland trees may be present including *Acer rubrum* var. *drummondii*, *Salix nigra*, and *Salix caroliniana*. Various wetland grasses, sedges, and forbs are present.

Sweetgum-(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest

Attributes, descriptions, a photo, and a map are shown in Table C-10, and Figures C-19 and C-20.

Table C-10. Attributes and descriptions for Sweetgum-(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest.

Attribute	Description
CEGL Code	7726
Community Name	Sweetgum—(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest
Color	Red with some purple
Tone	Medium to dark
Texture	Medium to coarse
Pattern	Usually dense
Height	Medium to tall
Shape	Patchy, slightly elongated
Size	Very common class; large sized areas with little variation.
Location	Hardwood dominated forest found on slopes that are never flooded.
Association	Near pine dominated forests (4606, 4232)
Comments	Usually adjacent to pine dominated forests, but difficult to separate from 8585 in CIR because of the prevalence of oaks.



Figure C-19. Example of Sweetgum—(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest.

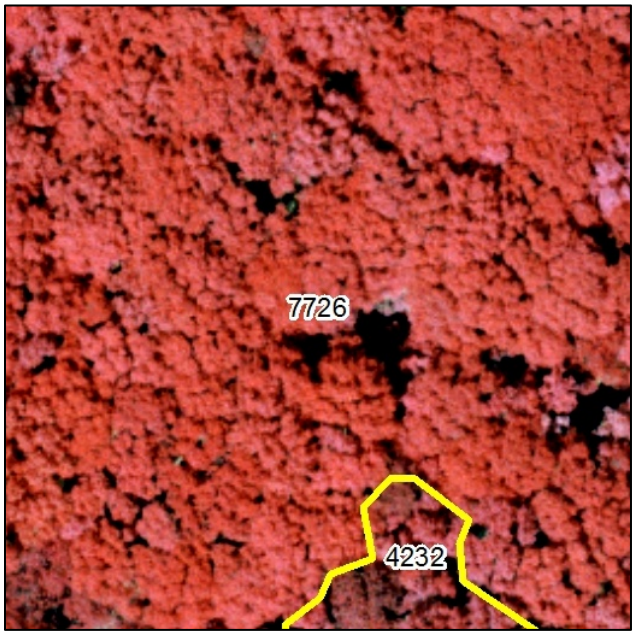


Figure C-20. Map showing Sweetgum—(Water Oak, Willow Oak)—Loblolly Pine/Elliott's Blueberry—Wax-myrtle Forest (7726).

Summary

Ocmulgee Mounds National Historical Park Vegetation

At Ocmulgee Mounds NHP, this forest tends to be rich with mixtures of high-quality site indicators, early-successional, and exotic species. The moderate to dense (60–80% cover) tree canopy, 20–35 meters [65.6–114.8 ft] tall, is dominated by varying combinations of *Liquidambar styraciflua* (sweetgum), *Pinus taeda* (loblolly pine), *Quercus nigra* (water oak), and *Quercus phellos* (willow oak) and may also include *Fraxinus pennsylvanica* (green ash) and *Liriodendron tulipifera* (tuliptree). The sparse (10–30%) subcanopy (10–20 meters [32.6–65.6 ft]) may include canopy

species as well as *Carya cordiformis* (bitternut hickory), *Celtis laevigata* (sugarberry), and *Quercus pagoda* (cherrybark oak). Dominants in the moderate (40–50%) tall-shrub layer (2–10 meters [6.6–32.8 ft) may include *Arundinaria gigantea* (giant cane), *Carya cordiformis* (bitternut hickory), *Crataegus spathulata* (littlehip hawthorn), *Ostrya virginiana* (hophornbeam), and/or *Ulmus alata* (winged elm), frequently with *Aesculus pavia* (red buckeye). The sparse (10–20%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is generally made up of species from the upper layers. The sparse to moderately dense (20–70%) herbaceous layer is dominated by *Carex* (sedge) spp. (particularly *Carex abscondita* (thicket sedge), also *Carex oxylepis* (sharpscale sedge) and *Carex blanda* (eastern woodland sedge)) and includes small amounts of many other taxa, including *Asplenium platyneuron* (ebony spleenwort), *Dichanthelium commutatum* (variable panicgrass), *Euonymus americanus* (strawberry bush), *Galium aparine* (stickywilly), *Myosotis macrosperma* (largeseed forget-me-not), *Nothoscordum bivalve* (crowpoison), *Poa annua* (annual bluegrass), *Rubus trivialis* (southern dewberry), and *Verbesina occidentalis* (yellow crownbeard). Vines are abundant and may be found trailing along the ground or climbing into the upper layers. Common species include *Bignonia capreolata* (crossvine), *Campsis radicans* (trumpet creeper), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax* (greenbrier) spp., *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine). In addition, a total of 12 exotic species were recorded from three plots; *Lonicera japonica* (Japanese honeysuckle) is an herbaceous layer dominant.

Global Vegetation

The closed canopy is codominated by *Liquidambar styraciflua* (sweetgum) with *Quercus* (oak) spp., especially *Quercus nigra* (water oak) and *Quercus phellos* (willow oak), or possibly *Quercus pagoda* (cherrybark oak). *Nyssa sylvatica* (blackgum) is also typical in the canopy or subcanopy, along with *Liriodendron tulipifera* (tuliptree) in some cases. One phase has an emergent canopy of large *Pinus taeda* (loblolly pine). The moderately well-developed subcanopy is dominated by canopy species with *Ilex longipes* (Georgia holly), *Sassafras albidum* (sassafras), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Prunus serotina* (black cherry), *Vaccinium arboreum* (farkleberry), *Carpinus caroliniana* (American hornbeam), and others. The shrub stratum is often sparse, and is primarily composed of canopy and subcanopy species. Occasionally a rather dense cover of *Morella cerifera* (wax-myrtle) may be present. Other species that may occur include *Euonymus americanus* (strawberry bush), *Rubus* (blackberry) sp., *Callicarpa americana* (American beautyberry), *Vaccinium elliottii* (Elliott's blueberry), *Gaylussacia frondosa* (blue huckleberry), and *Gaylussacia dumosa* (dwarf huckleberry). The vine/liana stratum is sparse to moderate and species present include *Bignonia capreolata* (crossvine), *Vitis rotundifolia* (muscadine), *Smilax bona-nox* (saw greenbrier), *Smilax rotundifolia* (roundleaf greenbrier), *Wisteria frutescens* (American wisteria), *Gelsemium sempervirens* (evening trumpetflower), *Toxicodendron radicans* (eastern poison-ivy), *Ampelopsis arborea* (peppervine), and others. The herbaceous layer ranges from moderate to fairly dense. Typical species include *Chasmanthium sessiliflorum* (longleaf woodoats), *Scleria triglomerata* (whip nutrush), *Carex abscondita* (thicket sedge), *Dichanthelium boscii* (Bosc's panicgrass), *Mitchella repens* (partridgeberry), *Juncus coriaceus* (leathery rush), *Chimaphila maculata* (striped prince's pine), *Asplenium platyneuron* (ebony spleenwort), *Malaxis unifolia* (green adder's-mouth orchid), and others. The exotic *Lonicera japonica* (Japanese honeysuckle) is common in occurrences of this community.

