National Park Service
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Natural Resource Stewardship and Science

Vegetation Mapping at Chattahoochee River National Recreation Area

Photointerpretation Key and Final Vegetation Map

Natural Resource Report NPS/SECN/NRR—2019/2028



ON THE COVER
Woodland scene in the Bowman's Island Unit of Chattahoochee River National Recreation Area
Photograph by: Marguerite Madden, June 2014

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Natural Resource Report NPS/SECN/NRR—2019/2028

David L. Cotten[1], Brandon P. Adams[1], Nancy K. O'Hare[1], Christopher S. Cooper[2], Sergio Bernardes[1], Thomas R. Jordan[1], and Marguerite Madden[1]

[1]Center for Geospatial Research (CGR)
Department of Geography
University of Georgia
Athens, GA 30606

[2]National Park Service
Southeast Coast Inventory and Monitoring Network
135 Phoenix Road
Athens, GA 30605

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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 Chattahoochee River National Recreation Area (CHAT). This mapping effort 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.

Because of the extensive 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 NatureServe vegetation plots, 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 Chattahoochee River NRA, both inside the park and within a 500-meter (1,640-ft) buffer. The buffer size used for this study covered a much larger area than the region found within the park. This illustrates the linear nature of the park and how much it, including the river, is susceptible to land use land cover changes outside of the boundary. The buffer polygons and attributes 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. Within the park, the more detailed community element global (CEGL) codes were used. Chattahoochee River NRA covers approximately 3,000 hectares (7,413 acres [ac]) while the buffer contains approximately 10,700 hectares (26,440 ac). The majority of land use within the buffer, 57%, is residential.

The most common vegetation classes found at Chattahoochee River NRA were Southern Red Oak—White Oak Mixed Oak Forest (7244) and Piedmont Dry—Mesic Basic White Oak—Hickory Forest (7232) with 10.4% and 9.9% of the park respectively. The smallest class was Southern Woolgrass Bulrush Marsh (3866) and Knotweed Pondshore and Ditchbank Vegetation (4966), at less than 0.05% each. Water, covering 19.2 % of the park, represents a higher percentage of area than any vegetation class. A rigorous accuracy assessment was conducted on the 30 map classes within the boundary of the park representing floristic types within the National Vegetation Classification System. Results showed an 82% map accuracy and a kappa rating of 81% using 356 accuracy assessment points.

The products of 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 staff at Chattahoochee River National Recreation Area for helping us with this project. Staff at the Island Ford Visitor Center kindly provided us with a complimentary annual park pass. Paula Capece shared her knowledge of the exotic plant removal program in the park. Joseph Jarquin, GIS Intern, provided GIS layers of extensive trail networks, access points, and facilities in Chattahoochee River NRA.

Introduction

Chattahoochee River National Recreation Area 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 Inventory and Monitoring Program Southeast Coast Network (SECN) using mapping standards defined under the National Vegetation Classification System (NVCS; Jennings et al. 2009). Under Task Agreement # P13AC01319, the University of Georgia Center for Geospatial Research 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 Chattahoochee River National Recreation Area (CHAT) Vegetation Mapping project coordinated by the University of Georgia Center for Geospatial Research 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 (see 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 that are within parks. Parks use this information for planning, research, education, and to help guide decisions related to park management. Results are also shared widely with other agencies, researchers, and scientists.

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 (SECN) includes 17 parks with significant natural resources, in 15 administrative units. SECN 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 Chattahoochee River National Recreation Area

The Chattahoochee River begins in northeast Georgia and travels 867 kilometers (539 miles [mi]) downstream to the Apalachicola Bay in Florida. Chattahoochee River NRA is located along 77 kilometers (48 mi) of the Chattahoochee River just north of Atlanta, Georgia (Figure 1). The boundary of Chattahoochee River NRA is not contiguous. There are over 50 parcels, organized into 16 management units, varying in size from 17 to more than 300 hectares (42 to more than 741 ac). Given its proximity to urban and residential areas, the park is constantly adding to and reconfiguring its boundaries.

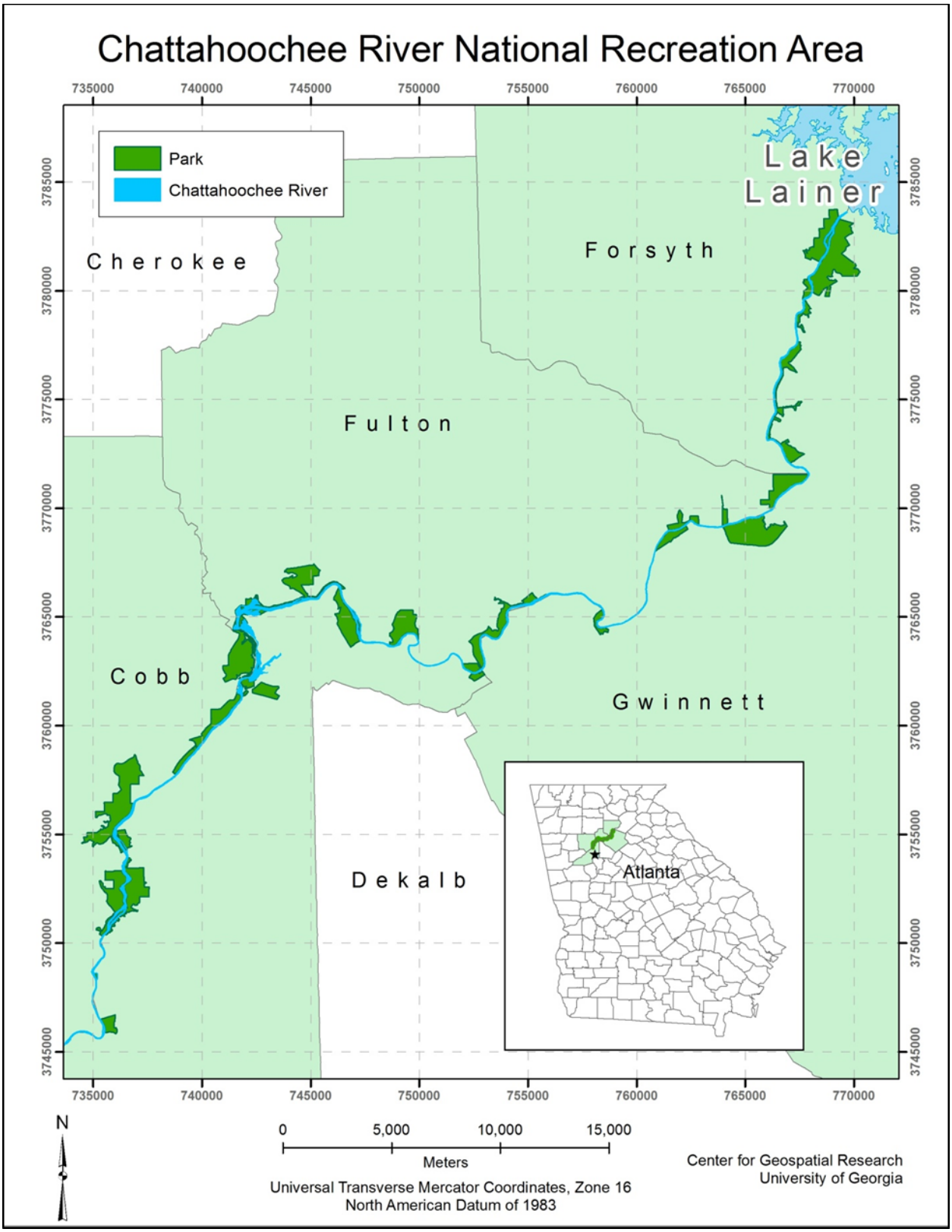


Figure 1. Location of Chattahoochee River National Recreation Area and its position relative to the state of Georgia and the city of Atlanta.

On August 15, 1978 former President Jimmy Carter signed a congressional bill to establish the Chattahoochee River National Recreation Area. Through this bill the NPS acquired 77 kilometers (48 mi) of the Chattahoochee River, along with land including such areas as the Palisades, Cochran Shoals, and Bowman's Island. The newly acquired property had boundaries of approximately 320 kilometers (199 mi). However, the boundaries were only described in the bill and were not surveyed on the ground (U.S. Senate 1999).

The size and boundaries of the Chattahoochee River NRA have changed since its establishment. When established in 1978, the initial size was approximately 2,400 hectares (5,931 ac); expansion in 1999 increased the size to 4,050 hectares (10,008 ac; Getty et al. 2001). There have been other land acquisitions, including some that were associated with land swaps that removed select parcels from the park. At least two different boundary layers were provided by the park for this project; each had some minor resolution errors related to the river boundary layers. For our purposes, we combined the boundary layers to encompass the greatest possible extent.

The Chattahoochee River NRA is very popular for recreational activities including fishing, hiking, canoeing, rafting, tubing, and boating. The total annual visitation as of 1999 was estimated to be approximately 3.5 million visitors (U.S. Senate 1999). The Chattahoochee River NRA comprises roughly 75% of the green space found in the greater Atlanta metropolitan area (Kunkle and Vana-Miller 2000). The park also contains numerous natural habitats as well as 19th century historic sites and American Indian archaeological sites.

The Chattahoochee River is currently affected by several types of pollution, due to rapid land development. Forsyth County, located immediately adjacent to the park, is one of the fastest growing counties in the United States (U.S. Senate 1999). This rapid urban sprawl resulted in water treatment plants being outpaced by development, causing wastewater to overflow during heavy rain events. With urban development comes an increase in impervious surfaces. These paved surfaces wash pollutants into the river and cause thermal pollution from the unnatural heating of water runoff (NPS 2014). This study found that more than 800 hectares (1,977 ac) within and around Chattahoochee River NRA are at least partially covered by some form of impervious surface, illustrating the need for monitoring of buffer areas surrounding the park in addition to monitoring of the area within park boundaries.

Vegetation Classification System

The task agreement for mapping required that 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 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.

The association level is determined by diagnostic species in all strata (tree canopy, sub canopy, tall-shrub, short-shrub, herbaceous, nonvascular, 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 sub canopy 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 due to similar over story characteristics and lack of information on sub canopy vegetation, a second vegetation was assigned as a supplement to the dominant vegetation code.

Prior to the University of Georgia Center for Geospatial Research's photointerpretation, NatureServe conducted field surveys in accordance with standard practices (Jennings et al. 2009) to create a list of NVCS CEGL codes for Chattahoochee River NRA (NatureServe 2009). Their detailed report includes a dichotomous key for separating the CEGL codes described for the park. 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 and/or edaphic factors[1] (e.g. soil pH) which would not be evident in leaf-on CIR photographs. In the CHAT key, soil pH was frequently used, yet the canopy species did not reflect underlying soil properties. The NatureServe report also includes comprehensive descriptions of diagnostic species for each CEGL code, and additional information on both the global and local expressions of the vegetation community type.

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, University of Georgia Center for Geospatial Research augmented the NVCS classes identified as occurring in the park by NatureServe 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 around Chattahoochee River NRA contained extensive areas subject to human influence; consequently, the National Vegetation Classification System was not applicable. Buffer areas were therefore mapped using guidelines derived from the Anderson Level II 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 the LULC categories adjacent to the park, though different modifiers were generally used in the buffer compared to within the park.

In summary, the park was mapped to the association (CEGL) level of the National Vegetation Classification System while the buffer area was more appropriately mapped using Anderson Level II guidelines. Modifiers to these classification systems were used, as appropriate, to ensure a meaningful classification system for this particular park.

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

Vegetation Mapping Workflow

The general workflow for this vegetation mapping project 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 1) 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 visits 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

Steps 1, 2, and 3 are self-explanatory; the detailed workflow for the other steps, as pertains to the mapping of Chattahoochee River NRA, is described below. Note that steps 4–7 reflect an iterative, rather than a linear, process.

Table 1. 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 IRMA portal 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 (19.7 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 datasets 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). 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 2 and Table 1.

Color infrared (CIR) aerial photographs of Chattahoochee River NRA at 1:12,000 scale was 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 142 photos in 14 flight lines were required to cover the park. A map guide was created to help with visualization of the park because of its linear layout (Figure 3). Details about the flight lines and photo center locations can be found in Appendix A.

The mapping area was split in two sections: park and buffer. The park was defined as the area within the prescribed boundaries of the park, 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.

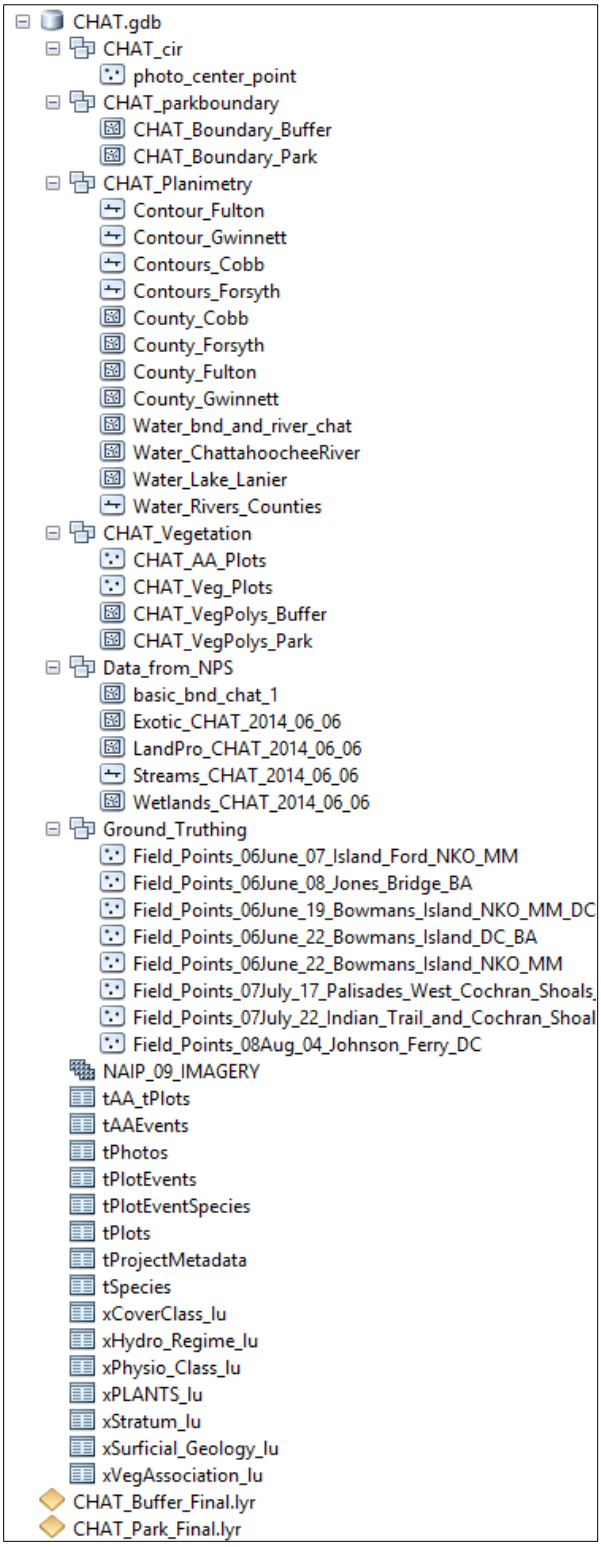


Figure 2. Foundation geodatabase created for Chattahoochee River National Recreation Area**.**

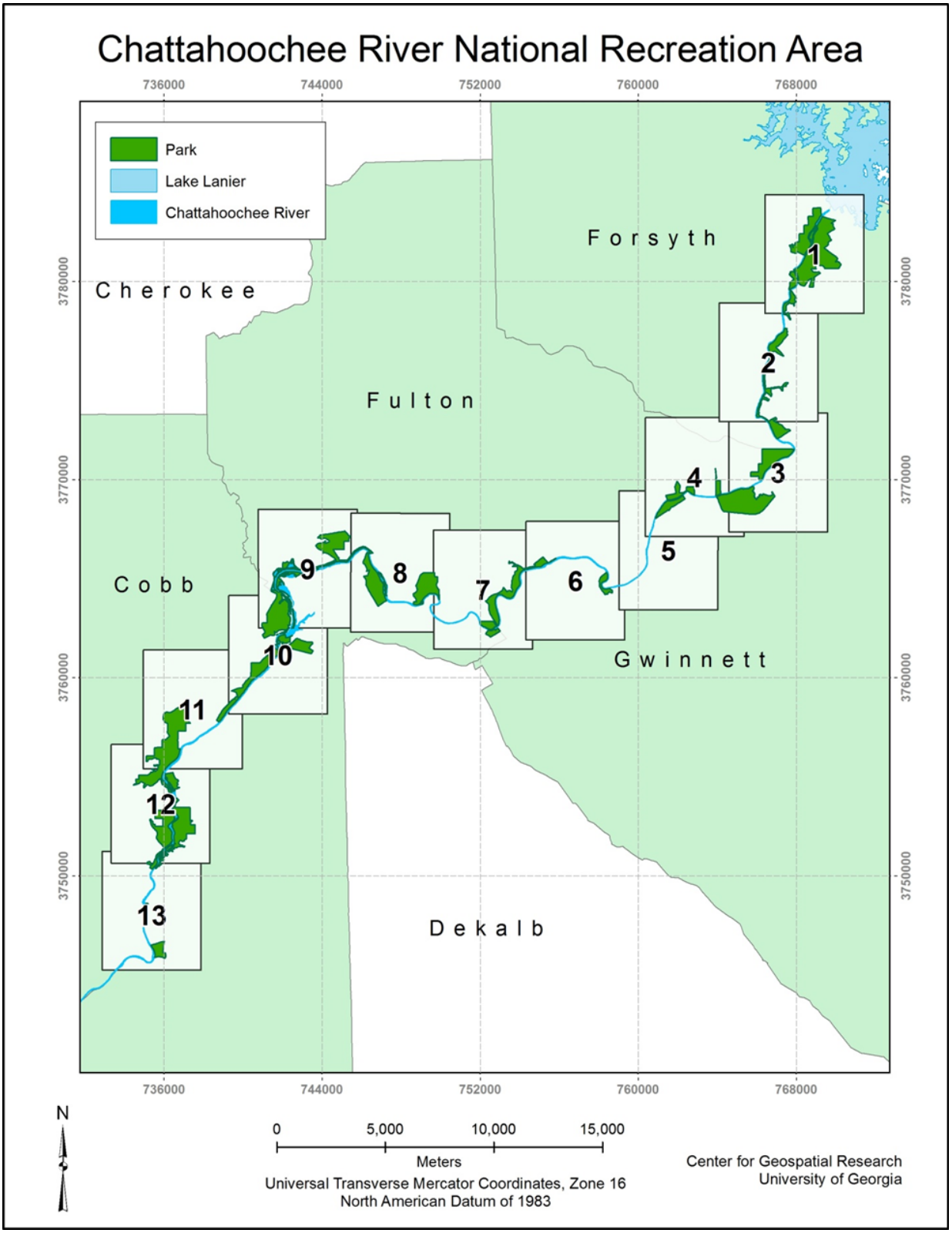


Figure 3. Map guide to aid in displaying the entire area encompassed by Chattahoochee River NRA. The linear nature of the Recreation Area makes it difficult to display on one page, so the map was divided into 13 sections for this report.

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 NVCS 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 Chattahoochee River NRA ranged in size from 100 square meters (10 × 10 meters [1,076 square feet {sq ft} or 32.8 × 32.8 ft]) to 1,000 square meters (50 × 20 meters [10,764 sq ft or 164 × 65.6 ft]). 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 with associated descriptions and field notes (Appendix B and C).

The 26 vegetation associations for Chattahoochee River NRA were determined by NatureServe from 73 plots. Three of these plots were unable to be classified resulting in 70 usable plots. The UGA Center for Geospatial Research visited 252 points to interpret the CIR signatures of these vegetation associations to delineate vegetation. The accuracy assessment plots included 409 accuracy assessment points.

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, such as Southern Buttonbush Pond (2191). Still others were represented by multiple point locations; e.g., Piedmont Dry-mesic Basic Oak Hickory Forest (7232) was sampled eight times. 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.

The photointerpretation key was developed to assist in the extension of the signatures at the plot level to the remainder of the park (Appendix D). 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.

The key for Chattahoochee River NRA provided by NatureServe included 26 associations, not including Southern Buttonbush Pond (2191). The strength and intensity of the image were described using color (varying from green to pink to purple), tone (light to dark), and texture (fine to coarse). 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 CEGL code.

Field Surveys and Ground Truth

In the course of 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 70 ground points. These areas required field visits to clarify.

Field work and ground truthing for Chattahoochee River NRA took place in June, July, and August 2014. Field visits were aimed at giving specific attention to representative habitats, rare and important communities, areas that have 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 a higher level of detail of the original CIR compared paper maps and 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 sampled site. The coordinates were later post-processed by differential correction using Trimble's Pathfinder Office Software and base station data from sites in Atlanta. In some cases, base station data were only partially available, necessitating use of multiple base stations in the Atlanta 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 sq ft]), based upon visual uniformity. Researchers also noted: the presence of exotics; evidence of past or present human influence (e.g., agriculture, grazing, logging, mowing, exotic vegetation removal, old home sites); and damage by insects, wild hogs, blow down, or fire. Before 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. In cases where researchers were unable to determine a clear match to a NVCS CEGL in the field, more detailed notes were taken in order 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 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 seven field visits or investigations and 252 discrete point locations were collected at Chattahoochee River NRA (Table 2 and Appendix E). The number of sites visited in a single day ranged from 19 to 61 and was often influenced by terrain, weather, and point of interest density. Usually, if more than two people were in the field, two independent field teams worked simultaneously to cover more area.

Table 2. Field visits and points collected for Chattahoochee River National Recreation Area.

Date (2014)	Team Member(s)	Number of Data Points
June 6	N. K. O'Hare, B. P. Adams	19
June 19	D. L. Cotten, B. P. Adams, M. Madden, N. K. O'Hare	24
June 22	D. L. Cotten, B. P. Adams, M. Madden, N. K. O'Hare	44
July 7	M. Madden, N. K. O'Hare	28
July 17	M. Madden, D. L. Cotten, B. P. Adams	46
July 22	D. L. Cotten, B. P. Adams	61
August 4	D. L. Cotten	30
Total	**–**	**252**

Photointerpretation and GIS Methods

The industry-standard GIS software, ArcGIS, offers a variety of methods and procedures to perform 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 MMU 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 × 48 inches [86.4 × 122 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

A total of 30 distinct NVCS CEGL association level vegetation communities were found in Chattahoochee River NRA, including water and human influence classes (Table 3). Of the 26 classes found in the original vegetation key for the park, all were used. Additionally, two non-CEGL codes, Water (9998) and Human Influence (9999) were added.

In the buffer zone, there were 20 distinct Anderson Level II codes (Table 4). Both the park and buffer area were further classified through the use of modifiers (Table 5).

Table 3. Land cover classes found within the park area of Chattahoochee River National Recreation Area based on the National Vegetation Classification System.

Code	Description
2191	Southern Buttonbush Pond
3866	Southern Woolgrass Bulrush Marsh
3901	Black Willow Riverbank Shrubland
4044	Successional Broomsedge Vegetation
4112	Rush Marsh
4232	Piedmont Loblolly Pine – Oak Forest
4415	Piedmont Chestnut Oak – Heath Bluff
4416	Mafic Xeric Piedmont Oak Forest
4542	Piedmont Rocky Mesic Mafic Forest
4638	Successional Water Oak Forest
4732	Blackberry – Greenbrier Successional Shrubland Thicket
4966	Knotweed Pondshore and Ditchbank Vegetation
6011	Early- to Mid-Successional Loblolly Pine Forest
7178	White Pine Plantation
7220	Successional Tuliptree Forest (Circumneutral Type)
7221	Interior Mid- to Late-Successional Tuliptree – Hardwood Upland Forest (Acid Type)
7232	Piedmont Dry-Mesic Basic White Oak – Hickory Forest
7244	Southern Red Oak – White Oak Mixed Oak Forest
7312	River Birch Levee Forest
7521	Successional Tuliptree – Loblolly Pine Upland Forest

Table 3 (continued). Land cover classes found within the park area of Chattahoochee River National Recreation Area based on the National Vegetation Classification System.

Code	Description
7546	Loblolly Pine – Tuliptree Successional Bottomland Forest
7551	Loblolly Pine – (Willow Oak, Water Oak, Diamondleaf Oak) Temporarily Flooded Forest
7730	Sycamore – Sugarberry – Green Ash / Northern Spicebush – Possumhaw / Reflexed Sedge Forest
8431	Xeric Ridgetop Chestnut Oak Forest
8465	Piedmont Acidic Mesic Mixed Hardwood Forest
8474	Southeastern Smooth Alder Swamp
9998	Water
9999	Human Influence

Table 4. Land cover/land use classes within the buffer area of Chattahoochee River National Recreation Area.

Code	Description
11	Residential
12	Commercial and Services
13	Industrial
14	Transportation, Communications, and Utilities
15	Industrial and Commercial Complexes
17	Other Urban or Built-up Land
21	Cropland and Pasture
22	Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticulture Areas
24	Other Agricultural Land
31	Herbaceous Rangeland
32	Shrub and Brush Rangeland
41	Deciduous Forest Land
42	Evergreen Forest Land
43	Mixed Forest Land
50	Major River
51	Streams and Canals

Table 4 (continued). Land cover/land use classes within the buffer area of Chattahoochee River National Recreation Area.

Code	Description
53	Reservoirs
61	Forested Wetland
62	Nonforested Wetlands
76	Transitional Areas

Table 5. Modifiers used throughout the park area and buffer of Chattahoochee River National Recreation Area.

Code	Description
BG3	Bare Ground – Greater than 75 percent
FM1	Mixed Forest – Less than 25 percent
FM2	Mixed Forest – 25 to 75 percent
FM3	Mixed Forest – Greater than 75 percent
Gm3	Herbaceous and Graminoid – Greater than 75 percent
GRC	Golf Course/Recreation Field
IS2	Impervious – 25 to 75 percent
IS3	Impervious – Greater than 75 percent
VG3	Vegetation – Greater than 75 percent

The most common class found in Chattahoochee River NRA was Water (9998) at 19.2% then Human Influence (9999) covering 14.3% of the park. The most common vegetation classes were Southern Red Oak—White Oak Mixed Oak Forest (7244) and Piedmont Dry-Mesic Basic White Oak—Hickory Forest (7232) with 10.4% and 9.9% of the park respectively. The smallest class was Southern Woolgrass Bulrush Marsh (3866) and Knotweed Pondshore and Ditchbank Vegetation (4966), at less than 0.05% each (Table 6 and Figure 4).

Within the buffer region of park, residential areas (11) dominated the land use/land cover classes and comprised 57% of the total buffer area. The next largest class was mixed forest (43), at 10.3 %. The smallest class found within the buffer was Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticulture Areas (22), industrial (13), and nonforested wetlands (62), with less than 0.1% of the total area each (Table 7 and Figure 5). Of note because of the linear nature of the park, the 500-meter (1,640-ft) buffer area was nearly three times larger than the land area found within the park boundary

(approximately 10,673 hectares [26,374 ac] in the buffer compared to approximately 3,748 hectares [9,262 ac] in the park).

Modifiers were utilized throughout the park and buffer regions to further enhance the classification system. The modifier system was based mainly on human influence factors and used another classification system. This other classes can include vegetation, mixed forest, or impervious surface coverage based on a scaling system. The scaling system used 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% (Table 8). The final vegetation maps can be found in Appendix F.

Table 6. Community element global code (CEGL) classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Chattahoochee River National Recreation Area. [ha – hectares].

CEGL	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
2191	2	5.86	11.72	0.31
3866	2	0.71	1.42	0.04
3901	15	1.09	16.37	0.44
4044	46	3.54	162.62	4.34
4112	13	0.84	10.93	0.29
4232	68	4.43	301.38	8.01
4415	8	5.54	44.36	1.18
4416	4	4.15	16.59	0.44
4542	2	5.71	11.41	0.30
4638	74	3.11	230.26	6.12
4732	15	2.75	41.27	1.10
4966	3	0.54	1.63	0.04
6011	21	3.95	82.91	2.20
7178	2	3.92	7.85	0.21
7220	30	4.35	130.37	3.46
7221	23	2.60	59.74	1.59
7232	56	6.71	375.53	9.97
7244	50	7.88	394.25	10.47
7312	13	1.60	20.79	0.55
7521	23	4.17	95.90	2.55

Table 6 (continued). Community element global code (CEGL) classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Chattahoochee River National Recreation Area. [ha – hectares].

CEGL	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
7546	13	5.76	74.88	1.99
7551	14	3.38	47.33	1.26
7730	102	2.77	282.88	7.51
8431	9	4.96	44.68	1.19
8465	12	2.67	32.01	0.85
8474	3	1.40	4.21	0.11
9998	37	19.52	722.19	19.18
9999	126	4.28	539.29	14.32
Total	**786**	**–**	**3,764.79**	**100**

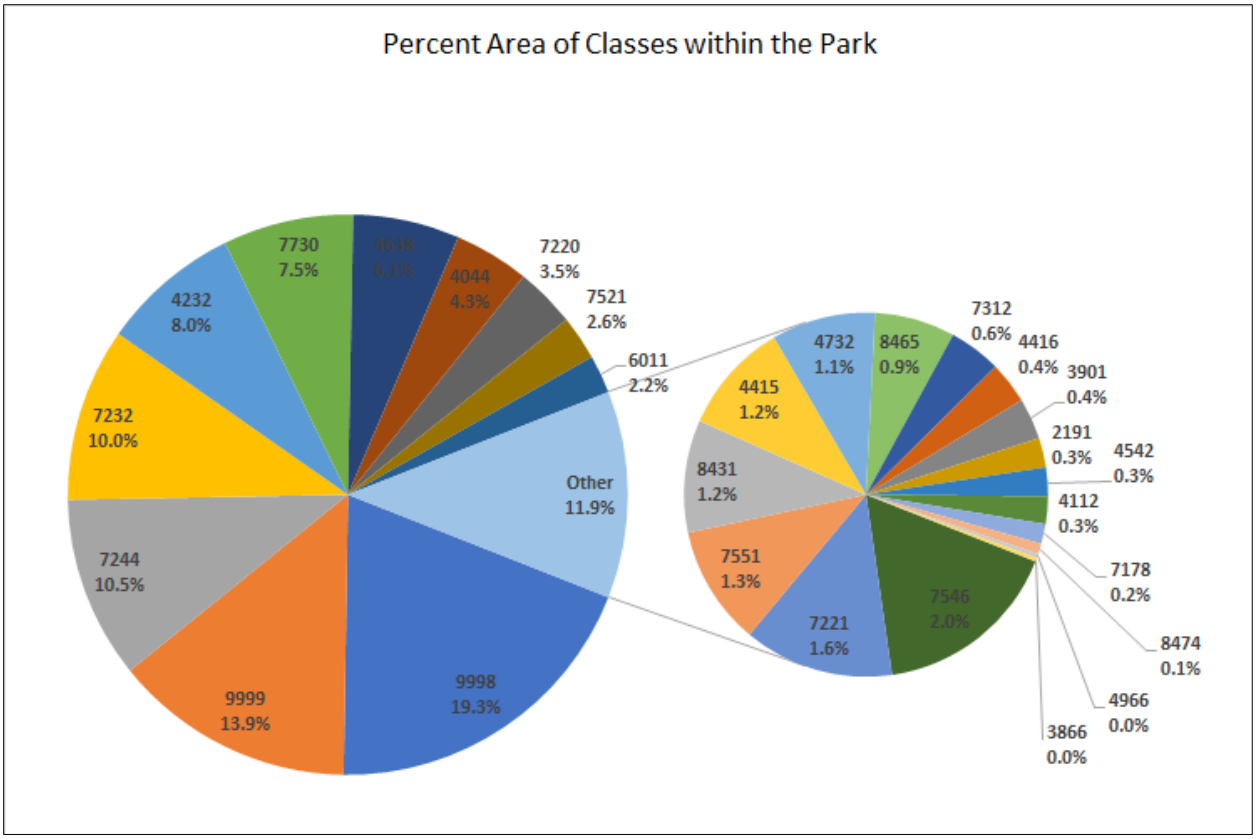


Figure 4. Park vegetation classes in Chattahoochee River National Recreation Area organized by relative size.

Table 7. Land use/land cover class, frequency of occurrence, mean area, total area, and percentage of total area within the buffer area of Chattahoochee River National Recreation Area. [ha – hectares].

Class	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
Residential	178	34.2	6,088.1	57.0
Commercial and Services	97	6.1	591.5	5.5
Industrial	4	2.5	9.9	0.1
Transportation, Communications, and Utilities	79	4.1	327.4	3.1
Industrial and Commercial Complexes	7	7.3	51.2	0.5
Other Urban or Built-up Land	65	9.6	623.1	5.8
Cropland and Pasture	3	58.2	174.7	1.6
Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticulture Areas	4	2.5	10.0	0.1
Other Agricultural Land	7	9.2	64.3	0.6
Herbaceous Rangeland	23	4.1	93.2	0.9
Shrub and Brush Rangeland	5	3.1	15.7	0.1
Deciduous Forest Land	82	6.4	523.8	4.9
Evergreen Forest Land	11	2.8	30.8	0.3
Mixed Forest Land	79	13.9	1,101.6	10.3
Major River	21	35.9	754.4	7.1
Streams and Canals	5	2.5	12.4	0.1
Reservoirs	123	1.1	136.3	1.3
Forested Wetland	5	3.2	16.2	0.2
Nonforested Wetlands	4	1.7	6.9	0.1
Transitional Areas	16	2.7	43.1	0.4
Total	**816**	**–**	**10,673.6**	**100**

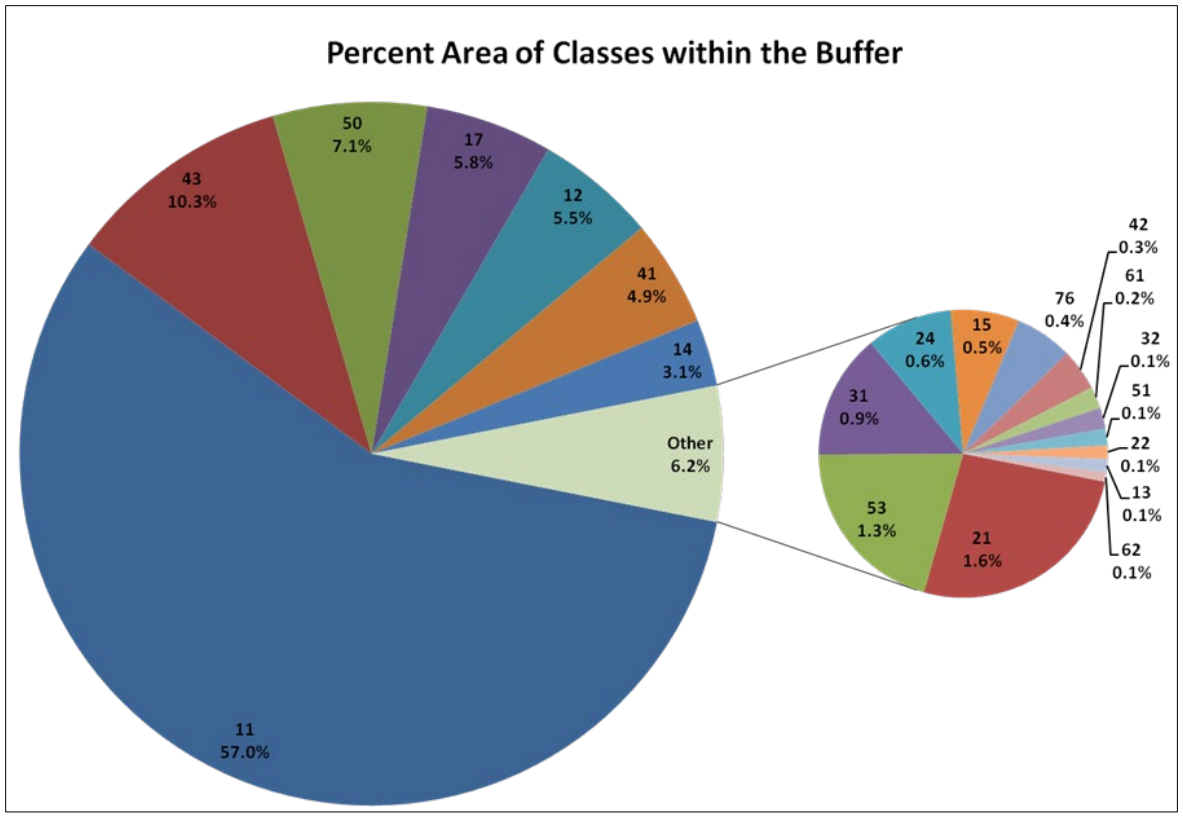


Figure 5. Buffer classes found surrounding Chattahoochee River National Recreation Area, organized by relative size.

Table 8. Modifiers used throughout the park and buffer areas of Chattahoochee River National Recreation Area, including frequency of occurrence, mean area, and total area. [ha – hectares].