American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest

Attributes, descriptions, a photo, and a map are shown in Table C-11, and Figures C-21 and C-22.

Table C-11. Attributes and descriptions for American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest.

Attribute	Description
CEGL Code	7730
Community Name	American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw /Reflexed Sedge Forest
Color	Pink to red
Tone	Light to medium
Texture	Medium to coarse
Pattern	Moderate to dense
Height	Medium to tall
Shape	Elongated
Size	Very common class; small average size with some variation.
Location	Mesic forest found in wetland areas near water.
Association	7734,7412
Comments	Typically lightest tones on the map, but can get confused with nearly all other groups due to the wide range of species that can be found in this class.



Figure C-21. Example of American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest.

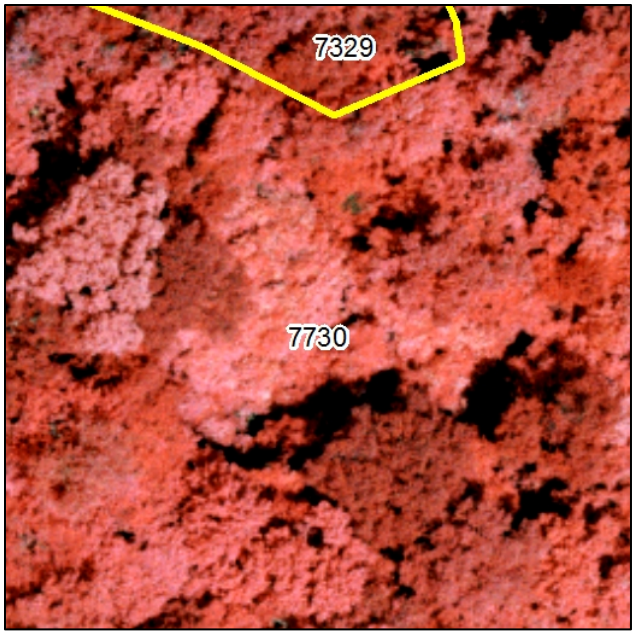


Figure C-22. Map showing American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest (7730).

Summary

Ocmulgee Mounds National Historical Park Vegetation

The moderate (50% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is comprised of *Acer saccharinum* (silver maple), *Celtis laevigata* (sugarberry), *Fraxinus americana* (white ash), and *Platanus occidentalis* (American sycamore). The moderately sparse (30%) subcanopy (10–15 meters [32.8–49.2 ft]) is dominated by *Acer negundo* (box elder), *Acer saccharinum* (silver maple), and *Ulmus rubra* (slippery elm). The completely closed (100%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) is dominated by the invasive exotic *Ligustrum sinense* (Chinese privet). As a result of this dense shrub layer, the short-shrub layer (1–2 meters [3.3–6.6 ft]) and herbaceous layer are very sparse (5% and 20% cover, respectively). Herbs include *Chaerophyllum tainturieri* (hairyfruit chervil), *Chasmanthium latifolium* (Indian woodoats), *Dichanthelium commutatum* (variable panicgrass), *Galium* (bedstraw) sp., and *Verbesina occidentalis* (yellow crownbeard). Vines are abundant and may be found trailing along the ground or climbing into the upper layers. Common species include *Brunnichia ovata* (American buckwheat vine), *Campsis radicans* (trumpet creeper), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine).

Global Vegetation

The mostly closed canopy of this community is dominated by *Platanus occidentalis* (American sycamore), *Celtis laevigata* (sugarberry), and *Fraxinus pennsylvanica* (green ash). These species, along with *Acer negundo* (box elder), are also important in the well-developed subcanopy. Other tree species are possible in these strata and include *Crataegus viridis* (green hawthorn), *Juglans nigra* (black walnut), *Acer saccharinum* (silver maple), *Morus rubra* (red mulberry), *Ilex decidua* (possumhaw), *Ulmus americana* (American elm), *Planera aquatica* (planertree), *Quercus laurifolia*

(laurel oak), *Liquidambar styraciflua* (sweetgum), *Carya aquatica* (water hickory), and others. The shrub layer generally is sparse and is dominated by *Lindera benzoin* (northern spicebush), *Ilex decidua* (possumhaw), *Asimina triloba* (pawpaw), and likely other species as well. *Acer barbatum* (southern sugar maple) may be an important shrub-layer component at the southern end of this community's range. Some examples of this community also have patches of *Arundinaria gigantea* (giant cane) in spots. The herbaceous layer is typically sparse; constant species are *Boehmeria cylindrica* (small-spike false nettle), *Carex grayi* (Gray's sedge), *Carex retroflexa* (reflexed sedge), and *Viola* (violet) spp. Other typical species include *Botrychium dissectum* (cutleaf grapefern), *Carex lupulina* (hop sedge), *Chasmanthium latifolium* (Indian woodoats), *Onoclea sensibilis* (sensitive fern), *Pilea pumila* (Canadian clearweed), *Polygonum hydropiperoides* (swamp smartweed), *Polygonum virginianum* (jumpseed), and others. The vine stratum is moderate and many species are possible. Among these are *Bignonia capreolata* (crossvine), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax tamnoides* (bristly greenbrier), *Vitis rotundifolia* (muscadine), and *Toxicodendron radicans* (eastern poison-ivy). Exotic species such as *Ligustrum sinense* (Chinese privet), *Lonicera japonica* (Japanese honeysuckle), and *Microstegium vimineum* (Nepalese browntop) may invade stands of this association and increase following disturbance.

Atlantic Coastal Plain Black Willow—Green Ash Levee Forest

Attributes, descriptions, a photo, and a map are shown in Table C-12, and Figures C-23 and C-24.

Table C-12. Attributes and descriptions for Atlantic Coastal Plain Black Willow—Green Ash Levee Forest.