Code	Description	Frequency	Mean Area (ha)	Total Area (ha)
BG3	Bare Ground – Greater than 75 percent	12	2.2	22.0
FM1	Mixed Forest – Less than 25 percent	78	14.8	1151.0
FM2	Mixed Forest – 25 to 75 percent	81	29.3	2371.6
FM3	Mixed Forest – Greater than 75 percent	64	45.3	2899.0
Gm3	Graminoids — Greater than 75 percent	3	2.2	6.5
GRC	Golf Course/Recreation Field	109	6.3	681.3
IS1	Impervious – Less than 25 percent	6	6.6	39.9
IS2	Impervious – 25 to 75 percent	25	8.0	200.3
IS3	Impervious – Greater than 75 percent	116	4.5	526.8
VG3	Vegetation – Greater than 75 percent	21	5.0	104.0
Total	–	**515**	–	**8,002.4**

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 ha) of the particular vegetation class within the map area, according to the rule set established by the National Park Service for this purpose:

- 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 6.

Point Acquisition

The Accuracy Assessment points were collected September 29–November 8, 2014 by D. O'Loughlin, B. Cogdell, F. Barksdale, J. Carr, and K. Hunt. Appendix G shows the locations of these points and Appendix H has the detailed information gathered at each of the 409 half a hectare (1.2 ac) accuracy assessment plot locations.

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 analysis. The different QA/QC categories are presented in Table 9, and the final accuracy assessment is presented in Table 10a–b in the next section (Quality Assurance of AA Plots).

Table 9. 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	M1	262	Retained
No primary code as deemed by AA field observations	L2	17	Kicked out
Non-existing class	L2a	5	Kicked out
Poor fit deemed by AA field observations	L2b	5	Kicked out
Spatial errors – points were too close to boundaries	S1	17	Kicked out
Heavily influenced by anthropogenic factors	M2	4	Kicked out
Key discrepancies – disagreements between AA and NatureServe	M2a	4	Kicked out
Plot located outside of the park	O	1	Kicked out
Incorrect Match	M5	64	Retained
Changed Polygon	C1	30	Retained (9 polygons adjusted)
Total	–	409	356 used for analysis

Quality Assurance of AA Plots

The AA plots were divided into 10 categories (Table 9): "perfect match" (M1) if AA plots were assigned the same CEGL code as the polygon that they fell in, if the AA plot was labeled 0 by the AA field observations (L2), if the AA plot was in a polygon that did not exist in the initial NatureServe assessment database (L2a), if the AA plot was labeled as a "poor fit" by the AA field observations (L2b), if the plot was heavily influenced by anthropogenic factors (M2), if the AA plot description differed from overlapping NatureServe plots (M2a), if the plot was within 10 meters (32.8 ft) of a polygon boundary or smaller than the MMU (MMU; S1), and if the AA plot as located outside of the park boundary (O1).

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 MMU (0.5 hectare [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 could be classified as 0 if there were no classes that fit the vegetation description (L2). In other cases an AA plot would be deemed a poor fit (L2b) 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, or an area greatly affected by human influence (McManamay et al. 2019). These classes were not included in the final accuracy assessment.

The AA plots labeled as non-existing class refer to those plots given labels that were not in the database (4332, 7237, 7332, 7432, and 8405). These classes were not available to be compared with polygon values, and therefore couldn't be correctly assigned during the AA process. If an AA plot was labeled with one if these codes 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 10 meters [32.8 ft] of a polygon boundary) or were within an area smaller than MMU were labeled "spatial mismatch" (S1). Plots that fall in these regions are difficult to classify since the AA plot is meant to represent an area within a 40-meter (131.2-ft) radius and can be easily misinterpreted, therefore those 17 points were removed accordingly.

There were numerous locations that showed only emergent vegetation when the imagery was acquired yet during the accuracy assessment there was a more-developed short canopy, thus causing a class discrepancy. Most of these plots were in anthropogenic influenced areas and were labeled "Human Influence" (M2). These four instances were removed from the analysis. Discrepancies between AA plot descriptions with a nearby NatureServe (within 40 meters [131.2-ft]) vegetation plot were also addressed. These AA plots were labeled "key mismatches" (M2a) and the four instances were removed. Additionally, there was one AA plot that was located outside of the park boundary (O) and was therefore removed.

Finally, to ensure the most effective map was created, nine 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 Chattahoochee River NRA and the confusion matrix for the park is show in Table 10a–b. Overall 53 AA plots were removed (L2, L2a, L2b, S1, M2, M2a, and O) based on the points lying in locations that were deemed unrepresentative of the polygon or imagery from 2011. This left 356 AA plots that were used to assess the map based on the 2011 imagery.

All available data was used to create a final vegetation classification for the park and the confusion matrix for the park is show in Table 10. The overall assessment showed an 82% accuracy and a kappa rating of 81.

Table 10a. 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.

Class	1111	2191	3866	3901	4044	4112	4232	4415	4416	4542	4638	4732	4966	6011	7178	7220	7221	7232	7244	7312	7521	7546	7551	7730	8431	8465	8474	Total
1111	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
2191	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**
3866	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
3901	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**13**
4044	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
4112	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**
4232	0	0	0	0	0	0	15	0	0	0	0	0	0	2	0	1	0	1	0	0	0	0	2	0	0	0	0	**21**
4415	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**11**
4416	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	**4**
4542	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**4**
4638	0	0	0	0	0	0	0	0	0	0	26	0	0	1	0	0	1	1	1	0	0	1	0	1	0	0	0	**32**
4732	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
4966	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
6011	0	0	0	0	0	0	0	0	0	0	0	0	0	23	1	1	0	0	0	0	0	0	0	1	0	0	0	**26**
7178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
7220	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	13	0	0	0	0	1	0	0	0	0	0	0	**16**
7221	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	1	0	0	0	0	0	0	**7**
7232	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	1	1	45	1	0	2	1	0	1	0	1	0	**56**
7244	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	31	0	0	0	0	0	1	0	0	**35**
7312	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	**9**
7521	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	15	0	0	0	0	0	**18**
7546	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	2	1	0	3	0	1	0	1	0	**10**
7551	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	4	0	0	0	0	**7**
7730	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	1	0	1	0	0	0	35	0	0	1	**42**
8431	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	10	0	0	**11**
8465	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9	0	**11**
8474	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	**2**
Total	**0**	**5**	**1**	**14**	**2**	**6**	**18**	**13**	**2**	**5**	**32**	**4**	**1**	**31**	**2**	**18**	**8**	**50**	**37**	**12**	**19**	**5**	**6**	**40**	**11**	**11**	**3**	**356**

Table 10b. Accuracy and error for the confusion matrix. Overall accuracy is 69. Kappa is 66.

Accuracy / error type	**1111**	**2191**	**3866**	**3901**	**4044**	**4112**	**4232**	**4415**	**4416**	**4542**	**4638**	**4732**	**4966**	**6011**	**7178**	**7220**	**7221**	**7232**	**7244**	**7312**	**7521**	**7546**	**7551**	**7730**	**8431**	**8465**	**8474**
User Accuracy	0[b]	100[a]	100[a]	100[a]	100[a]	83[a]	71[a]	100[a]	50[b]	75[a]	81[a]	75[a]	100[a]	88[a]	100[a]	81[a]	71[a]	80[a]	89[a]	100[a]	83[a]	30[b]	57[b]	83[a]	91[a]	82[a]	100[a]
Commission Error	100	0	0	0	0	17	29	0	50	25	19	25	0	12	0	19	29	20	11	0	17	70	43	17	9	18	0
Producer Accuracy	0[b]	100[a]	100[a]	93[a]	100[a]	83[a]	83[a]	85[a]	100[a]	60[b]	81[a]	75[a]	100[a]	74[a]	50[b]	72[a]	63[b]	90[a]	84[a]	75[a]	79[a]	60[b]	67[b]	88[a]	91[a]	82[a]	67[b]
Omission Error	0	0	0	7	0	17	17	15	0	40	19	25	0	26	50	28	38	10	16	25	21	40	33	13	9	18	33

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

[b] 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 companies with more data, including the imagery used for photointerpretation, polygon boundaries, and NatureServe plots.

A significant cause of error associated with the AA plots in Chattahoochee River NRA were based on spatial mismatches. If the AA companies were provided digital copies of the aerial photographs in GeoPDF form then they could see the vegetation from an aerial perspective, thus providing a broader context of the area in question. Using the GeoPDF, blank polygon files could be provided to reduce errors caused by AA plots that are within 10 meters (32.8 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, errors can be reduced since 17 of 409 plots for the park were attributed to these errors (S1).

The comments recorded by the accuracy assessment team "no primary code" (L2) was a significant cause of error and removal of points for final assessment. If the Accuracy Assessment did not find the NatureServe key adequate to address the vegetation classes of the park, then new points should be found. Seventeen points were removed due to this comment. Overall, these simple techniques could add 35 (9%) more plots to the accuracy assessment.

Conclusion

A final vegetation map for Chattahoochee River NRA was created to represent the vegetation occurring within the park during 2011. This product is only one of four steps necessary to produce a final 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, and performing an accuracy assessment (2014). The entire process for the park took more than 10 years to complete.

Acquisition of aerial imagery and determination of the CEGL codes occur beforehand; accuracy assessment occurs afterwards. The entire process may take three to seven years to complete. While the National Vegetation Classification System intends to capture stable vegetation categories, either man-made or natural disturbances may change some areas during the three to seven years required to produce a final 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 final vegetation map should be evaluated as a snapshot.

Because of the extensive influence of urban sprawl around the park, applying the NVCS to the association (CEGL) level was challenging. The present vegetation of the park 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, 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. 2013; Thompson et al. 2011). As noted above, the NVCS classification system is not readily applicable to disturbed communities. Overall, most regions of the park contained intact habitats; thus, applying the NVCS was mostly straight forward in these areas.

The buffer size used for this study covered a much larger area than the region found within Chattahoochee River NRA. This illustrates the linear nature of the park and how much it, including the river, is susceptible to land use/land cover changes outside of the boundary. The park covers approximately 3,000 hectares (7,413 ac) while the buffer contains approximately 10,700 hectares (26,440 ac). The majority of land use within the buffer, 57%, is residential. This study found that over 800 hectares (1,977 ac) within and around the park contain some form of impervious surface. This is an extreme lower limit since many impervious surfaces may be obscured from view in an aerial photograph. The results of this study indicate the importance of the areas surrounding the park and the ways in which they can influence habitats found within park boundaries.

Literature Cited

Anderson, J. R., E. E. Hardy, J. T. Roach, and R. E. Witmer. 1976. A land use and land cover classification system for use with remote sensor data. Geological Survey Professional Paper 964. U.S. Government Printing Office, Washington, D.C.

Anderson, M., P. Bourgeron, M. Bryer, R. Crawford, L. Engelking, D. Faber-Langendoen, M. Gallyoun, K. Goodin, D. Grossman, & S. Landaal. 1998. International classification of ecological communities: Terrestrial vegetation of the United States. Volume II. The National Vegetation Classification System: List of types. The Nature Conservancy, Arlington, Virginia.

Davis, M. A., K. Thompson, J. P. Grime & A. Liebhold. 2005. Invasibility: The local mechanism driving community assembly and species diversity. Ecography 28(5): 696–704.

Fancy, S. G., J. E. Gross, and S. L. Carter. 2009. Monitoring the condition of natural resources in US national parks. Environmental Monitoring and Assessment 151: 161–174.

Getty, A., K. Cheri, W. Carroll, B. Konig, D. Libman, D. Elk, S. Bach, and K. Johns. 2001. Planning approach for the Chattahoochee River National Recreation Area General Management Plan/EIS. Pages 145-148 *in* K. J. Hatcher, editor. Proceedings of the 2001 Georgia Water Resources Conference. Institute of Ecology, University of Georgia, Athens, Georgia.

Grossman, D. H., D. Faber-Langendoen, A. S. Weakley, M. Anderson, P. Bourgeron, Crawford, K. Goodin, S. Landaal, K. Metzler, K. Patterson, M. Pyne, M. Reid & L. Sneddon. 1998. International classification of ecological communities: Terrestrial vegetation of the United States. Volume I. The National Vegetation Classification System: Development, status, and applications. The Nature Conservancy, Arlington, Virginia.

Grossman, D. H., K. L. Goodin, and C. L. Reuss, editors. 1994. Rare plant communities of the conterminous United States: An initial survey. The Nature Conservancy, Arlington, Virginia.

Jennings, M. D., D. Faber-Langendoen, O. L. Loucks, R. K. Peet, and D. Roberts. 2009. Standards for associations and alliances of the U.S. National Vegetation Classification. Ecological Monographs 79(2): 173–199.

Kunkle, S., and D. Vana-Miller. 2000. Water Resources Management Plan: Chattahoochee National Recreation Area Georgia. National Park Service, Water Resources Division, Denver, Colorado.

McManamay, R. H., S. L. Corbett, and A. C. Curtis. 2019. Field procedures for vegetation mapping accuracy assessment: Cape Lookout National Seashore and Cape Hatteras National Seashore—Version 1.0. Standard Operating Procedure. NPS/SECN/SOP—1.4.17. Southeast Coast Network, Athens, Georgia. Available at: https://irma.nps.gov/DataStore/Reference/Profile/2266071 (last accessed September 2019).

National Park Service (NPS). 2015. Vegetation inventory. NPS Inventory and Monitoring. Available at: https://www.nps.gov/im/vegetation-inventory.htm (last accessed August 2019).

National Park Service (NPS). 2018a. NPS Inventory and Monitoring. Available at: https://www.nps.gov/im/about.htm (last accessed August 2019).

National Park Service (NPS). 2018b. NPS Southeast Coast Inventory & Monitoring Network. Available at: https://www.nps.gov/im/secn/index.htm (last accessed August 2019).

National Park Service (NPS). 2014. Chattahoochee River National Recreation Area. https://www.nps.gov/chat/index.htm (last accessed August 2019).

Pardue, J. 2008. The GeoPDF File; a new solution for the digital publication, distribution, and collaboration of geospatial data. 30 pp. U. S. Geological Survey, Reston, VA, USA.

Schmoldt, D. L., D. L. Peterson, and D. G. Silsbee. 1994. Developing inventory and monitoring programs based on multiple objectives. Environmental Management 18(5): 707–727.

Thompson, J. R., D. N. Carpenter, C. V. Cogbill, and D. R. Foster. 2013. Four centuries of change in northeastern United States forests. PLoS ONE 8(9): e72540.

Thompson, J. R., D. R. Foster, R. Scheller, and D. Kittredge. 2011. The influence of land use and climate change on forest biomass and composition in Massachusetts, USA. Ecological Applications 21(7): 2425–2444.

UNESCO. 1973. International Classification and Mapping of Vegetation. Series 6. Ecology and conservation. United Nations Educational, Scientific, and Cultural Organization, Paris, France.

United States Senate. 1999. Chattahoochee River Recreation Area. Senate Bill 109. Congress Session 106-62. Committee on Energy and Natural Resources.

Wuthrich, D. 2006. Data Sharing with GeoPDFs. Geospatial Solutions 16: 34–35.

Appendix A. Flight Line and Photo Centers

Table A-1. Chattahoochee River National Recreation Area flight line, photo numbers, and photo center coordinates (UTM Zone 16, NAD83). Photos were acquired by Aero-Metric at 1:12,000 scale on May 1, 2011.

Flight Line	Photo	Easting	Northing
5	1	735123.4	3744887.1
5	2	735118.3	3746002.7
5	3	735119.7	3747101.0
5	4	735121.6	3748193.5
5	5	735111.9	3749283.5
5	6	735115.1	3750341.8
5	7	735114.2	3751413.6
5	8	735119.3	3752484.3
5	9	735123.4	3753546.9
5	10	735116.7	3754618.5
5	11	735114.1	3755689.9
5	12	735122.0	3756756.0
5	13	735118.8	3757847.3
5	14	735114.9	3758924.3
6	1	737059.5	3744829.3
6	2	737060.5	3745939.1
6	3	737064.0	3747030.5
6	4	737059.5	3748118.6
6	5	737053.4	3749190.7
6	6	737044.8	3750280.8
6	7	737056.9	3751370.1
6	8	737074.4	3752445.7
6	9	737071.7	3753521.6
6	10	737072.4	3754611.3
6	11	737069.4	3755641.7

Flight Line	Photo	Easting	Northing
6	12	737064.7	3756736.4
6	13	737057.0	3757824.9
6	14	737071.2	3758865.6
6	15	737065.0	3759954.8
7	1	736807.3	3756470.7
7	2	737637.8	3757149.5
7	3	738482.1	3757848.7
7	4	739317.2	3758545.5
7	5	740161.4	3759232.3
7	6	740980.4	3759926.0
7	7	741828.3	3760627.9
7	8	742657.4	3761307.3
7	9	743494.7	3761988.3
7	10	744315.9	3762674.1
7	11	745159.1	3763367.9
7	12	745973.8	3764044.5
7	13	746803.8	3764722.9
7	14	747661.7	3765434.7
7	15	748481.4	3766103.2
8	1	739008.0	3760770.6
8	2	739831.6	3761464.3
8	3	740671.6	3762144.4
8	4	741503.3	3762831.4
8	5	742360.5	3763536.6
8	6	743183.7	3764217.0
8	7	744038.9	3764914.8
8	8	744866.8	3765593.2
8	9	745699.7	3766279.4
8	10	746541.5	3766962.3

Flight Line	Photo	Easting	Northing
9	1	740277.8	3764297.4
9	2	741123.8	3764990.5
9	3	741966.0	3765698.0
9	4	742804.5	3766375.7
9	5	743626.3	3767066.1
9	6	744472.4	3767766.9
9	7	745286.6	3768444.3
10	1	744874.9	3764023.6
10	2	745938.4	3763834.5
10	3	747019.2	3763643.2
10	4	748052.4	3763462.1
10	5	749083.4	3763269.2
10	6	750136.8	3763083.2
10	7	751202.9	3762902.1
10	8	752270.4	3762715.3
10	9	753353.9	3762523.1
10	10	754455.0	3762327.1
11	1	746350.7	3765697.1
11	2	747420.2	3765516.8
11	3	748487.5	3765330.1
11	4	749551.4	3765138.9
11	5	750605.4	3764951.6
11	6	751649.2	3764760.5
11	7	752717.0	3764573.2
11	8	753771.6	3764391.1
11	9	754850.4	3764200.6
12	1	749319.4	3762741.8
12	2	750374.8	3762915.7
12	3	751424.0	3763088.0

Flight Line	Photo	Easting	Northing
12	4	752518.3	3763274.4
12	5	753593.0	3763449.2
12	6	754670.7	3763625.4
12	7	755739.6	3763804.2
12	8	756814.8	3763987.6
12	9	757883.3	3764155.4
12	10	758927.8	3764325.7
12	11	760004.8	3764517.0
12	12	761059.4	3764697.1
13	1	750358.9	3764850.5
13	2	751426.8	3765024.7
13	3	752482.4	3765205.6
13	4	753547.2	3765375.4
13	5	754596.0	3765550.9
13	6	755667.6	3765729.4
13	7	756736.0	3765925.2
13	8	757819.8	3766103.8
13	9	758909.3	3766271.2
13	10	759995.4	3766454.1
13	11	761065.4	3766618.9
14	1	760277.2	3766162.5
14	2	760786.7	3767120.2
14	3	761305.2	3768074.0
14	4	761822.6	3769017.7
14	5	762341.9	3769961.1
15	1	763272.3	3767844.3
15	2	764228.4	3768275.5
15	3	765207.0	3768721.0
15	4	766207.0	3769196.8

Flight Line	Photo	Easting	Northing
15	5	767169.3	3769621.6
15	6	768167.1	3770093.5
16	1	761440.3	3769107.3
16	2	762435.5	3769573.1
16	3	763434.1	3770021.9
16	4	764396.5	3770462.2
16	5	765360.1	3770913.1
16	6	766352.1	3771358.6
16	7	767345.5	3771810.0
16	8	768341.9	3772278.1
17	1	765975.3	3770509.5
17	2	766196.1	3771591.0
17	3	766421.1	3772655.2
17	4	766661.3	3773705.4
17	5	766896.7	3774790.3
17	6	767110.2	3775857.2
17	7	767334.4	3776929.5
17	8	767552.9	3777974.7
17	9	767767.0	3779048.3
17	10	767973.6	3780093.2
17	11	768206.5	3781122.1
17	12	768419.9	3782166.5
17	13	768642.5	3783215.1
17	14	768869.6	3784257.7
18	1	769645.6	3778628.1
18	2	769866.1	3779696.8
18	3	770070.3	3780768.3
18	4	770301.4	3781821.0
18	5	770525.7	3782877.8

Flight Line	Photo	Easting	Northing
18	6	770742.5	3783917.5

Appendix B. NatureServe Vegetation Plot Data

Table B-1. NatureServe vegetation plot locations and notes. Field data acquired by L. Echols, L. Kruse and G. Burke in May, July, August, September, and October 2007 and August and September 2008.