Attribute	Description
CEGL Code	7734
Community Name	Atlantic Coastal Plain Black Willow – Green Ash Levee Forest
Color	Pink to red
Tone	Light to medium
Texture	Medium to coarse
Pattern	Sparse to dense
Height	Short to tall
Shape	Elongated and patchy
Size	Common class; small sized patches.
Location	Mesic forest found near water and in low lying areas.
Association	7730, 7412, and 4290
Comments	Can be sparse like 4290, but it contains more trees. Similar to 7412 but less of a homogenous canopy. Found in similar hydrologic locations as 7730 but usually less dense.



Figure C-23. Example of Atlantic Coastal Plain Black Willow—Green Ash Levee Forest.

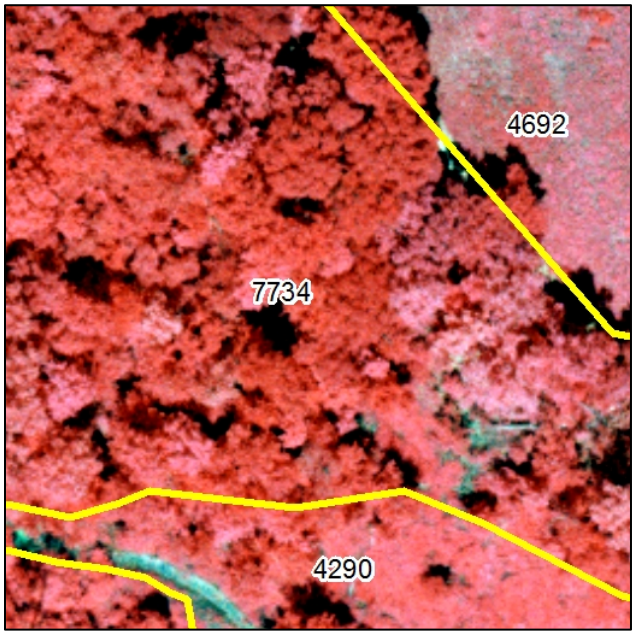


Figure C–24. Map showing Atlantic Coastal Plain Black Willow—Green Ash Levee Forest (7734).

Summary

Ocmulgee Mounds National Historical Park Vegetation

The moderately dense (70% cover) tree canopy, 20–35 meters [65.6–114.8 ft] tall, is codominated by *Acer rubrum* (red maple) and *Salix nigra* (black willow), along with lesser amounts of *Platanus occidentalis* (American sycamore). The moderately sparse (40%) subcanopy (15–20 meters [49.2–65.6 ft]) is made up of canopy species along with *Fraxinus pennsylvanica* (green ash). The sparse (30%) tall-shrub layer (5–10 meters [) and sparse (10%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are dominated by the invasive exotic *Ligustrum sinense* (Chinese privet) but also include significant amounts of *Cornus foemina* (stiff dogwood) and saplings of canopy species. The moderately sparse (40%) but rich herbaceous layer is dominated by *Glyceria striata* (fowl mannagrass); additional

species found in lesser amounts include *Ageratina altissima* (white snakeroot), *Bidens discoidea* (small beggarticks), *Boehmeria cylindrica* (small-spike false nettle), *Brunnichia ovata* (American buckwheat vine), *Carex tribuloides* (blunt broom sedge), *Commelina virginica* (Virginia dayflower), *Juncus effusus* (common rush), *Leersia oryzoides* (rice cutgrass), *Ludwigia palustris* (marsh seedbox), *Onoclea sensibilis* (sensitive fern), *Panicum hemitomon* (maidencane), *Pilea pumila*, *Polygonum setaceum* (bog smartweed), *Sagittaria latifolia* (broadleaf arrowhead), *Saururus cernuus*, *Triadenum walteri* (greater marsh St. Johnswort), and many others. Vines are abundant and may be found trailing along the ground or climbing into the upper layers. Common species include *Ampelopsis arborea* (peppervine), *Berchemia scandens* (Alabama supplejack), *Brunnichia ovata* (American buckwheat vine), *Bignonia capreolata* (crossvine), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison-ivy), *Vitis cinerea* var. *baileyana* (graybark grape), and *Vitis rotundifolia* (muscadine).

Global Vegetation

The mostly closed to closed canopy layer is strongly dominated by *Salix nigra* (black willow). Other typical species in the canopy include *Fraxinus pennsylvanica* (green ash), *Platanus occidentalis* (American sycamore), *Acer rubrum* (red maple), and likely others. The shrub layer is sparse, and species present include *Salix nigra* (black willow), *Taxodium distichum* (bald-cypress), *Planera aquatica* (planertree), *Celtis laevigata* (sugarberry), *Platanus occidentalis* (American sycamore), *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Acer negundo* (box elder), and likely others. The herbaceous stratum typically is sparse but can be species-rich. Species present in the herbaceous layer include *Boehmeria cylindrica* (small-spike false nettle), *Glyceria striata* (fowl mannagrass), *Saururus cernuus* (lizard's-tail), and others. The vine layer is absent to very sparse.

Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest

Attributes, descriptions, a photo, and a map are shown in Table C-13, and Figures C-25 and C-26.

Table C-13. Attributes and descriptions for Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest.

Attribute	Description
CEGL Code	8585
Community Name	Upper East Gulf Coastal Plain Cherrybark Oak – Sweetgum Terrace Forest
Color	Red with some purple
Tone	Medium to dark
Texture	Medium to coarse
Pattern	Usually dense
Height	Medium to tall
Shape	Patchy
Size	Rare class; medium sized patches.

Table C-13 (continued). Attributes and descriptions for Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest.

Attribute	Description
Location	Hardwood dominated forest found in partially flooded regions.
Association	4232
Comments	Similar to 7726 but co dominated by Cherrybark Oak rather than Water Oak, therefore difficult to distinguish in summer CIR.



Figure C-25. Example of Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest.

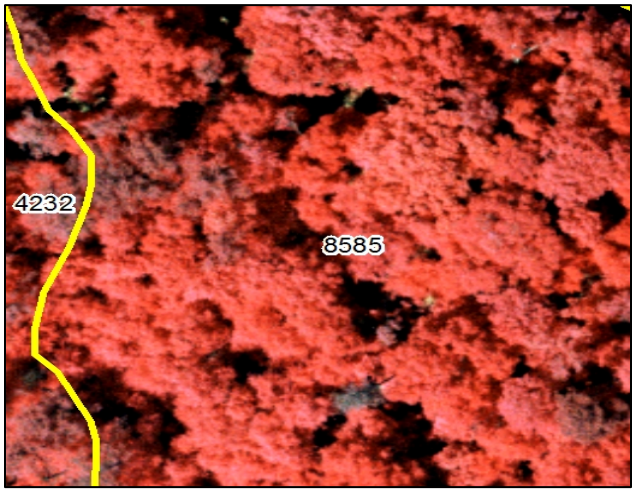


Figure C-26. Map showing Upper East Gulf Coastal Plain Cherrybark Oak—Sweetgum Terrace Forest (8585).