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
CHAT001	33.8913	-84.4375	Rock Chestnut Oak, Mockernut, Big Leaf Magnolia, Small Stream Mesic Slope Forest	7232	Trails, roads, exotic plants	Broad-leaved	Cold-deciduous	Forest
CHAT002	33.8695	-84.4404	–	4415	Unmarked foot path	Broad-leaved	Cold-deciduous	Forest
CHAT003	33.8932	-84.4373	–	7244	Numerous canopy gaps, plot falls between two foot trails, potential disturbance from foot traffic; herb layer species richness depauperate	Broad-leaved	Cold-deciduous	Forest
CHAT004	33.8909	-84.4425	–	4415	–	Broad-leaved	Cold-deciduous	Forest
CHAT005	33.8879	-84.4479	Mesic stream terrace *Q. alba*	–	–	Forest	–	–
CHAT006	33.8878	-84.4467	–	7232	–	Broad-leaved	Cold-deciduous	Forest
CHAT007	33.8885	-84.4360	–	4232	Even-aged pine stand; logging or agriculture in past	Mixed	Mixed evergreen/cold-deciduous	Forest
CHAT008	33.9162	-84.9423	Hibiscus	3901	–	Broad-leaved	Cold-deciduous	Shrubland
CHAT009	33.9520	-84.3991	–	4638	Trails/roads	Broad-leaved	Cold-deciduous	Forest
CHAT010	33.9399	-84.4114	–	4112	–	Graminoid	Herb-perennial	Herbaceous

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
CHAT011	33.9395	-84.4118	–	4966	–	Broad-leaved	Herb-perennial	Herbaceous
CHAT012	33.9497	-84.4019	–	4542	Small amount of *Lonicera japonica* and *Ligustrum sinense*	Broad-leaved	Cold-deciduous	Forest
CHAT013	33.9402	-84.0000	–	4112	–	Broad-leaved	Herb-perennial	
CHAT014	33.9121	-84.4497	–	3866	–	Graminoid	Herb-perennial	Herbaceous
CHAT015	33.9375	-84.4396	–	8465	Several *Cornus* standing dead with signs of younger sucker shoots, a number of live trees with no immediate signs of disease	Broad-leaved	Cold-deciduous	Forest
CHAT016	33.9381	-84.4388	–	8465	Trail upslope outside of plot, minimal human disturbance; *ligustrum sinense* established and could pose threat to area	Broad-leaved	Cold-deciduous	Forest
CHAT017	33.9349	-84.4413	–	4232	–	Needle-leaved	Evergreen	Forest
CHAT018	33.9146	-84.4478	–	7546	Logging, exotic plants, agriculture?	Broad-leaved	Cold-deciduous	Forest
CHAT019	33.9858	-84.3818	–	8465	–	Broad-leaved	Cold-deciduous	Forest
CHAT020	33.9858	-84.3806	–	7232	Small amounts of *Ligustrum sinense*, *Lonicera japonica*, and *Rosa multiflora*	Broad-leaved	Cold-deciduous	Forest
CHAT021	33.9864	-84.3812	–	7232	Exotic plants	Broad-leaved	Cold-deciduous	Forest
CHAT022	33.9844	-84.3847	–	7220	Non-official foot trail	Broad-leaved	Cold-deciduous	Forest
CHAT023	33.9821	-84.3828	–	7244	Small amounts of *Albizzia julibrissin*, slightly more *Ligustrum sinense*	Broad-leaved	Cold-deciduous	Forest

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
CHAT024	33.9792	-84.3788	–	4232	–	Mixed	Mixed evergreen/cold-deciduous	Forest
CHAT025	33.9048	-84.4440	–	7220	*Lonicera japonica*	Broad-leaved	Cold-deciduous	Forest
CHAT026	34.0096	-84.3536	–	4232	Exotic plants	Mixed	Mixed evergreen/cold-deciduous	Forest
CHAT027	34.0113	-84.3529	–	8431	Exotic plants	Broad-leaved	Cold-deciduous	Forest
CHAT028	34.0128	-84.3553	–	4415		Broad-leaved	Cold-deciduous	Forest
CHAT029	34.0113	-84.3578	–	7232		Broad-leaved	Cold-deciduous	Forest
CHAT030	33.9083	-84.4544	–	7220	Exotic plants	Broad-leaved	Cold-deciduous	Forest
CHAT031	34.0096	-84.3522	–	7244	Exotic plants	Broad-leaved	Cold-deciduous	Forest
CHAT032	33.9910	-84.3250	*Pinus taeda* Temporarily Flooded Forest	7551	–	Mixed	Mixed evergreen/cold-deciduous	Forest
CHAT033	33.9934	-84.3249	*Betula* / *Carpinus* Floodplain	7312	Exotic plants	Broad-leaved	Cold-deciduous	Forest
CHAT034	33.9961	-84.3270	–	7232	–	Broad-leaved	Cold-deciduous	Forest
CHAT035	34.1540	-84.0850	*Fagus* - *Liriodendron tulipifera* - *Pinus taeda* Mesic Slope	8465	–	Broad-leaved	Cold-deciduous	Forest
CHAT036	34.1541	-84.0855	–	7521	Pine bark beetle	Broad-leaved	Cold-deciduous	Forest
CHAT037	34.1528	-84.0851	–	7244		Broad-leaved	Cold-deciduous	Forest

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
CHAT038	34.1547	-84.0835	–	–	–	0	Cold-deciduous	Forest
CHAT039	34.1534	-84.0844	–	–	Pine bark beetle	Broad-leaved	Cold-deciduous	Forest
CHAT040	34.1555	-84.0858	–	7221	Hiker made trail; exotic plants; Dogwood anthracnose	Broad-leaved	Cold-deciduous	Forest
CHAT041	34.1027	-84.1039	–	4638	–	Broad-leaved	Cold-deciduous	Forest
CHAT042	34.1422	-84.0905	–	7232	Exotic plants, dogwood anthracnose	Broad-leaved	Cold-deciduous	Forest
CHAT043	34.1425	-84.0868	–	4044	–	Graminoid	Herb-perennial	Herbaceous
CHAT044	34.0941	-84.1092	–	7330	Exotic plants: *Microstegium* forms a continuous carpet in the herbaceous layer; *Ligustrum sinense* and *Lonicera japonica* are also problematic	Broad-leaved	Cold-deciduous	Forest
CHAT045	34.0952	-84.1096	–	7312	Exotic plants: *Microstegium vimineum* forms a continuous carpet within plot	Broad-leaved	Cold-deciduous	Forest
CHAT046	34.0311	-84.1238	–	4112	–	Graminoid	Herb-annual	Herbaceous
CHAT047	34.0307	-84.1253	–	4112	–	Mixed	Herb-annual	Shrubland
CHAT048	34.0308	-84.1232	–	4638	–	Broad-leaved	Cold-deciduous	Forest
CHAT049	34.0307	-84.1224	–	7730	Exotic plants: *Ligustrum sinense* is very established and needs control before native shrubs are excluded	Broad-leaved	Cold-deciduous	Forest
CHAT050	34.0314	-84.1240	–	4732	Area potentially affected by herbicide spraying - need land use history data	Graminoid	Herb-perennial	Herbaceous

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
CHAT051	34.0479	-84.1010	–	7312	*Ligustrum sinense* is well established and problematic	Broad-leaved	Cold-deciduous	Forest
CHAT052	34.0494	-84.1003	–	7178	Logging	Needle-leaved	Evergreen	Forest
CHAT053	34.1189	-84.0974	–	4638	–	Broad-leaved	Cold-deciduous	Forest
CHAT054	34.1360	-84.0864	–	7244	Dogwood anthracnose	Broad-leaved	Cold-deciduous	Forest
CHAT055	34.1426	-84.0188	–	4232	–	Needle-leaved	Evergreen	Forest
CHAT056	34.1426	-84.0188	–	4415	Water runoff created path to river, only point of soil exposure, likely also used by hikers	Broad-leaved	Cold-deciduous	Forest
CHAT057	34.0120	-84.3596	–	7220	–	Broad-leaved	Cold-deciduous	Forest
CHAT058	33.9968	-84.3277	–	7220	Exotic plants: *Lonicera japonica* and *Hedera helix* are problematic; *Microstegium* is established	Broad-leaved	Cold-deciduous	Forest
CHAT059	33.9894	-84.3270	–	6011	–	Needle-leaved	Evergreen	Forest
CHAT060	33.9521	-84.4001	–	7232	Exotic plants: *Lonicera japonica* a serious problem in the herbaceous layer	Broad-leaved	Cold-deciduous	Forest
CHAT061	33.9517	-84.3992	–	8474	–	Broad-leaved	Cold-deciduous	Shrubland
CHAT062	33.8921	-84.4441	–	8431	–	Broad-leaved	Cold-deciduous	Forest
CHAT063	33.8914	-84.4431	–	8431	–	Broad-leaved	Cold-deciduous	Forest
CHAT064	34.0227	-84.1736	–	4638	Exotic plants	Broad-leaved	Cold-deciduous	Forest
CHAT065	33.9953	-84.2020	–	7730	–	Broad-leaved	Cold-deciduous	Forest
CHAT066	33.9940	-84.2023	–	7730	–	Broad-leaved	Cold-deciduous	Forest

Plot Code	Field X	Field Y	Provisional	Elcode	Environment	Leaf Type	Leaf Phenology	Physiological Class
CHAT067	34.0024	-84.2382	–	4232	–	Mixed	Mixed evergreen/cold-deciduous	Forest
CHAT068	33.9989	-84.2487	–	7220	–	Broad-leaved	Cold-deciduous	Forest
CHAT069	34.0002	-84.2384	–	7312	–	Broad-leaved	Cold-deciduous	Forest
CHAT070	33.9392	-84.4122	–	4966	–	Graminoid	Herb - perennial	Herbaceous
CHAT071	33.9389	-84.4128	–	4966	–	Graminoid	Herb - perennial	Herbaceous
CHAT072	33.8792	-84.4419	–	6011	–	Needle-leaved	Evergreen	Forest

Appendix C. NatureServe Vegetation Plot and Photo Center Locations

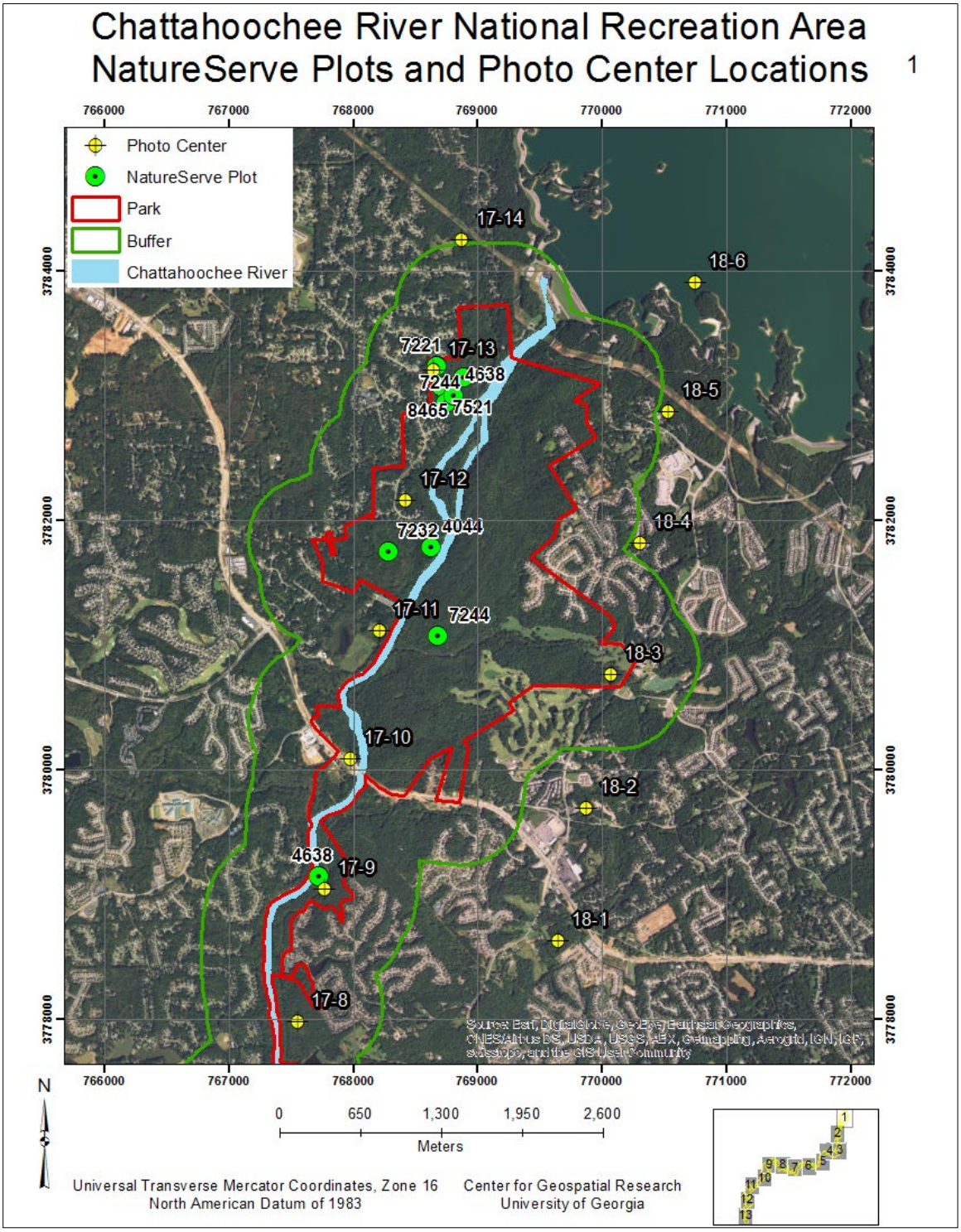


Figure C-1. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 1.

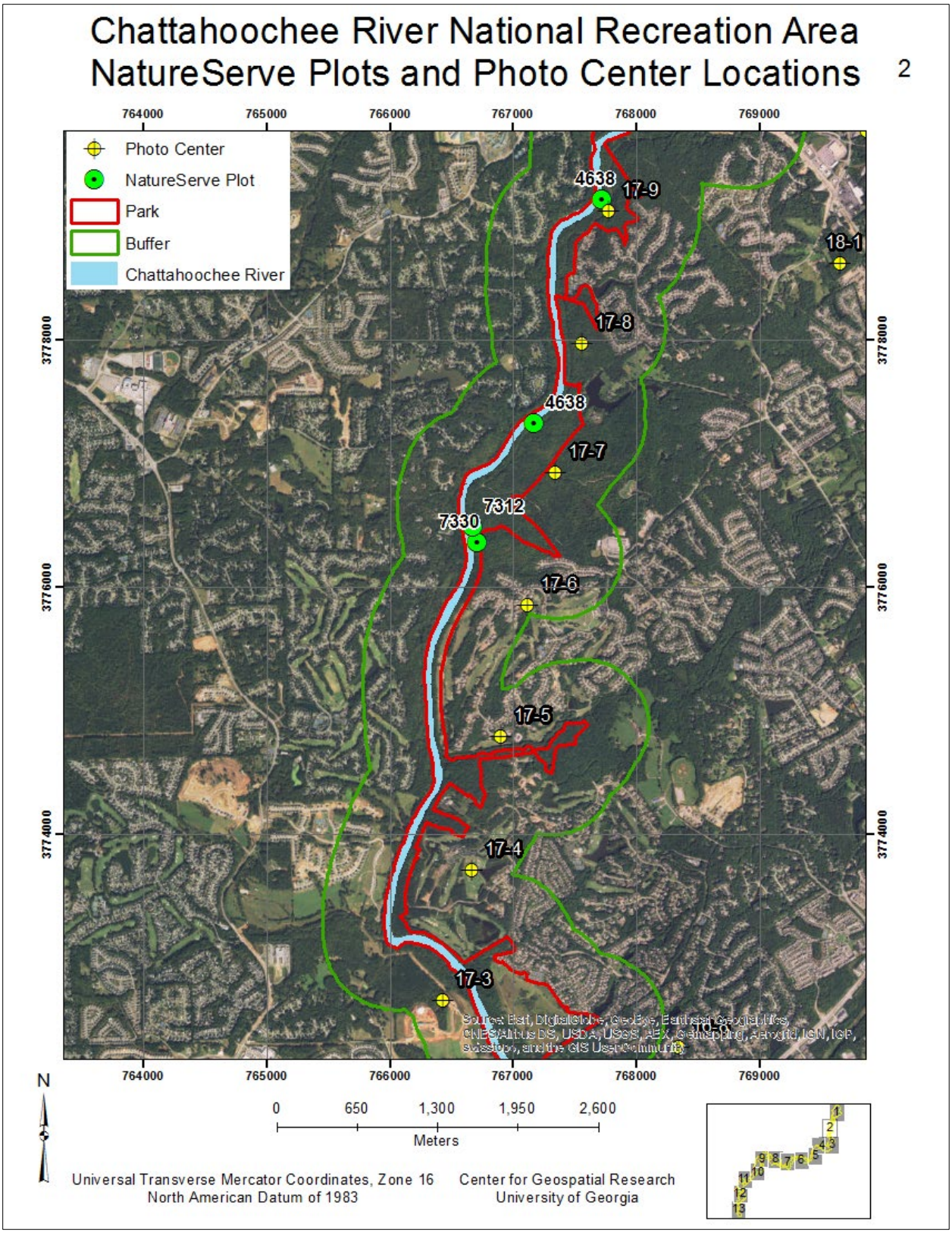


Figure C-2. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 2.