Summary

Ocmulgee Mounds National Historical Park Vegetation

The moderate (50% cover) tree canopy, 20–35 meters [65.5–114.8] tall, is codominated by *Liquidambar styraciflua* (sweetgum) and *Quercus pagoda* (cherrybark oak); additional species include *Carya ovata* (shagbark hickory) and *Quercus nigra* (water oak). The very sparse (10%) subcanopy (15–20 meters [49.2–65.6 ft]) is made up of *Acer leucoderme* (chalk maple), *Carya ovata* (shagbark hickory), and *Ostrya virginiana* (hophornbeam). The moderately sparse (40%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) and short-shrub layer (1–2 meters [3.3–6.6 ft]) contain sapling canopy species as well as *Aesculus pavia* (red buckeye), *Carpinus caroliniana* (American hornbeam), *Prunus caroliniana* (Carolina laurelcherry), *Ulmus alata* (winged elm), and *Vaccinium arboreum* (farkleberry). In addition, *Arundinaria gigantea* (giant cane) dominates the short-shrub layer. The moderately sparse (40%) herbaceous layer is dominated by the exotic vine *Lonicera japonica* (Japanese honeysuckle) but also includes *Asplenium platyneuron* (ebony spleenwort), *Carex blanda* (eastern woodland sedge), *Carex nigromarginata* (black edge sedge), *Chasmanthium latifolium* (Indian woodoats), *Dichanthelium boscii* (Bosc's panicgrass), *Erythronium umbilicatum* (dimpled troutlily), *Melica mutica* (twoflower melicgrass), *Piptochaetium avenaceum* (blackseed speargrass), *Triodanis perfoliata* (clasping Venus' looking-glass), and others. Vines include *Gelsemium sempervirens* (evening trumpetflower), *Lonicera sempervirens* (trumpet honeysuckle), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), and *Vitis rotundifolia* (muscadine).

Global Vegetation

Stands are typically dominated by some combination of *Quercus pagoda* (cherrybark oak), *Quercus shumardii* (Shumard oak), and *Liquidambar styraciflua* (sweetgum). Other canopy trees include *Tilia americana* var. *caroliniana* (Carolina basswood), *Fraxinus americana* (white ash), *Quercus muehlenbergii* (chinkapin oak), *Acer barbatum* (southern sugar maple), *Quercus rubra* (northern red oak), *Ulmus rubra* (slippery elm), *Fagus grandifolia* (American beech), *Quercus alba* (white oak), *Quercus phellos* (willow oak), *Liriodendron tulipifera* (tuliptree), *Carya glabra* (pignut hickory), *Carya ovalis* (red hickory), *Carya carolinae-septentrionalis* (southern shagbark hickory), and *Juglans nigra* (black walnut). *Quercus shumardii* (Shumard oak) may be more important in the subcanopy than in the canopy. Other additional subcanopy and tall-shrub species include *Ulmus alata* (winged elm), *Ilex decidua* (possumhaw), *Halesia diptera* (two-wing silverbell), *Cercis canadensis* (eastern redbud), and *Ostrya virginiana* (hophornbeam). Important herbs are *Solidago auriculata* (eared goldenrod), *Verbesina virginica* (white crownbeard), *Spigelia marilandica* (woodland pinkroot), *Melica mutica* (twoflower melicgrass), *Trillium decipiens* (Chattahoochee River wakerobin), *Trepocarpus aethusae* (whitenymph), *Yeatesia viridiflora* (yellow bractspike), *Scutellaria ovata* (heartleaf skullcap), *Dichanthelium boscii* (Bosc's panicgrass), *Chasmanthium sessiliflorum* (longleaf woodoats), and *Sanicula canadensis* (Canadian blacksnakeroot). In a stand assigned here from Broken Arrow Creek (Russell County, Alabama, directly across the Chattahoochee River from Fort Benning, Georgia), the canopy is dominated by *Quercus muehlenbergii* (chinkapin oak) and *Quercus shumardii* (Shumard oak), and also contains *Quercus pagoda* (cherrybark oak), *Fagus grandifolia* (American beech), *Quercus rubra* (northern red oak),

Carya alba (mockernut hickory), and *Fraxinus americana* (white ash). The subcanopy contains *Halesia tetraptera* (mountain silverbell), *Ulmus alata* (winged elm), *Acer leucoderme* (chalk maple), *Cercis canadensis* (eastern redbud), *Cornus florida* (flowering dogwood), and *Ostrya virginiana* (hophornbeam). Shrubs include *Staphylea trifolia* (American bladdernut), *Acer leucoderme* (chalk maple), *Hydrangea quercifolia* (oakleaf hydrangea), *Ulmus alata* (winged elm), and *Aesculus pavia* (red buckeye). Herbs include *Polystichum acrostichoides* (Christmas fern), *Chasmanthium laxum* (slender woodoats), and *Solidago auriculata* (eared goldenrod). The diverse herbaceous layer may also include *Phlox divaricata* (wild blue phlox), *Amsonia tabernaemontana* (eastern bluestar), *Trillium decipiens* (Chattahoochee River wakerobin), *Cynoglossum virginianum* (wild comfrey), *Zephyranthes atamasca* (Atamasco lily), *Lithospermum tuberosum* (tuberous stoneseed), *Nothoscordum bivalve* (crowpoison), *Geranium maculatum* (spotted geranium), and *Hepatica nobilis* var. *obtusa* (roundlobe hepatica) (T. Govus pers. comm. 2001). A stand placed here from Ocmulgee Mounds National Historical Park exhibits a canopy codominated by *Liquidambar styraciflua* (sweetgum) and *Quercus pagoda* (cherrybark oak); additional species include *Carya ovata* (shagbark hickory) and *Quercus nigra* (water oak). The very sparse subcanopy is made up of *Acer leucoderme* (chalk maple), *Carya ovata* (shagbark hickory), and *Ostrya virginiana* (hophornbeam). The tall-shrub and short-shrub layers contain sapling canopy species as well as *Aesculus pavia* (red buckeye), *Carpinus caroliniana* (American hornbeam), *Prunus caroliniana* (Carolina laurelcherry), *Ulmus alata* (winged elm), and *Vaccinium arboreum* (farkleberry). In addition, *Arundinaria gigantea* (giant cane) dominates the short-shrub layer. The herbaceous layer includes *Asplenium platyneuron* (ebony spleenwort), *Carex blanda* (eastern woodland sedge), *Carex nigromarginata* (black edge sedge), *Chasmanthium latifolium* (Indian woodoats), *Dichanthelium boscii* (Bosc's panicgrass), *Erythronium umbilicatum* (dimpled troutlily), *Melica mutica* (twoflower melicgrass), *Piptochaetium avenaceum* (blackseed speargrass), *Triodanis perfoliata* (clasping Venus' looking-glass), and others. It is dominated by the exotic vine *Lonicera japonica* (Japanese honeysuckle). Other vines include *Gelsemium sempervirens* (evening trumpetflower), *Lonicera sempervirens* (trumpet honeysuckle), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), and *Vitis rotundifolia* (muscadine). At Ocmulgee Mounds National Historical Park near Macon, Georgia, a disturbed representative of this association was documented with *Carya ovata* (shagbark hickory) and *Acer leucoderme* (chalk maple) dominant in the subcanopy, and *Aesculus pavia* (red buckeye), *Vaccinium arboreum* (farkleberry), and *Arundinaria gigantea* (giant cane) dominant in the shrub layer.

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Appendix D. Accuracy Assessment

Table D-1. Data points acquired by J. Schmid, B. Cogdell, F. Barksdale, and B. Rosenblatt May, 2015.

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_001	OCMU_AA_ 050_001	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.7	CEGL007 726	-1	Fair fit. Slope forest above floodplain. No sweetgum	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_002	OCMU_AA_ 050_002	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.7	CEGL004 232	-1	Good fit. Pine/Hardwood slope forest	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_003	OCMU_AA_ 050_003	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.7	CEGL008 585	-1	Fair fit. Slope forest with oaks, pine, sweetgum, elms.	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_004	OCMU_AA_ 050_004	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.4	CEGL004 232	-1	Good fit. Upland forest on slope; herb layer absent.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_005	OCMU_AA_ 050_005	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1	CEGL004 290	-1	Good fit. Similar to OCMU_AA_050_006	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_006	OCMU_AA_ 050_006	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.6	CEGL004 290	-1	Good fit. Open savannah type landscape with Privet, Chinese tallow, and black willow sparsely located.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_007	OCMU_AA_ 050_007	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.5	CEGL004 290	-1	Fair fit. Within powerline easement dominated by Rubus spp.	5/6/2015 0:00	Ben Cogdell	1	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_008	OCMU_AA_ 050_008	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.7	CEGL004290	-1	Fair fit. Within powerline easement dominated by Rubus spp.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_009	OCMU_AA_ 050_009	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.5	CEGL004290	-1	Fair fit. Within powerline easement; some shrubs/vines encroaching.	5/6/2015 0:00	Ben Cogdell	1	20
OCMU_AA_ 050_010	OCMU_AA_ 050_010	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.2	CEGL004290	-1	Good fit. Open area within privet/black willow/tallow area	5/6/2015 0:00	Ben Cogdell	1	20
OCMU_AA_ 050_011	OCMU_AA_ 050_011	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.3	CEGL007730	-1	Fair fit. Almost 100% closed due to privet. Floodplain forest dense with privet.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_012	OCMU_AA_ 050_012	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2	CEGL004606	-1	Fair fit. Significant privet component. Floodplain forest, plot located at second terrace.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_013	OCMU_AA_ 050_013	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2	CEGL007730	-1	Good fit. Floodplain levee forest	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_014	OCMU_AA_ 050_014	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.4	CEGL007329	-1	Good fit-no cottonwood within plot. Low backwater area with saturated soils	5/4/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_015	OCMU_AA_ 050_015	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	4.3	CEGL004740	-1	Good fit. Levee position to Ocmulgee River.	5/4/2015 0:00	Ben Cogdell	1	24
OCMU_AA_ 050_016	OCMU_AA_ 050_016	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.2	CEGL007329	-1	Fair fit. Lacking Eastern cottonwood.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_017	OCMU_AA_ 050_017	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.7	CEGL007726	-1	Fair fit. Slope forest-somewhat disturbed from railroad.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_018	OCMU_AA_ 050_018	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.1	CEGL007730	-1	Fair fit. Various oaks with elms to lesser extent. Floodplain with little to no herbaceous cover.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_019	OCMU_AA_ 050_019	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.7	CEGL004290	-1	Good fit. Open savannah type landscape with few Chinese tallow.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_020	OCMU_AA_ 050_020	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.5	CEGL004290	-1	Good fit. Herbaceous marsh with Sacc. Stri & Alternanthera	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_021	OCMU_AA_ 050_021	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.7	CEGL007734	-1	Fair fit. On edge of ponded area. 6-18"" of water at point. No other species due to high water.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_022	OCMU_AA_ 050_022	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.3	CEGL004290	-1	Fair fit. Very little vegetation due to high water.	5/5/2015 0:00	Ben Cogdell	1	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_023	OCMU_AA_ 050_023	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.7	CEGL007734	-1	Poor fit. Within overall 007734- but plot dominated by invasives. Floodplain forest at edge of open area.	5/7/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_024	OCMU_AA_ 050_024	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.5	CEGL007734	-1	Good fit. Black willow/privet swamp. No ash, no sycamore, no dogwood. C. Tallow present.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_025	OCMU_AA_ 050_025	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.7	CEGL004290	-1	Good fit. Flat emergent floodplain adjacent to small creek.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_026	OCMU_AA_ 050_026	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.1	CEGL004290	-1	Fair fit. Freshwater marsh with Lance-leaf arrowhead. No Leersia present.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_027	OCMU_AA_ 050_027	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	2	CEGL007734	-1	Fair fit. Privet/Tallow dominated. No sycamore, No Ash, No dogwood, No black willow.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_028	OCMU_AA_ 050_028	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1	CEGL007734	-1	Fair fit. More of a woodland kept clear by hydrology. Floodplain woodland with Acer and Tallow.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_029	OCMU_AA_ 050_029	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2	CEGL007730	-1	Good fit. Floodplain forest with overflow channels present.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_030	OCMU_AA_ 050_030	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.7	CEGL007734	-1	Good fit. Sycamore present outside plot. Floodplain to creek at toe of slope below mound.	5/5/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_031	OCMU_AA_ 050_031	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.6	CEGL007734	-1	Fair fit. Chinese tallow appears to have replaced red maple. High spot within overal Emergent floodplain beaver swamp.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_032	OCMU_AA_ 050_032	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.8	CEGL007734	-1	Good fit. Forested wetland mixed. No dogwood. Nyssa present	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_033	OCMU_AA_ 050_033	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	5	CEGL007730	-1	Good fit. No silver maple, no sugarberry.	5/6/2015 0:00	Ben Cogdell	1	25
OCMU_AA_ 050_034	OCMU_AA_ 050_034	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.8	CEGL007734	-1	Fair fit. Creek through point.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_035	OCMU_AA_ 050_035	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.1	CEGL007734	-1	Good fit. Floodplain forest; A. rubrum, black willow, green ash.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_036	OCMU_AA_ 050_036	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	2	CEGL007730	-1	Poor fit. No real canopy. Domanated by tallow. Floodplain to creek.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_037	OCMU_AA_ 050_037	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.2	CEGL007730	-1	Good fit. Floodplain forest with evidence of active hydrology	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_038	OCMU_AA_ 050_038	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	3	CEGL007734	-1	Good fit. Floodplain forest adjacent to beaver pond and slough.	5/6/2015 0:00	Ben Cogdell	1	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_039	OCMU_AA_ 050_039	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.6	CEGL007734	-1	Fair fit. No willow or green ash within plot. Acer floodplain forest with heavy privet.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_040	OCMU_AA_ 050_040	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.2	CEGL007734	-1	Fair fit. Not adjacent to swamp but within floodplain.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_041	OCMU_AA_ 050_041	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.2	CEGL007734	-1	Good fit. Open woodland with dense herbaceous cover.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_042	OCMU_AA_ 050_042	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.7	CEGL007734	-1	Fair fit. Floodplain woodland dominated by A. rubrum. Edge of woodland area transitioning to forest.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_043	OCMU_AA_ 050_043	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.4	CEGL004290	-1	Good fit with significant tallow tree.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_044	OCMU_AA_ 050_044	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.2	CEGL004290	-1	Poor fit. High spot within floodplain to creek.	5/5/2015 0:00	Ben Cogdell	1	20