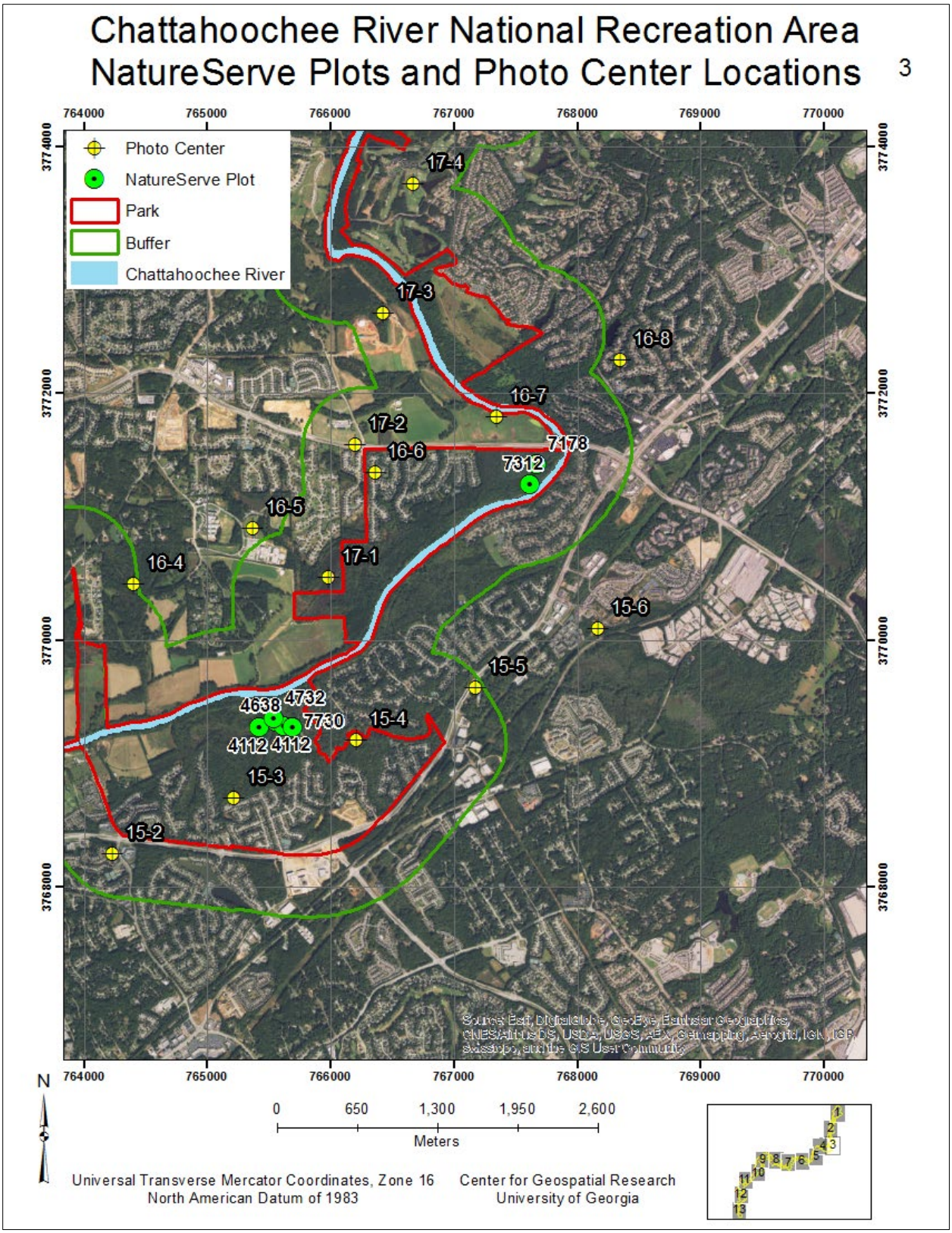


Figure C-3. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 3.

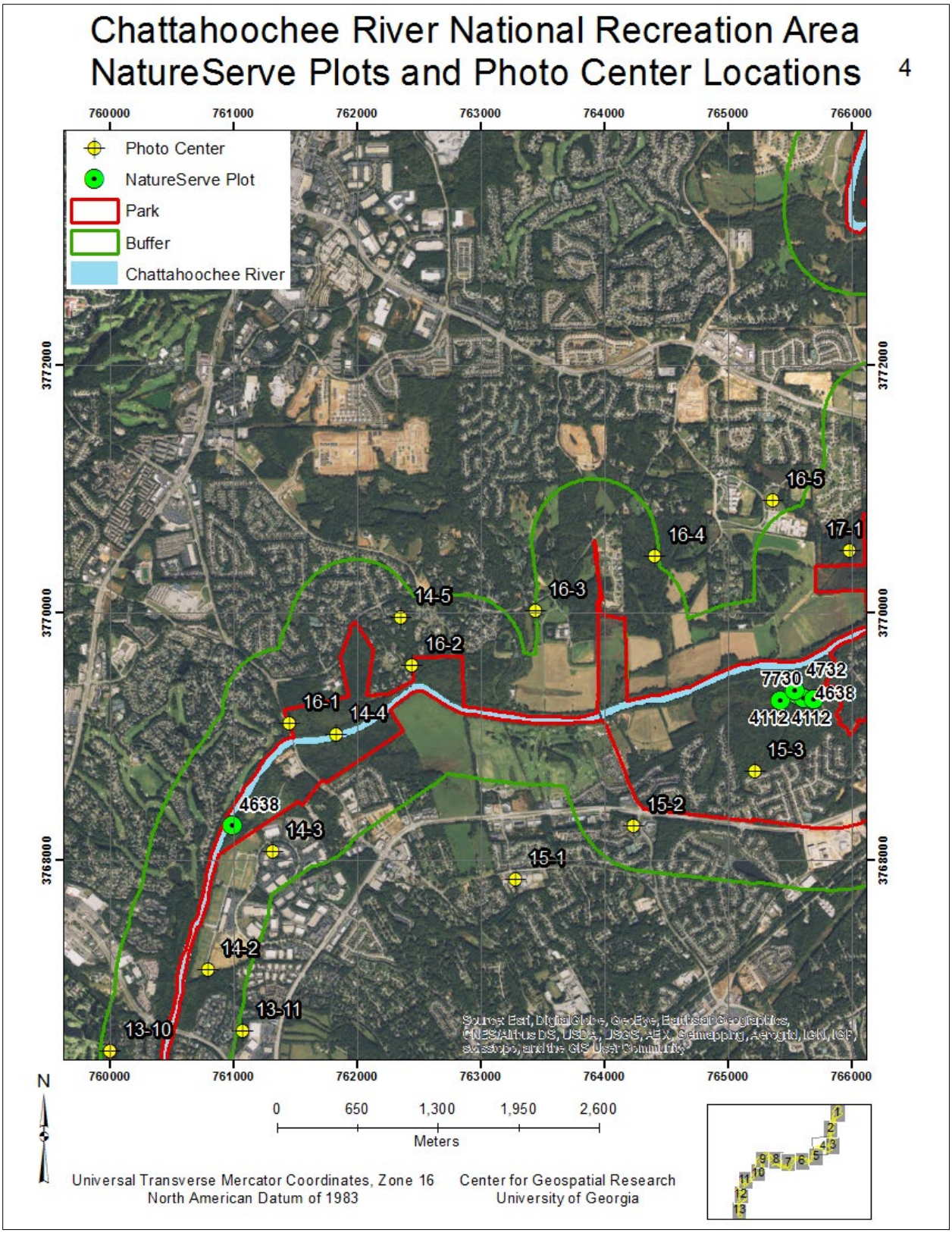


Figure C-4. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 4.

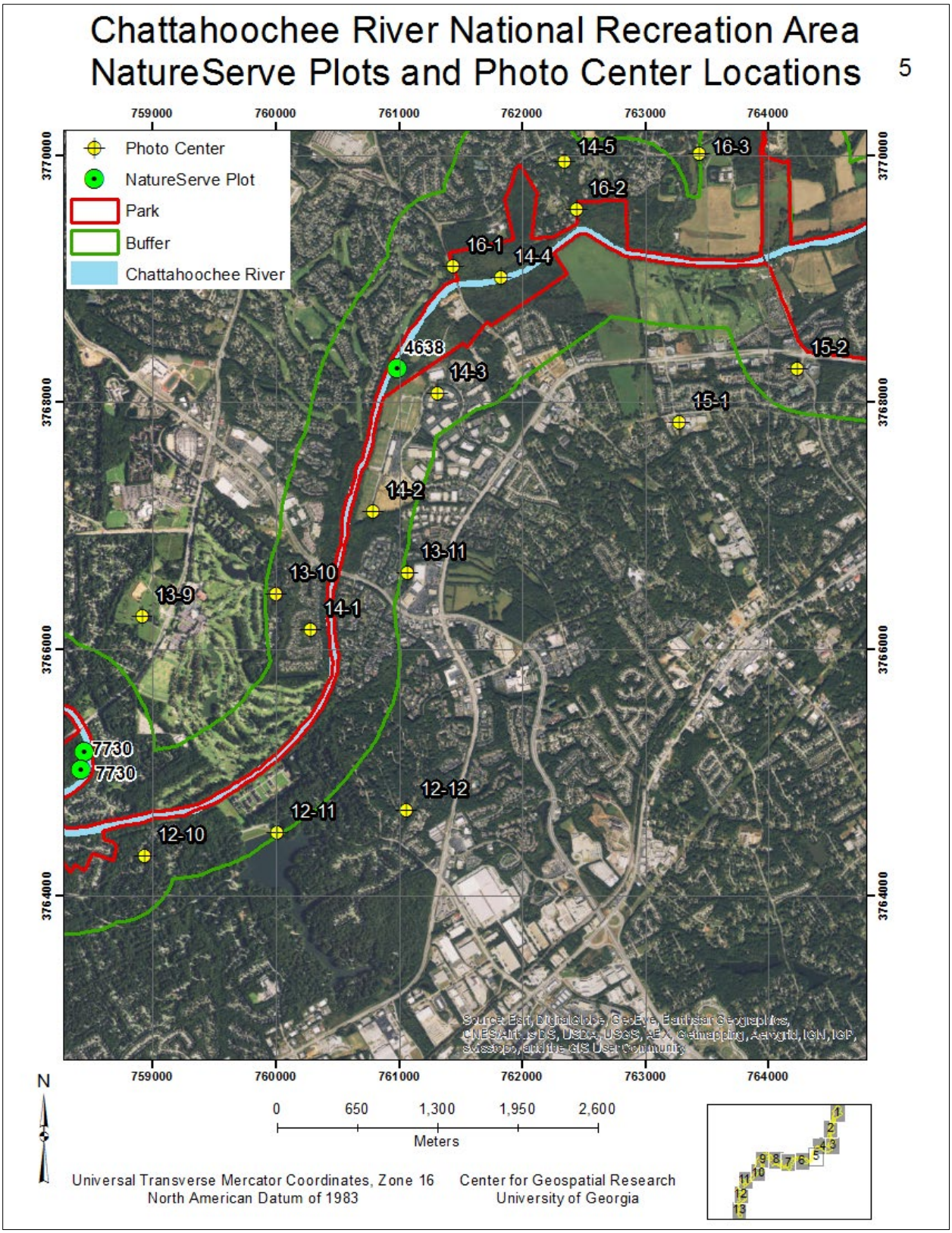


Figure C-5. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 5.

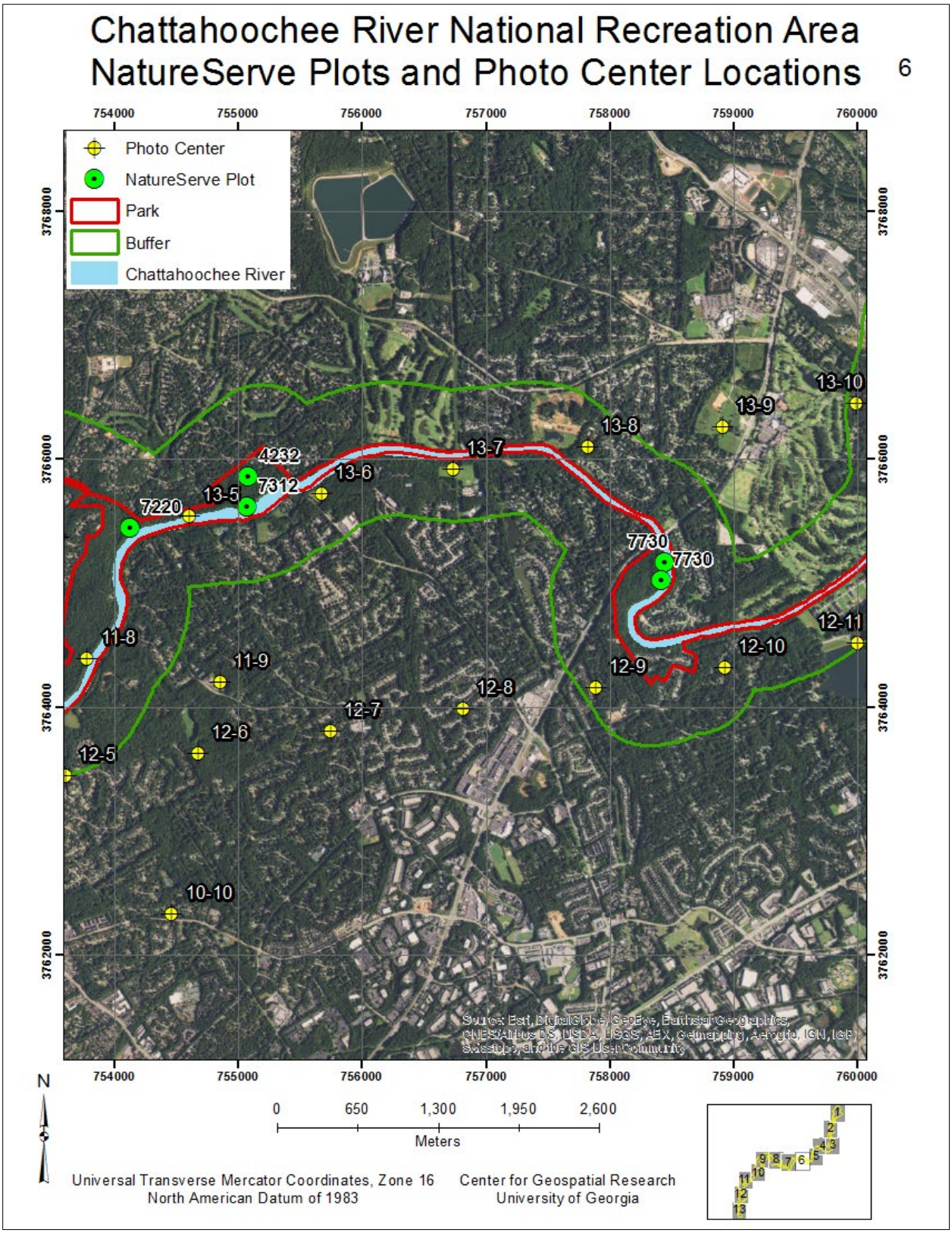


Figure C-6. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 6.

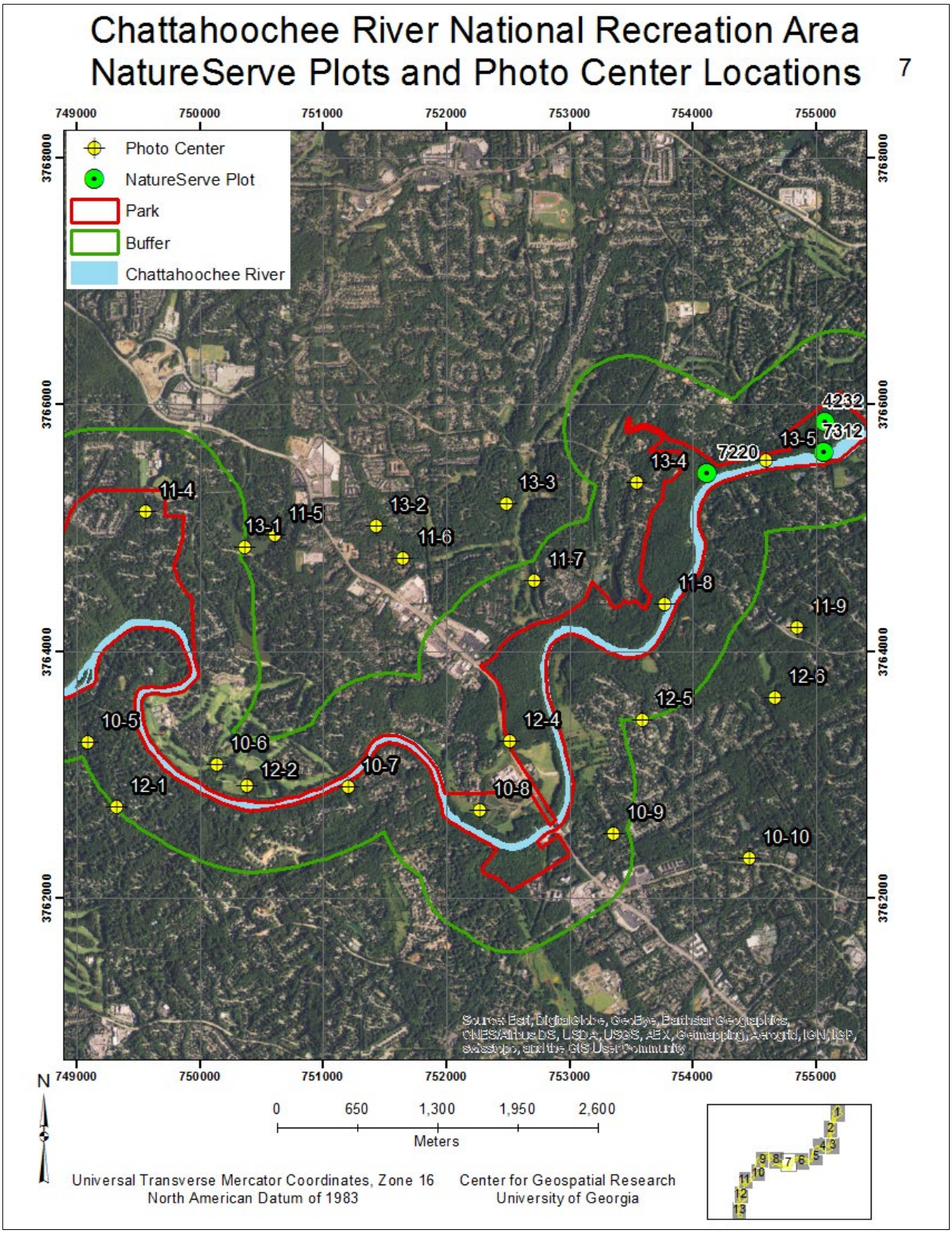


Figure C-7. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 7.

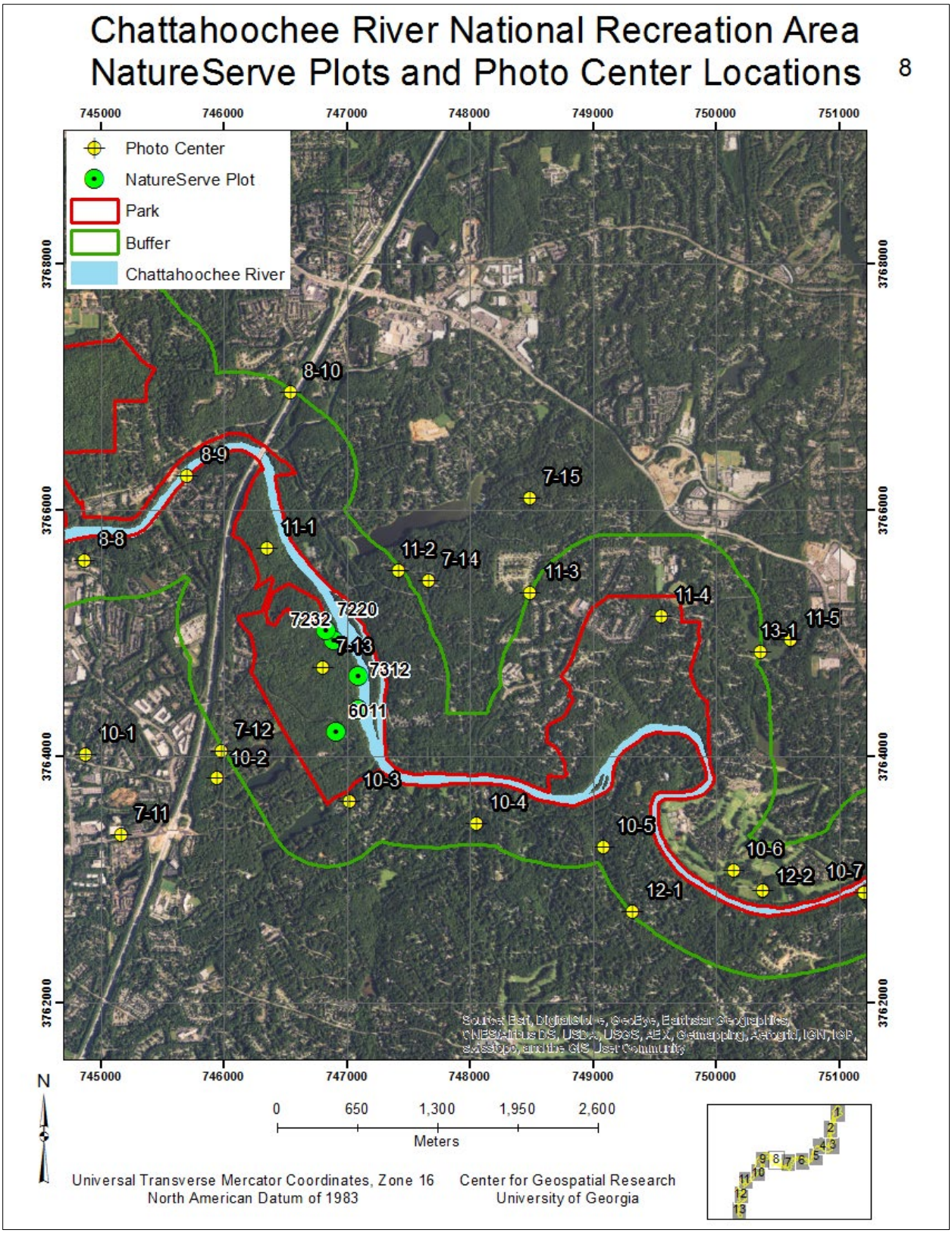


Figure C-8. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 8.

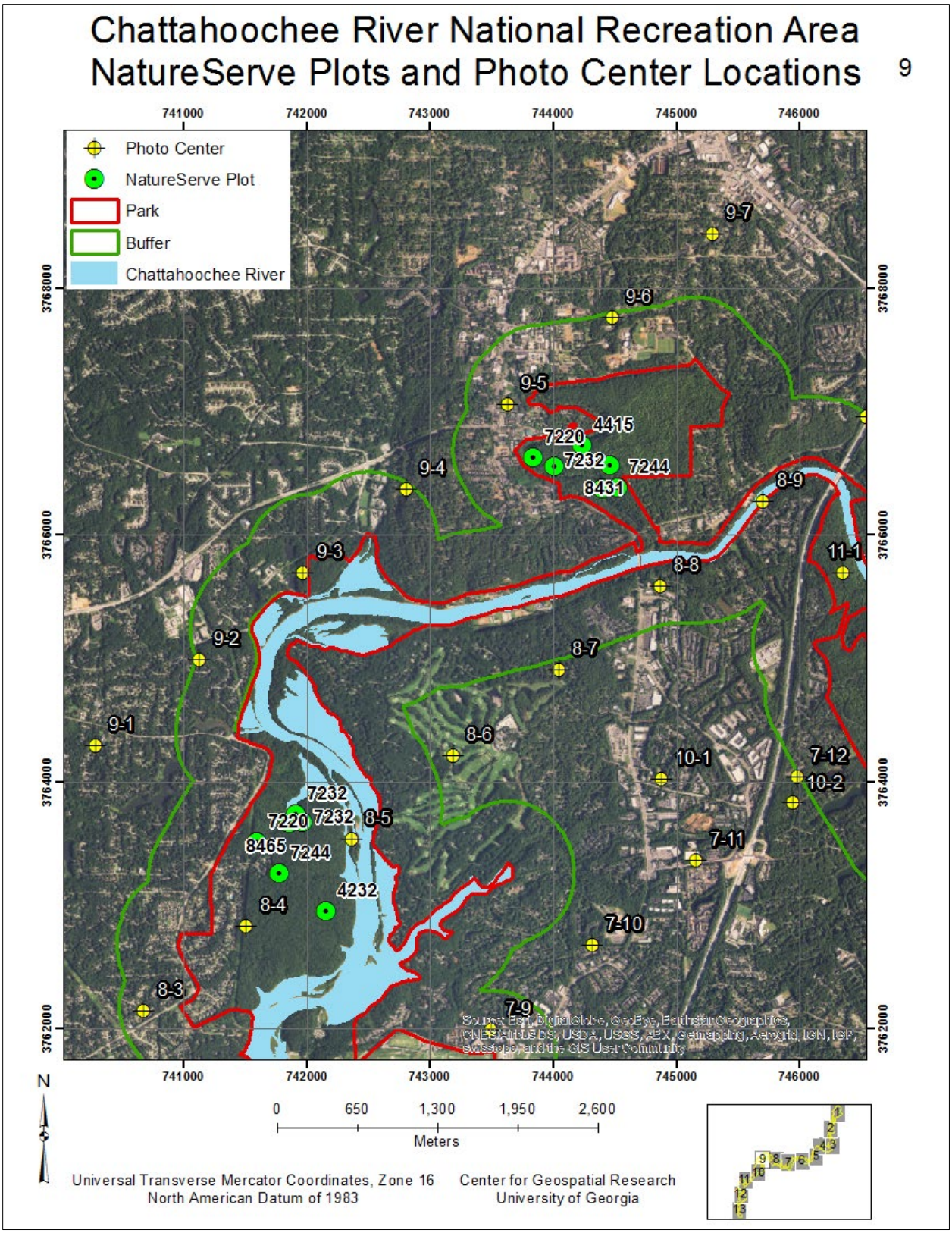


Figure C-9. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 9.

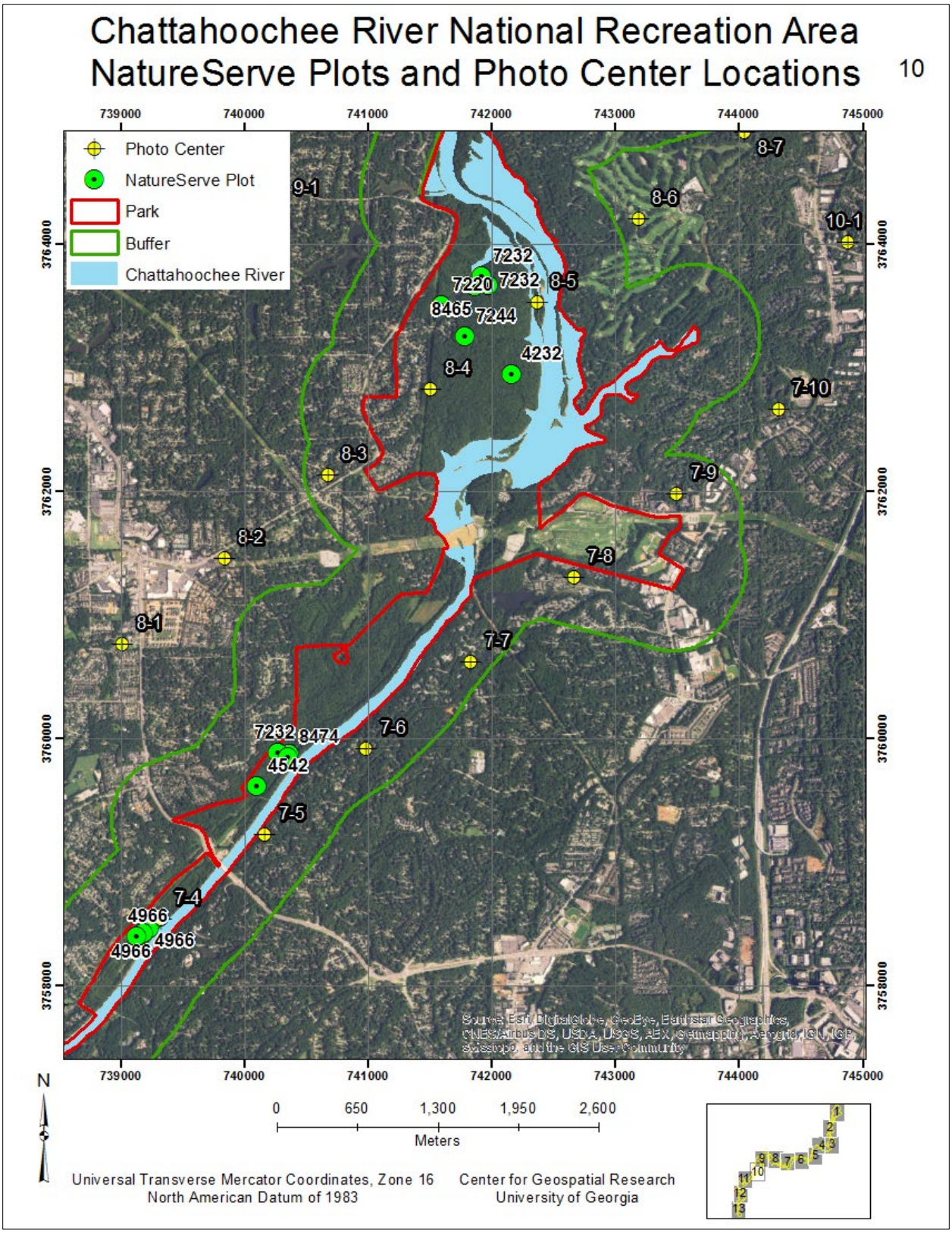


Figure C-10. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 10.

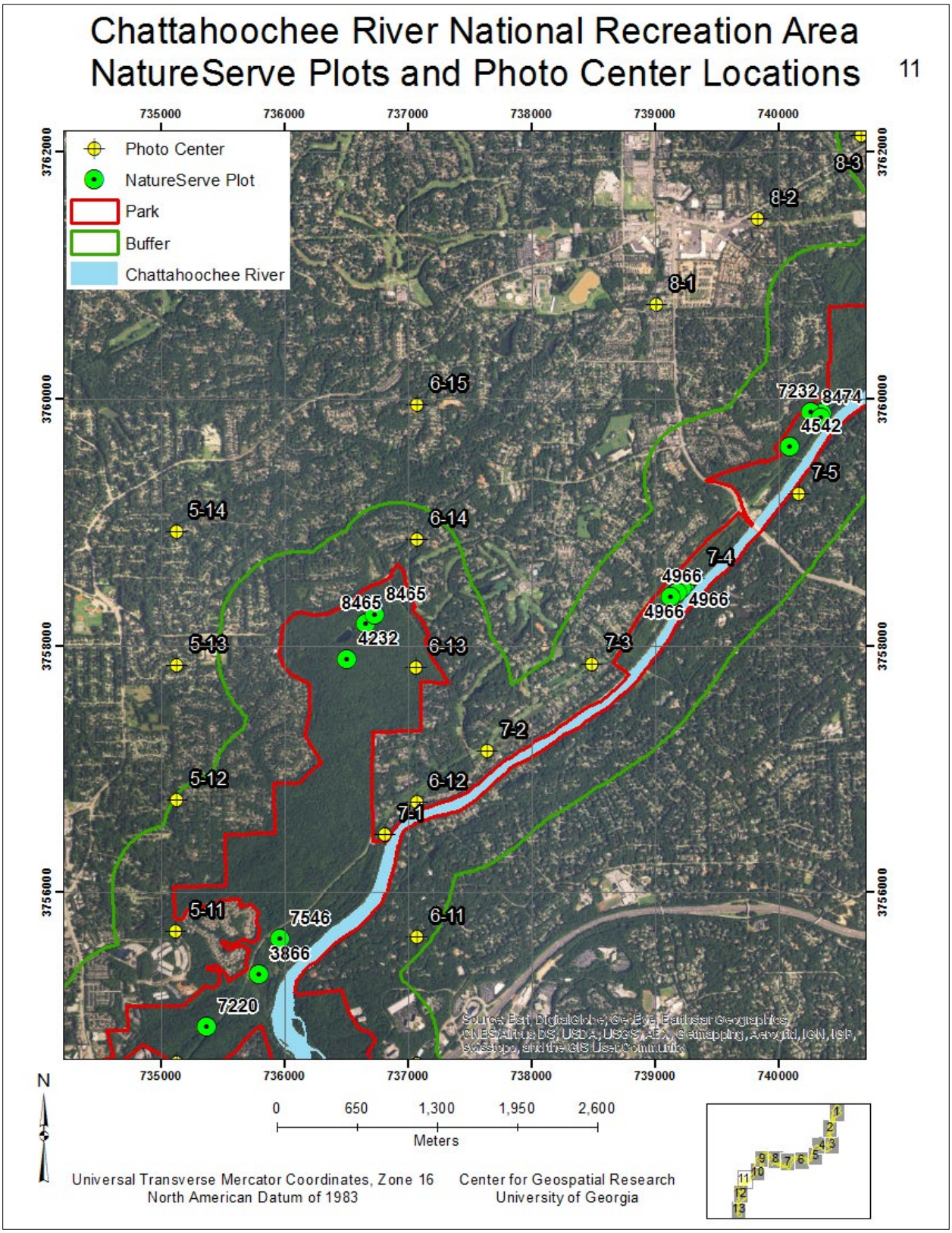


Figure C-11. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 11.

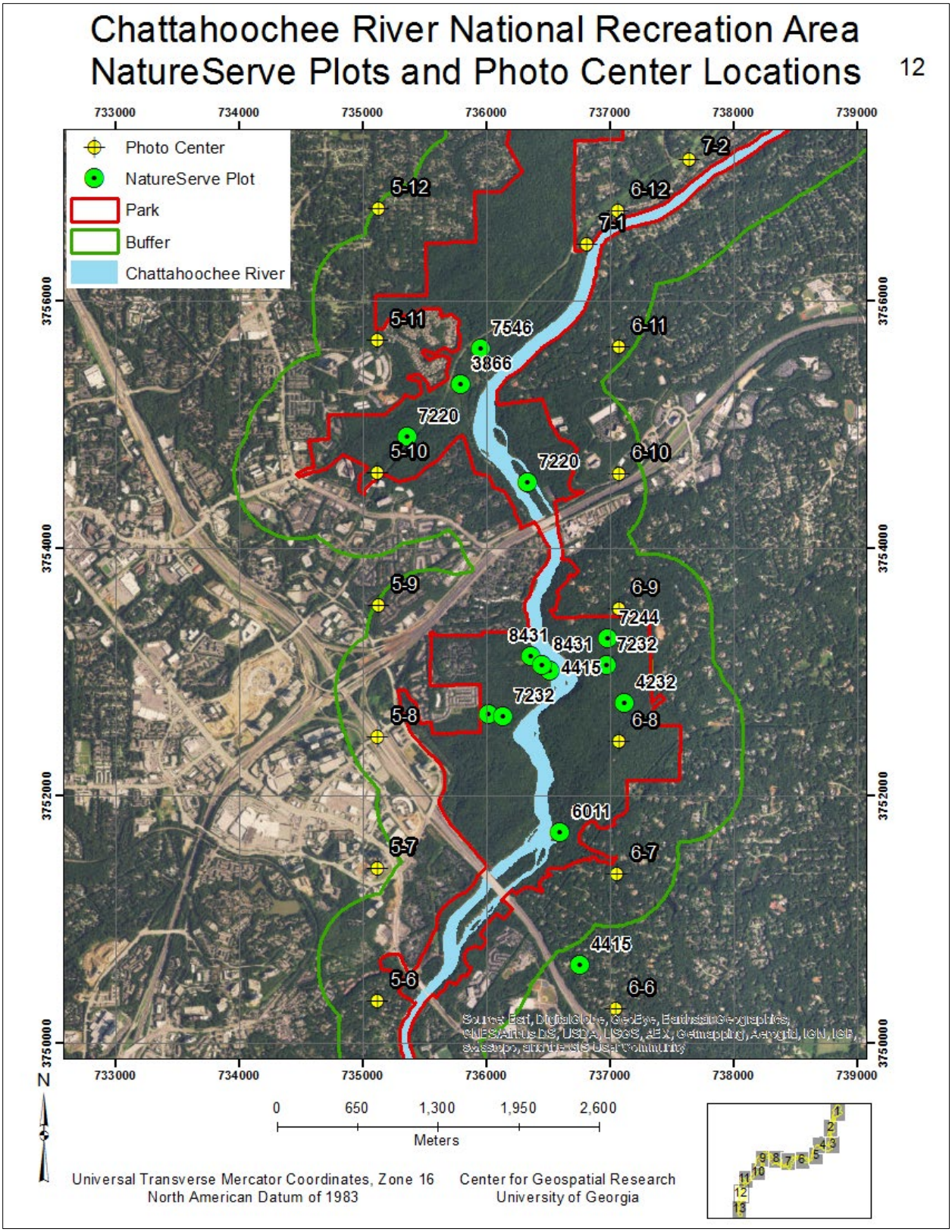


Figure C-12. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 12.