OCMU_AA_ 050_045	OCMU_AA_ 050_045	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1	CEGL007734	-1	Fair fit. Dominated by tallow tree. Black willow just outside of plot. Scrub-shrub/Emergent within floodplain to creek.	5/5/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_046	OCMU_AA_ 050_046	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.1	CEGL007734	-1	Good fit.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_047	OCMU_AA_ 050_047	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	2	CEGL007730	-1	Good fit. Floodplain swamp with privet.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_048	OCMU_AA_ 050_048	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.4	CEGL007730	-1	Poor fit. Canopy dominated by tallow tree and privet.	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_049	OCMU_AA_ 050_049	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.2	CEGL007730	-1	Poor fit. Privet-forest/woodland. Floodplain forest below first terrace.	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_050	OCMU_AA_ 050_050	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.2	CEGL007329	-1	Fair fit. Almost 100% canopy closure due to privet. Slope just above floodplain.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_051	OCMU_AA_ 050_051	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.8	CEGL007329	-1	Poor fit. Due to 100% cover of point. No herbaceous layer due to complete privet canopy. Within overall sweetgum forest.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_052	OCMU_AA_ 050_052	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	1	CEGL007730	-1	Fair fit. Significant privet. Floodplain levee forest.	5/7/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_053	OCMU_AA_ 050_053	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	3.7	CEGL007329	-1	Fair fit. A. negundo rather than A. rubrum. Significant privet. Floodplain forest below Ocmulgee and I-26.	5/7/2015 0:00	Ben Cogdell	1	24
OCMU_AA_ 050_054	OCMU_AA_ 050_054	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.2	CEGL007730	-1	Fair fit. Privet ~ 98% cover with Vitis on top. Floodplain to Ocmulgee on terrace. Point offset 30' due to dense canopy.	5/4/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_055	OCMU_AA_ 050_055	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	3.6	CEGL004606	-1	Fair fit. Significant component of water oak.Rise above floodplain near I-75.	5/5/2015 0:00	Ben Cogdell	1	24
OCMU_AA_ 050_056	OCMU_AA_ 050_056	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.7	CEGL007730	-1	Fair fit. Heavy privet and vine cover. Floodplain forest with heavy vine cover.	5/7/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_057	OCMU_AA_ 050_057	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.8	CEGL004740	-1	Good fit. Sugarberry replaced by Hackberry. Levee forest East of Ocmulgee River.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_058	OCMU_AA_ 050_058	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.4	CEGL004740	-1	Fair fit. Dominated by vitis. Little tree canopy.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_059	OCMU_AA_ 050_059	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	2	CEGL004740	-1	Good fit. Privet significant component. Floodplain to creek	5/4/2015 0:00	Ben Cogdell	1	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_060	OCMU_AA_ 050_060	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	2.1	CEGL007726	-1	Good fit. No ash, no hickory.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_061	OCMU_AA_ 050_061	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.9	CEGL007329	-1	Good fit. No cottonwood.	5/4/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_062	OCMU_AA_ 050_062	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.5	CEGL008585	-1	Goot fit.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_063	OCMU_AA_ 050_063	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	5.1	CEGL007726	-1	Good fit. No ash, no poplar. Slope forest dominated by water oak and sweetgum	5/6/2015 0:00	Ben Cogdell	1	25
OCMU_AA_ 050_064	OCMU_AA_ 050_064	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.5	CEGL008585	-1	Fair fit. No cherrybark oak present. Plot on trail within upland forest	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_065	OCMU_AA_ 050_065	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	4.3	CEGL004232	-1	Fair fit. Lacks many of the do-dominants. Slope forest leading to pond.	5/5/2015 0:00	Ben Cogdell	1	24
OCMU_AA_ 050_066	OCMU_AA_ 050_066	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	4	CEGL008585	-1	Good fit. Slope forest with water oak, sweetgum, and elm. No hickory, no poplar.	5/6/2015 0:00	Ben Cogdell	1	24
OCMU_AA_ 050_067	OCMU_AA_ 050_067	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.1	CEGL008585	-1	Fair fit. No water oak; site is along main road, portion of area is maintained trail. Upland slope.	5/4/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_068	OCMU_AA_ 050_068	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	3.2	CEGL007726	-1	Good fit. No tulip poplar.	5/6/2015 0:00	Ben Cogdell	1	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_069	OCMU_AA_ 050_069	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.9	CEGL007730	-1	Poor fit. Area of very dense privet within community. Low area behind terrace.	5/4/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_070	OCMU_AA_ 050_070	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	3.2	CEGL007726	-1	Fair fit. Disturbed area in railroad cut. No green ash, no tulip poplar.	5/5/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_071	OCMU_AA_ 050_071	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.9	CEGL007726	-1	Poor fit. Disturbed area with established privet/giant cane.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_072	OCMU_AA_ 050_072	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	9.7	CEGL007726	-1	Fair fit. No Tulip poplar, no hickory.	5/4/2015 0:00	Ben Cogdell	1	30
OCMU_AA_ 050_073	OCMU_AA_ 050_073	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.3	CEGL004290	-1	Fair fit. Transitional area dominated by solidago	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_074	OCMU_AA_ 050_074	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1	CEGL007734	-1	Poor fit. Dominats out competed by invasives. Low area next to backwater slough.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_075	OCMU_AA_ 050_075	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.9	CEGL007730	-1	Fair fit. Floodplain forest beyond first terrace. Other components located outside plot.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_076	OCMU_AA_ 050_076	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.9	CEGL007730	-1	Fair fit. Second terrace to Ocmulgee River. Heavy component of privet.	5/4/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_077	OCMU_AA_ 050_077	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.9	CEGL004740	-1	Good fit. Forest above beaver pond. Water oak is significant component.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_078	OCMU_AA_ 050_078	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1	CEGL007329	-1	Good fit. Floodplain forested wetland. No cottonwood.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_079	OCMU_AA_ 050_079	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.8	CEGL007734	-1	Fair fit. Forested swamp dominated by Nyssa & Leersia. No sweetgum, no dogwood.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_080	OCMU_AA_ 050_080	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	4.5	CEGL007730	-1	Poor fit. Floodplain forest between I-16 and open water area. Dominated by oaks. Heavy privet component.	5/7/2015 0:00	Ben Cogdell	1	24
OCMU_AA_ 050_081	OCMU_AA_ 050_081	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	7	CEGL007734	-1	Fair fit. No black willow present. Soil inundated/saturated.	5/4/2015 0:00	Ben Cogdell	1	27
OCMU_AA_ 050_082	OCMU_AA_ 050_082	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	2.5	CEGL007730	-1	Good fit. Privet swamp. No silver maple, no sugarberry.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_083	OCMU_AA_ 050_083	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.8	CEGL007734	-1	Good fit. Located east of backwater slough.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_084	OCMU_AA_ 050_084	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.8	CEGL004740	-1	Fair fit. Dominated by Acer/Privet. Floodplain forest choked with privet.	5/5/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_085	OCMU_AA_ 050_085	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	5.3	CEGL007730	-1	Good fit. Floodplain forest-celtis/sycamore/privet. No boxelder, no silver maple.	5/5/2015 0:00	Ben Cogdell	1	25
OCMU_AA_ 050_086	OCMU_AA_ 050_086	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.5	CEGL007730	-1	Good fit. Sycamore/Ash/Sugarberry floodplain swamp.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_087	OCMU_AA_ 050_087	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	4.9	CEGL007734	-1	Good fit. Low depression within floodplain forest. No willow.	5/6/2015 0:00	Ben Cogdell	1	25
OCMU_AA_ 050_088	OCMU_AA_ 050_088	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.2	CEGL004740	-1	Fair fit. Near ROW of I-75 low area behind Ocmulgee Levee. No other codominants present.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_089	OCMU_AA_ 050_089	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	3.9	CEGL004740	-1	Good fit. Low area over first terrace to Ocmulgee River. Substantial privet component.	5/4/2015 0:00	Ben Cogdell	1	24
OCMU_AA_ 050_090	OCMU_AA_ 050_090	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.7	CEGL007329	-1	Fair fit. No E. Cottonwood, no silver maple. Tallow/privet associated.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_091	OCMU_AA_ 050_091	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.6	CEGL007734	-1	Good fit.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_092	OCMU_AA_ 050_092	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	3.5	CEGL004232	-1	Fair fit. Slope-forest pine/winged elm/oaks. Hophornbeam dominant in understory. No sweetgum	5/7/2015 0:00	Ben Cogdell	1	24