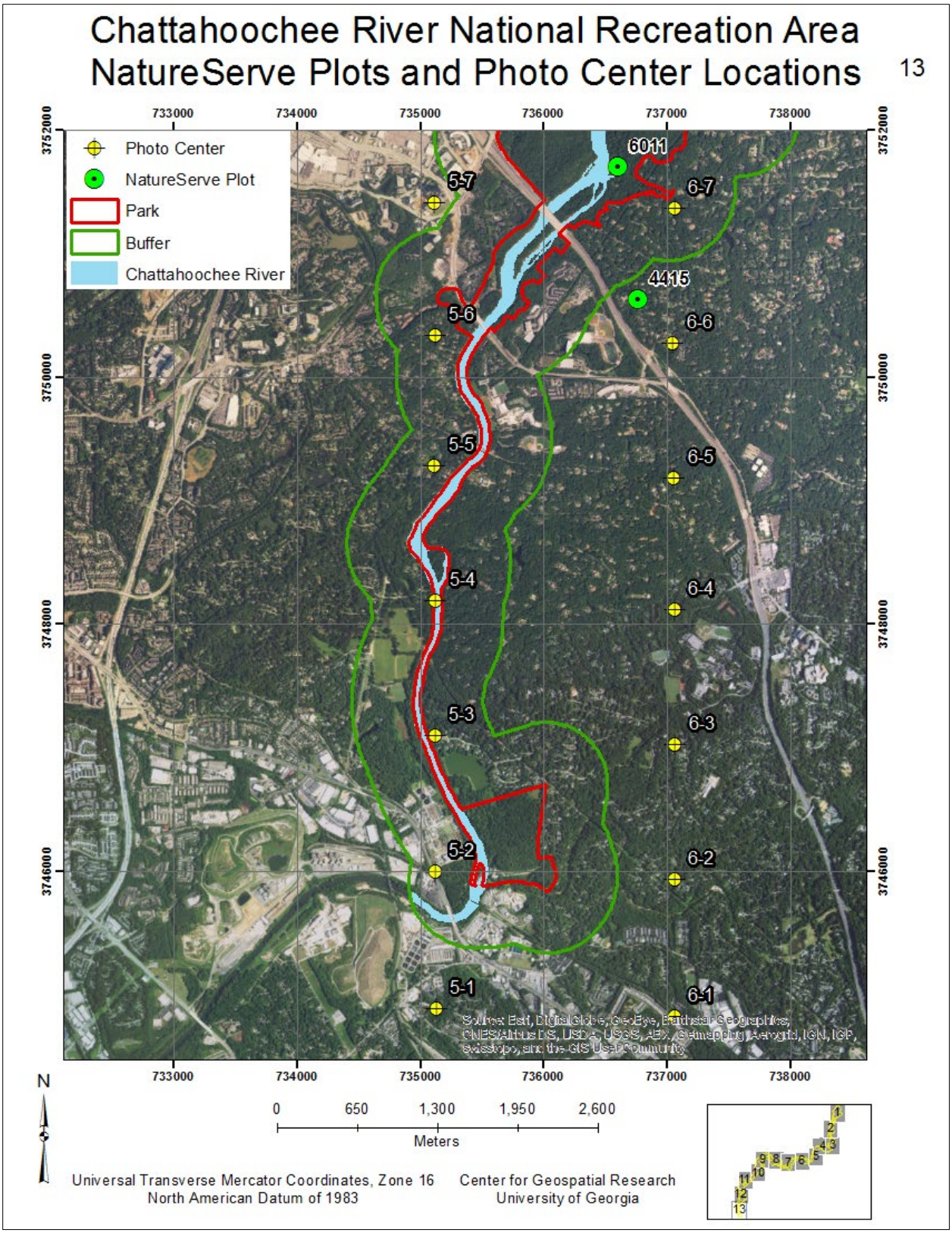


Figure C-13. NatureServe plot locations and photo center locations overlaid on visible imagery provided by Digital Globe in Section 13.

Appendix D. Photointerpretation Key

The photointerpretation key describes the attributes of the color infrared (CIR) images used to delineate the vegetation association CEGL codes found within the park. For each CEGL code, a CIR 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 CEGL code 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.

Southern Woolgrass Bulrush Marsh

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

Table D-1. Attributes and descriptions for Southern Woolgrass Bulrush Marsh.

Attribute	Description
CEGL Code	3866
Community Name	Southern Woolgrass Bulrush Marsh
Color	Pink with gray
Tone	Light
Texture	Coarse
Pattern	Open
Height	Very short
Shape	Oblong
Size	Rare class, occurs only once in park.
Location	Hydric shrubland found in wetlands, especially artificial ones.
Association	4112
Comments	Similar to 4112 but usually wetter with clumps of taller vegetation.



Figure D-1. Example of Southern Woolgrass Bulrush Marsh.

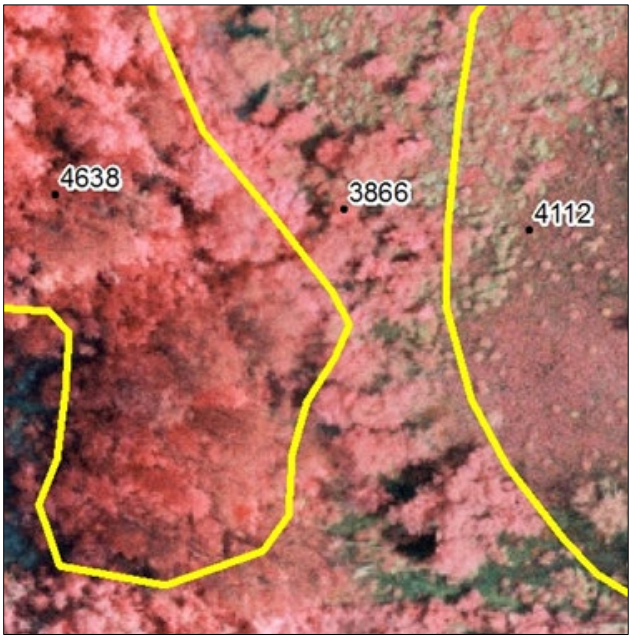


Figure D-2. Map showing Southern Woolgrass Bulrush Marsh (3866).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

This community is defined by the dominance of *Scirpus cyperinus* (woolgrass) in the herbaceous layer which may be completely closed (90–100% cover). At Chattahoochee River, there is a very sparse (10%) emergent tree layer (5–10 meters [16.4–32.8 feet {ft}]) of *Fraxinus pennsylvanica*

(green ash) and sparse (30%) shrub layer (1–5 meters [3.3–16.4 ft]) of *Alnus serrulata* (hazel alder), which is also found at the Kennesaw Mountain NBP site along with a small amount *Salix nigra* (black willow). Additional herbs found in small amounts at one site or the other or both include *Boehmeria cylindrica* (small-spike false nettle), *Eleocharis obtusa* (blunt spikerush), *Juncus biflorus* (bog rush), *Juncus effusus* (common rush), *Lobelia cardinalis* (cardinalflower), *Ludwigia palustris* (marsh seedbox), *Mikania scandens* (climbing hempvine), *Polygonum hydropiper* (marshpepper knotweed) (exotic), *Polygonum punctatum* (dotted smartweed), *Proserpinaca pectinata* (combleaf mermaidweed), *Sparganium americanum* (American bur-reed), and *Triadenum walteri* (greater marsh St. Johnswort).

Global Vegetation

Stands of this association consist of *Scirpus cyperinus* (woolgrass) as an essentially monospecific stand. *Saccharum* (sugarcane) spp., *Carex* (sedge) spp., and *Schoenoplectus* (bulrush) spp. are often found in this community, especially on the margins. Other co-occurring species of this association are not fully understood. In the Interior Low Plateau of Tennessee, *Scirpus cyperinus* (woolgrass) is commonly found with *Typha latifolia* (broadleaf cattail). In addition, *Juncus effusus* (common rush) and an occasional *Alnus serrulata* (hazel alder) are also present.

Black Willow Riverbank Shrubland

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

Table D-2. Attributes and descriptions for Black Willow Riverbank Shrubland.

Attribute	Description
CEGL Code	3901
Community Name	Black Willow Riverbank Shrubland
Color	Pink to red
Tone	Light
Texture	Coarse
Pattern	Thin with dense thickets
Height	Short
Shape	Patchy, following topography
Size	Uncommon class; very small patches with little variation.
Location	Hydric shrubland found in low, wet regions.
Association	7730, 4966
Comments	Trees in wetland areas; usually small areal extent. Distinguishable from 7312 and 7730 by shorter canopy height.



Figure D-3. Example of Black Willow Riverbank Shrubland.

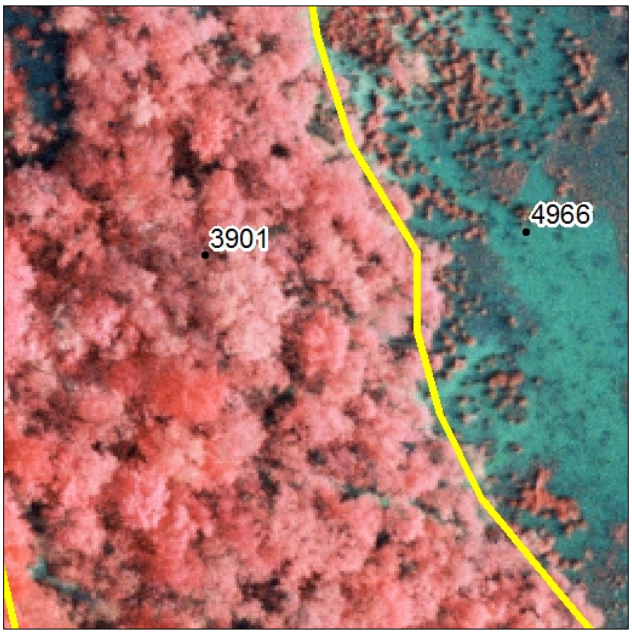


Figure D-4. Map showing Black Willow Riverbank Shrubland (3901).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderate (40% cover) tall-shrub layer (2–5 meters [6.6–16.4 ft] tall) is dominated by *Salix nigra* (black willow) with lesser amounts of *Acer rubrum* (red maple) and *Liquidambar styraciflua* (sweetgum). The sparse (20%) short-shrub layer (2–5 meters [6.6–16.4 ft]) includes *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), and *Rubus argutus* (sawtooth blackberry). The dense (80%) herbaceous layer is codominated by *Erechtites hieraciifolia* (American burnweed) and *Juncus effusus* (common rush) and includes lesser amounts of *Panicum rigidulum* (redtop

panicgrass), *Polygonum setaceum* (bog smartweed), and exotic *Polygonum hydropiper* (marshpepper knotweed).

Global Summary

This broadly defined type represents vegetation dominated by scrubby forms of *Salix nigra* (black willow) across the southeastern and northeastern United States, and possibly into Canada. Stature and closure may vary depending on disturbance. Additional types may be developed as more information becomes available.

Successional Broomsedge Vegetation

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

Table D-3. Attributes and descriptions for Successional Broomsedge Vegetation.

Attribute	Description
CEGL Code	4044
Community Name	Successional Broomsedge Vegetation
Color	Pink
Tone	Light
Texture	Fine to medium
Pattern	Homogenous
Height	Very short
Shape	Irregular
Size	Uncommon class with very small average size.
Location	Mesic herbaceous vegetation found in old fields/pastures.
Association	3866
Comments	Drier areas with vegetation other than shrubs or trees. May have variable tone and texture depending upon species diversity.



Figure D-5. Example of Successional Broomsedge Vegetation.

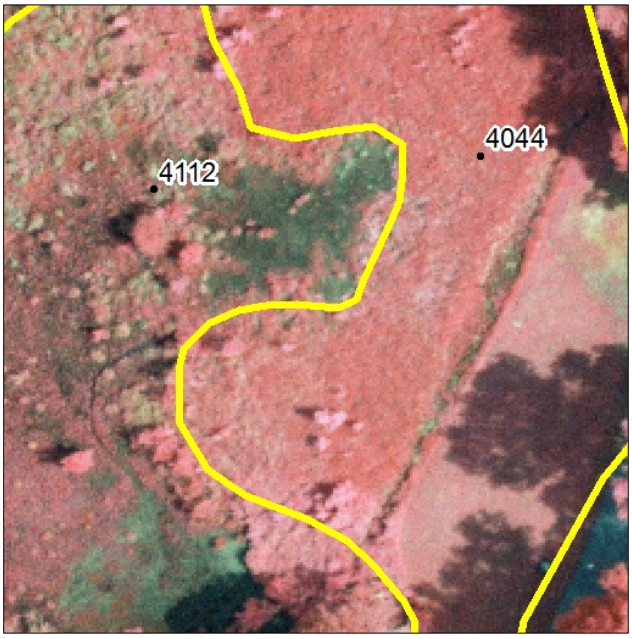


Figure D-6. Map showing Successional Broomsedge Vegetation. (4044).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The completely closed (100% cover) herbaceous layer (1–2 meters [3.3–6.6 ft] tall) is dominated by grasses *Andropogon virginicus* (broomsedge bluestem), *Dichanthelium scoparium* (velvet panicum), and *Tridens flavus* (purpletop tridens) and the forb *Eupatorium capillifolium* (dogfennel). Additional herbs include *Acalypha gracilens* (slender threeseed mercury), *Dichanthelium laxiflorum* (openflower rosette grass), *Eragrostis* (lovegrass) sp., *Lespedeza repens* (creeping lespedeza),

Potentilla canadensis (dwarf cinquefoil), *Pseudognaphalium obtusifolium*, and exotic *Setaria pumila* (yellow bristlegrass).

Global Vegetation

Stands of this community are dominated by *Andropogon virginicus* var. *virginicus* (broomsedge bluestem), sometimes codominant with *Lolium pratense* (meadow ryegrass). Associated species vary with geography and habitat and include typical pioneer species. Species with high cover values in plot samples attributed to this type include *Tridens flavus* (purpletop tridens), *Setaria parviflora* (marsh bristlegrass), *Eragrostis spectabilis* (purple lovegrass), and *Panicum anceps* (beaked panicgrass) (NatureServe Ecology, unpubl. data). On the eastern Highland Rim of Tennessee (Arnold Air Force Base), associated species include *Diodia teres* (poorjoe), *Aristida dichotoma* (churchmouse threeawn), *Aristida oligantha* (prairie threeawn), *Packera anonyma* (Small's ragwort), *Paspalum laeve* (field paspalum), *Lespedeza virginica* (slender lespedeza), and *Plantago virginica* (Virginia plantain). *Rubus argutus* (sawtooth blackberry) and *Smilax* (greenbrier) spp. may be locally abundant but are not dominant. In clearcuts, *Schizachyrium scoparium* (little bluestem), *Danthonia spicata* (poverty oatgrass), and *Dichanthelium* (rosette grass) spp. are also common, as are occasional *Quercus* (oak) spp. and *Rubus argutus* (sawtooth blackberry). The plot at Shiloh National Military Park (western Tennessee) was a mowed field of mostly native species, dominated by *Andropogon virginicus* var. *virginicus* (broomsedge bluestem). *Paspalum setaceum* (thin paspalum) and *Tridens flavus* (purpletop tridens) were codominant (with less cover). Other herbaceous plants with high cover values were *Setaria parviflora* (marsh bristlegrass), *Diodia teres* (poorjoe), *Schizachyrium scoparium* (little bluestem), and less common were *Packera anonyma* (Small's ragwort), *Sorghum halepense* (Johnsongrass), and *Cyperus retrorsus* (pine barren flatsedge). At less than 1% cover were *Polypremum procumbens* (juniper leaf), *Oxalis stricta* (common yellow oxalis), *Eragrostis spectabilis* (purple lovegrass), *Salvia lyrata* (lyreleaf sage), *Solanum carolinense* (Carolina horsenettle), *Digitaria sanguinalis* (hairy crabgrass), *Panicum anceps* (beaked panicgrass), *Croton willdenowii* (Willdenow's croton), *Trifolium pratense* (red clover), *Kummerowia striata* (Japanese clover), *Coreopsis pubescens* (star tickseed), *Plantago lanceolata* (narrowleaf plantain), and *Mecardonia acuminata* (axilflower). At only a trace amount of cover were *Conyza canadensis* (Canadian horseweed), *Acalypha virginica* (Virginia threeseed mercury), *Solidago* (goldenrod) sp., *Erigeron annuus* (eastern daisy fleabane), *Sida spinosa* (prickly fanpetals), *Hypericum drummondii* (nits and lice), *Polygala verticillata* (whorled milkwort), *Eupatorium capillifolium* (dogfennel), *Passiflora incarnata* (purple passionflower), and *Asclepias amplexicaulis* (clasping milkweed). In West Virginia, common associates include *Sorghastrum nutans* (Indiangrass), *Dichanthelium clandestinum* (deertongue), *Anthoxanthum odoratum* (sweet vernalgrass), *Phleum pratense* (timothy), *Dactylis glomerata* (orchardgrass), *Daucus carota* (Queen Anne's lace), *Lotus corniculatus* (birdfoot deervetch), *Trifolium pratense* (red clover), *Leucanthemum vulgare* (oxeye daisy), *Solidago canadensis* (Canada goldenrod), *Solidago rugosa* (wrinkleleaf goldenrod), and *Solidago nemoralis* (gray goldenrod).

Rush Marsh

Attributes, descriptions, and a map are shown in Table D-4 and Figure D-7.

Table D-4. Attributes and descriptions for Rush Marsh.

Attribute	Description
CEGL Code	4112
Community Name	Rush Marsh
Color	Pink to purple
Tone	Dark
Texture	Coarse
Pattern	Homogenous
Height	Very short
Shape	Irregular
Size	Common class; small average size with little variation.
Location	Hydric graminoid/herbaceous vegetation found in natural or artificial ponds.
Association	4966
Comments	Difficult to distinguish from 3866 in summer CIR. More even tone and texture relative to 4966.