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_093	OCMU_AA_ 050_093	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	3.3	CEGL007730	-1	Good fit. Forested floodplain. Canopy without a single dominant species.	5/4/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_094	OCMU_AA_ 050_094	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	3.1	CEGL007329	-1	Fair fit. No cottonwood, no tuliptree. Larger component of boxelder.	5/4/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_095	OCMU_AA_ 050_095	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	4.6	CEGL007329	-1	Good fit. No E. Cottonwood	5/4/2015 0:00	Ben Cogdell	1	25
OCMU_AA_ 050_096	OCMU_AA_ 050_096	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	9.4	CEGL007726	-1	Good fit. Slope above floodplain.	5/6/2015 0:00	Ben Cogdell	1	29
OCMU_AA_ 050_097	OCMU_AA_ 050_097	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	10.1	CEGL004606	-1	Fair fit. No loblolly pine. Swale with Nyssa.	5/4/2015 0:00	Ben Cogdell	1	30
OCMU_AA_ 050_098	OCMU_AA_ 050_098	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.9	CEGL007726	-1	Fair fit. No green ash/tulip poplar/hickory.	5/4/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_099	OCMU_AA_ 050_099	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	7.5	CEGL007329	-1	Poor fit. Slope/seep forested wetland. Area is seepage slope-tulip poplar dominant in canopy. Subcanopy is red maple, sweetgum, tupelo, grondcover is ferns, lizards tail. Not floodplain, no cottonwood.	5/6/2015 0:00	Ben Cogdell	1	28

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_100	OCMU_AA_ 050_100	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.9	CEGL004232	-1	Good fit. Ridgetop forest.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_101	OCMU_AA_ 050_101	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	5.4	CEGL008585	-1	Fair fit. Almost 100% cover of privet within overall forest. Mesic forest with gentle slope to bottom.	5/5/2015 0:00	Ben Cogdell	1	25
OCMU_AA_ 050_102	OCMU_AA_ 050_102	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.7	CEGL007726	-1	Good fit. Upland forest. Loblolly outside of plot.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_103	OCMU_AA_ 050_103	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	3	CEGL004606	-1	Good fit. Floodplain swamp.	5/6/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_104	OCMU_AA_ 050_104	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.4	CEGL004606	-1	Good fit. Floodplain rise moving up from beaver swamp. Loblolly surrounding plot.	5/5/2015 0:00	Ben Cogdell	1	20
OCMU_AA_ 050_105	OCMU_AA_ 050_105	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.8	CEGL007726	-1	Good fit. Forested slope. No ash.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_106	OCMU_AA_ 050_106	5/6/2015 0:00	Jeremy Schmid, Flynt Barksdale	1	CEGL007734	-1	Good fit. Floodplain swamp.	5/6/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_050_107	OCMU_AA_050_107	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.5	CEGL007329	-1	Fair fit. Lowland forest-disturbed within railroad cut. No cottonwood, no maple. Celtis present.	5/6/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_108	OCMU_AA_050_108	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	2.3	CEGL004232	-1	Good fit. Pine/Oak/Elm forest.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_109	OCMU_AA_050_109	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.2	CEGL004232	-1	Good fit. Pine/oak upland forest	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_050_110	OCMU_AA_050_110	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.7	CEGL004232	-1	Good fit. Pine upland with sweetgum.	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_111	OCMU_AA_050_111	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.3	CEGL004232	-1	Good fit. Slope forest/pine/hophornbeam/oaks. No sweetgum, no elm.	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_050_112	OCMU_AA_050_112	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.5	CEGL004232	-1	Good fit. Sweetgum/pine forest.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_113	OCMU_AA_050_113	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	6.3	CEGL004740	-1	Good fit. No box elder	5/4/2015 0:00	Ben Cogdell	1	26
OCMU_AA_050_114	OCMU_AA_050_114	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.3	CEGL004232	-1	Good fit. Upland pine-maintained/mowed.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_050_115	OCMU_AA_050_115	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.3	CEGL004232	-1	Good fit. Slope forest with pine, sweetgum, water oak.	5/5/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_116	OCMU_AA_ 050_116	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.9	CEGL004232	-1	Good fit. Upland pine/oak forest. No sweetgum.	5/7/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_117	OCMU_AA_ 050_117	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.8	CEGL007726	-1	Fair fit. No sweetgum in canopy, no tulip poplar.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_118	OCMU_AA_ 050_118	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	1.3	CEGL004232	-1	Good fit. Top of ridge, forest.	5/5/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_119	OCMU_AA_ 050_119	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.2	CEGL007726	-1	Good fit. Slope forest with Loblooly pine, sweet gum, water oak. No ash, no poplar.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_120	OCMU_AA_ 050_120	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	6.5	CEGL004232	-1	Good fit. Pine /oak upland forest.	5/7/2015 0:00	Ben Cogdell	1	26
OCMU_AA_ 050_121	OCMU_AA_ 050_121	5/7/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.6	CEGL004232	-1	Good fit. Upland forest near ridge top. Herbaceous stratum absent.	5/7/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_122	OCMU_AA_ 050_122	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	5.9	CEGL007726	-1	Good fit. Forested pine/sweetgum. No tulip poplar, no ash.	5/5/2015 0:00	Ben Cogdell	1	26
OCMU_AA_ 050_123	OCMU_AA_ 050_123	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	1	CEGL004232	-1	Fair fit. Forested slope maintained trail adjacent. No winged elm.	5/6/2015 0:00	Ben Cogdell	1	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_050_124	OCMU_AA_050_124	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.8	CEGL004232	-1	Good fit. Ridgetop forest.	5/5/2015 0:00	Ben Cogdell	1	23
OCMU_AA_050_125	OCMU_AA_050_125	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	4.6	CEGL004232	-1	Good fit.	5/6/2015 0:00	Ben Cogdell	1	25
OCMU_AA_050_126	OCMU_AA_050_126	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	2	CEGL004232	-1	Good fit. Ridgetop forest.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_127	OCMU_AA_050_127	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	4.4	CEGL004232	-1	Good fit. Pine/oak/sweetgum forest. No elm.	5/7/2015 0:00	Ben Cogdell	1	24
OCMU_AA_050_128	OCMU_AA_050_128	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	3.4	CEGL004232	-1	Good fit. Loblolly pine/sweetgum slope forest.	5/5/2015 0:00	Ben Cogdell	1	23
OCMU_AA_050_129	OCMU_AA_050_129	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.7	CEGL004232	-1	Good fit.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_130	OCMU_AA_050_130	5/4/2015 0:00	Ben Cogdell, Brad Rosenblatt	2.1	CEGL004606	-1	Fair fit. No swamp tupelo.	5/4/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_131	OCMU_AA_050_131	5/5/2015 0:00	Ben Cogdell, Brad Rosenblatt	2.3	CEGL007726	-1	Fair fit. Area disturbed due to railroad cut. Red Maple/Elm association present.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_050_132	OCMU_AA_050_132	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	4.4	CEGL004232	-1	Good fit. Slope forest with loblolly pine, sweetgum, oaks, hop hornbeam. No elm.	5/6/2015 0:00	Ben Cogdell	1	24

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Co	AA Photos	General_Co	AA Update	AA User	count	buffer
OCMU_AA_ 050_133	OCMU_AA_ 050_133	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	2.9	CEGL004232	-1	Fair fit. Pine/oak/sweetgum forest.	5/7/2015 0:00	Ben Cogdell	1	23
OCMU_AA_ 050_134	OCMU_AA_ 050_134	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.8	CEGL008585	-1	Good fit. Upland forest with pine/sweetgum. No hickory.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_135	OCMU_AA_ 050_135	5/6/2015 0:00	Ben Cogdell, Brad Rosenblatt	0.8	CEGL007726	-1	Fair fit. No ash, no poplar, no hickory.	5/6/2015 0:00	Ben Cogdell	1	21
OCMU_AA_ 050_136	OCMU_AA_ 050_136	5/5/2015 0:00	Jeremy Schmid, Flynt Barksdale	2.2	CEGL004232	-1	Good fit.	5/5/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_137	OCMU_AA_ 050_137	5/7/2015 0:00	Ben Cogdell, Brad Rosenblatt	1.9	CEGL004232	-1	Fair fit. Pine/oak/upland forest. Ostrya virginiana associated	5/7/2015 0:00	Ben Cogdell	1	22
OCMU_AA_ 050_138	OCMU_AA_ 050_138	5/4/2015 0:00	Jeremy Schmid, Flynt Barksdale	0.9	CEGL007730	-1	Poor fit.Ligustrum forest with sweetgum/ash canopy.	5/4/2015 0:00	Ben Cogdell	1	21

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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National Park Service
U.S. Department of the Interior

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