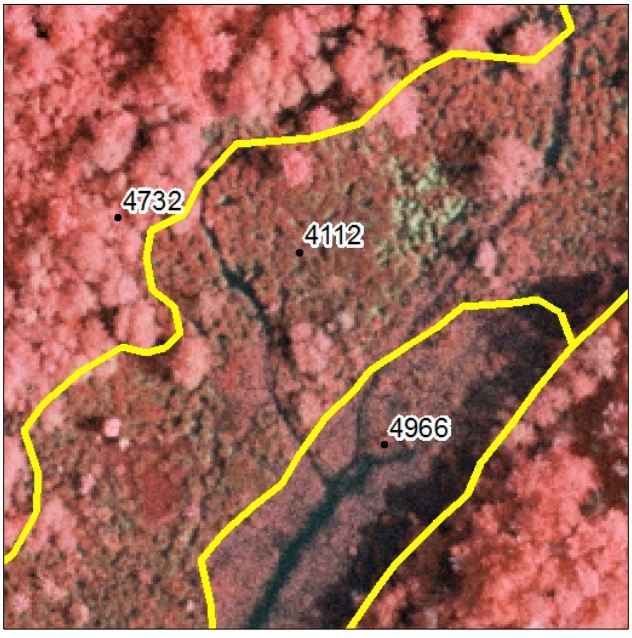


Figure D-7. Map showing Rush Marsh. (4112).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The general appearance of this community is that of an herbaceous wetland. However, there may also be a moderate (60% cover) emergent tall-shrub layer (5–10 meters [16.4–32.8 ft] tall) and a very sparse (10%) short-shrub layer (2–5 meters [6.6–16.4 ft]) that may include *Salix nigra* (black willow), *Fraxinus pennsylvanica* (green ash), *Acer negundo* (box-elder), *Acer rubrum* (red maple), and *Liquidambar styraciflua* (sweetgum). The defining stratum (100%) is the herb layer (1–2 meters [3.3–6.6 ft]) that is dominated by *Juncus effusus* (common rush); additional herbs include *Erechtites hieraciifolia* (American burnweed), *Hydrolea quadrivalvis* (waterpod), *Impatiens capensis* (jewelweed), *Ludwigia palustris* (marsh seedbox), *Panicum rigidulum* (redtop panicgrass), and *Scirpus cyperinus* (woolgrass). This community also supports state-vulnerable *Polygonum densiflorum* (denseflower knotweed).

Global Vegetation

This type is currently broadly and literally defined, based on dominance by *Juncus effusus* (common rush). In various parts of its broad range as currently defined, associated species may include *Andropogon glomeratus* (bushy bluestem), *Carex* (sedge) spp., *Cyperus* (flatsedge) spp., other *Juncus* (rush) spp., *Typha latifolia* (broadleaf cattail), *Scirpus cyperinus* (woolgrass), *Triadenum walteri* (greater marsh St. Johnswort), *Apios americana* (groundnut), and *Galium aparine* (stickywilly). In Georgia, Wharton (1978) cites *Carex rostrata* (beaked sedge), *Carex stipata* (owlfruit sedge), *Schoenoplectus pungens* (common threesquare), and *Sagittaria latifolia* (broadleaf arrowhead) as associates of beaver pond vegetation containing *Juncus effusus* (common rush).

Piedmont Loblolly Pine–Oak Forest

Attributes, descriptions, a photo, and a map are shown in Table D-5 and Figures D-8 and D-9.

Table D-5. Attributes and descriptions for Piedmont Loblolly Pine–Oak Forest.

Attribute	Description
CEGL Code	4232
Community Name	Piedmont Loblolly Pine–Oak Forest
Color	Pink to purple
Tone	Light to medium
Texture	Fine to medium
Pattern	Dense canopy
Height	Tall
Shape	Expansive

Table D-5 (continued). Attributes and descriptions for Piedmont Loblolly Pine–Oak Forest.

Attribute	Description
CEGL Code	4232
Community Name	Piedmont Loblolly Pine–Oak Forest
Color	Pink to purple
Tone	Light to medium
Texture	Fine to medium
Pattern	Dense canopy
Height	Tall
Shape	Expansive



Figure D-8. Example of Piedmont Loblolly Pine–Oak Forest.

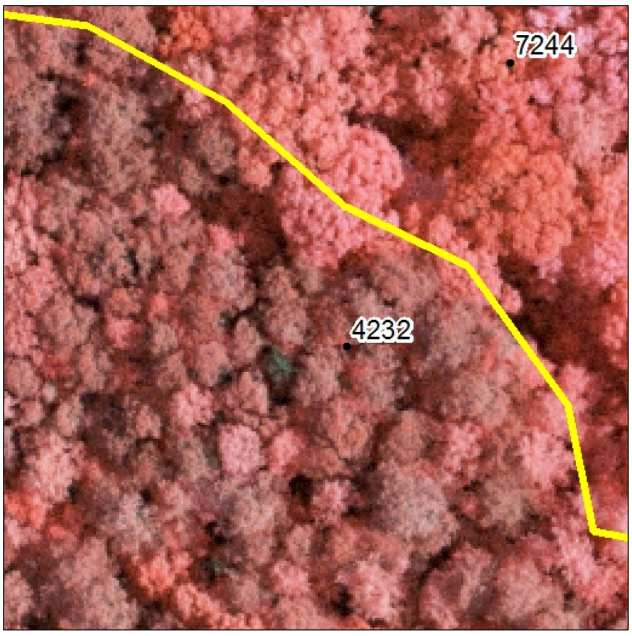


Figure D-9. Map showing Piedmont Loblolly Pine–Oak Forest (4232).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park
Vegetation

The moderate to dense (50–80% cover) tree canopy, 20–50 meters (65.6–164 ft) tall, is dominated by *Pinus taeda* (loblolly pine) and may occur with lesser amounts of *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Pinus echinata* (shortleaf pine), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak), *Quercus nigra* (water oak), *Quercus prinus* (chestnut oak), and *Quercus velutina* (black oak). The sparse to moderately dense (30–70%) subcanopy (10–20 meters [32.8–64.6 ft]) may include *Acer rubrum* (red maple), *Carya alba* (mockernut hickory), *Cornus florida* (flowering dogwood), *Oxydendrum arboreum* (sourwood), *Prunus serotina* (black cherry), and canopy oaks, particularly *Quercus velutina* (black oak). The sparse to moderate (20–50%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) is made up of saplings of the tree species as well as *Fagus grandifolia* (American beech) and *Vaccinium* spp. Common and/or abundant short shrubs in the very sparse (5–30%) short-shrub layer (1–2 meters [3.3–6.6 ft]) include *Asimina parviflora* (smallflower pawpaw), *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 very sparse (5–30%) herbaceous layer is made up mostly of seedlings of the tree and shrub species but may also include small amounts of herbs such as *Chimaphila maculata* (striped prince's pine), *Coreopsis major* (greater tickseed), *Dichanthelium* (rosette grass) spp., *Symphyotrichum* (aster) spp., and *Polystichum acrostichoides* (Christmas fern). Vine diversity is high (up to 20% cover) and includes *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).

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.

Piedmont Chestnut Oak/Heath Bluff

Attributes, descriptions, a photo, and a map are shown in Table D-6 and Figures D-10 and D-11.

Table D-6. Attributes and descriptions for Piedmont Chestnut Oak/Heath Bluff.

Attribute	Description
CEGL Code	4415
Community Name	Piedmont Chestnut Oak/Heath Bluff
Color	Pink
Tone	Light
Texture	Fine to medium
Pattern	Medium to dense

Table D-6 (continued). Attributes and descriptions for Piedmont Chestnut Oak/Heath Bluff.

Attribute	Description
Height	Medium to tall
Shape	Narrow
Size	Common class; medium patch size with some variation.
Location	Hardwood dominated forest found on very steep slopes near streams.
Association	8475
Comments	Difficult to distinguish from 4416 and 8431 because they are all dominated by Chestnut Oak. However usually found on steeper slopes relative to 8431 which is found on ridge tops.



Figure D-10. Example of Piedmont Chestnut Oak/Heath Bluff.

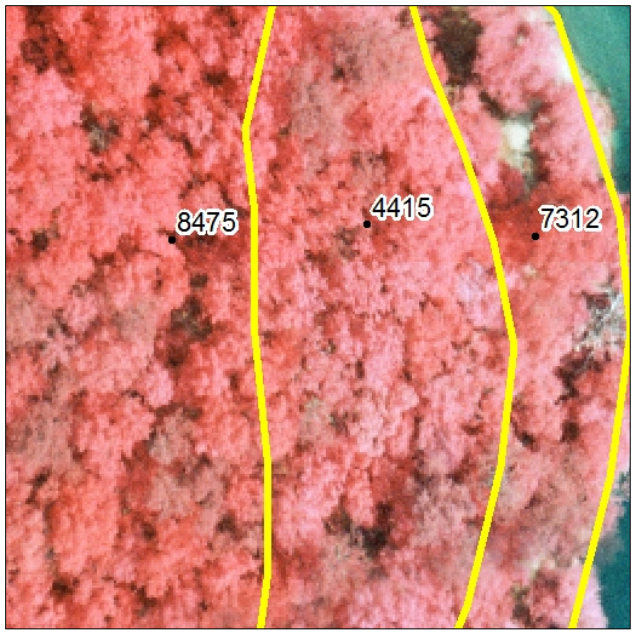


Figure D-11. Map showing Piedmont Chestnut Oak/Heath Bluff (4415).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The tree canopies of the sampled plots are quite variable, ranging from relatively sparse (40% cover) and short (15–20 meters [49.2–65.6 ft] tall) to extremely dense (80%) and tall (35–50 meters [114.8–164]). *Quercus prinus* (chestnut oak) is the dominant species and may occur along with significant amounts of *Liriodendron tulipifera* (tuliptree), *Pinus echinata* (shortleaf pine), *Pinus taeda* (loblolly pine), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak), *Quercus rubra* (northern red oak), and/or *Quercus velutina* (black oak). Dominants in the sparse to very dense (30–90%) subcanopy (10–20 meters [16.4–65.6 ft]) may include *Acer rubrum* (red maple), *Magnolia macrophylla* (bigleaf magnolia), (state-vulnerable), *Oxydendrum arboreum* (sourwood), *Quercus prinus* (chestnut oak), and *Quercus velutina* (black oak). The moderate to very dense (50–90%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) is codominated by *Kalmia latifolia* (mountain laurel) and *Rhododendron minus* (piedmont rhododendron), as is the sparse to very dense (30–90%) short-shrub layer (0.5–2 meters [1.6–6.6 ft]), which may also include small amounts of *Amelanchier arborea* (common serviceberry), *Asimina parviflora* (smallflower pawpaw), *Sassafras albidum* (sassafras), *Symplocos tinctoria* (common sweetleaf), *Vaccinium pallidum* (Blue Ridge blueberry), and *Viburnum acerifolium* (mapleleaf viburnum). The herbaceous layer is very sparse (< 5–30%) due to the dense upper layers. It is mostly comprised of tree and shrub seedlings but may include a few herbs such as *Danthonia spicata* (poverty oatgrass), *Dichanthelium* (rosette grass) spp., *Dryopteris marginalis* (marginal woodfern), *Euphorbia corollata* (flowering spurge), *Eurybia divaricata* (white wood aster), *Galax urceolata* (beetleweed), *Luzula echinata* (hedgehog woodrush), *Polystichum acrostichoides* (Christmas fern), *Pteridium aquilinum* (western brackenfern), and

Uvularia sessilifolia (sessileleaf bellwort), and vines *Gelsemium sempervirens* (evening trumpetflower), *Smilax* (greenbrier) spp., and *Vitis rotundifolia* (muscadine).

Global Vegetation

The canopy of stands of this association is typically dominated by *Quercus alba* (white oak), *Quercus prinus* (chestnut oak), *Quercus rubra* (northern red oak), and *Acer rubrum* var. *rubrum* (red maple). The subcanopy is strongly dominated by *Oxydendrum arboreum* (sourwood). Other canopy and subcanopy trees may include *Quercus coccinea* (scarlet oak), *Quercus stellata* (post oak), *Quercus velutina* (black oak), *Cornus florida* (flowering dogwood), *Pinus echinata* (shortleaf pine), and *Pinus virginiana* (Virginia pine). The shrub stratum is characteristically dense, and is dominated by *Kalmia latifolia* (mountain laurel); other shrubs may include *Symplocos tinctoria* (common sweetleaf), *Gaylussacia frondosa* (blue huckleberry), *Vaccinium stamineum* (deerberry), and *Amorpha schwerinii* (Schwerin's false indigo). The herb stratum is sparse and of low diversity, though typical herbs and subshrubs include *Epigaea repens* (trailing arbutus), *Hexastylis virginica* (Virginia heartleaf), *Chimaphila maculata* (striped prince's pine), *Monotropa hypopithys* (pinesap), *Schizachyrium scoparium* (little bluestem), and *Iris verna* var. *verna* (dwarf violet iris). An Alabama example is dominated by *Quercus prinus* (chestnut oak). *Magnolia macrophylla* (bigleaf magnolia) is a significant canopy and/or subcanopy component in two plots taken from Chattahoochee River National Recreation Area. Other characteristic canopy species include *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Pinus echinata* (shortleaf pine), *Pinus palustris* (longleaf pine), and occasionally *Carya alba* (mockernut hickory), *Quercus stellata* (post oak), and *Oxydendrum arboreum* (sourwood). The shrub layer is represented by a very dense ericaceous component dominated by *Kalmia latifolia* (mountain laurel), *Rhododendron minus* (piedmont rhododendron), and to a lesser degree, *Symplocos tinctoria* (common sweetleaf) and *Vaccinium* (blueberry) spp. Herbs are generally very sparse with *Galax urceolata* (beetleweed), *Tiarella cordifolia* (heartleaf foamflower), *Hexastylis arifolia* (littlebrownjug), and *Polystichum acrostichoides* (Christmas fern) appearing most prominent (Schotz, A. pers. comm.).

Xeric Mafic Chestnut Oak Forest

Attributes, descriptions, and a map are shown in Table D-7 and Figure D-12.

Table D-7. Attributes and descriptions for Xeric Mafic Chestnut Oak Forest.

Attribute	Description
CEGL Code	4416
Community Name	Xeric Mafic Chestnut Oak Forest
Color	Pink to red
Tone	Light
Texture	Medium to coarse
Pattern	Moderate to dense

Table D-7 (continued). Attributes and descriptions for Xeric Mafic Chestnut Oak Forest.

Attribute	Description
Height	Short to medium
Shape	Slightly circular following ridgetop topography
Size	Common class; largest average size with very large variation.
Location	Xeric hardwood forest found on ridge tops.
Association	4415, 8431, 7323
Comments	Difficult to distinguish from 8431 and 4415 using amount of rhododendron or presence of mafic indicator species. Relying upon topographic position on ridge (not slope).

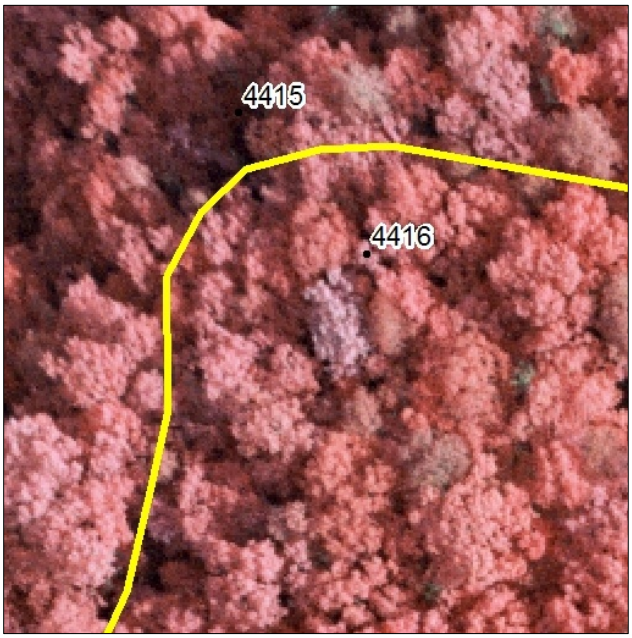


Figure D-12. Map showing Xeric Mafic Chestnut Oak Forest (4416).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderate to dense (50–80% cover) tree canopy, 15–35 meters (49.2–114.8 ft) tall, is codominated almost exclusively by *Carya pallida* (sand hickory) and *Quercus prinus* (chestnut oak), as is the very sparse to moderate (5–50%) subcanopy (10–20 meters [32.8–65.6 ft]). Additional tree species may include *Carya ovalis* (red hickory), *Pinus echinata* (shortleaf pine), *Quercus rubra* (northern red oak), and *Quercus stellata* (post oak). The very sparse to moderate (5–50%) tall-shrub

layer (2–10 meters [6.6–32.8 ft]) and sparse (20–40%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are dominated by the canopy species; additional shrubs may include *Asimina parviflora* (smallflower pawpaw), *Celtis occidentalis* (common hackberry), *Chionanthus virginicus* (white fringetree), *Diospyros virginiana* (common persimmon), *Philadelphus hirsutus* (streambank mock orange), *Ptelea trifoliata* (common hoptree), *Sassafras albidum* (sassafras), and *Vaccinium arboreum* (farkleberry). The sparse to moderate (10–50%) herbaceous layer may include *Arabis laevigata* (smooth rockcress), *Asplenium platyneuron* (ebony spleenwort), *Chimaphila maculata* (striped prince's pine), *Cocculus carolinus* (Carolina coralbead), *Dichanthelium boscii* (Bosc's panicgrass), *Dichanthelium commutatum* (variable panicgrass), *Houstonia longifolia* (longleaf summer bluet), *Passiflora lutea* (yellow passionflower), *Piptochaetium avenaceum* (blackseed speargrass) (often dominant), *Rubus argutus* (sawtooth blackberry), *Schizachyrium scoparium* (little bluestem), and many others. *Parthenocissus quinquefolia* (Virginia creeper), *Smilax bona-nox* (saw greenbrier), and *Vitis rotundifolia* (muscadine) are common and abundant vines. This community supports several state-rare species, including state-critically imperiled *Muhlenbergia sobolifera* (rock muhly), state-imperiled *Pycnanthemum curvipes* (stone mountainmint), and state-vulnerable *Eupatorium sessilifolium* (upland boneset).

Global Vegetation

The canopy of stands typically contains *Quercus prinus* (chestnut oak), *Carya pallida* (sand hickory), *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya glabra* (pignut hickory), and *Pinus echinata* (shortleaf pine). The subcanopy may contain *Carya pallida* (sand hickory), *Quercus marilandica* (blackjack oak), *Cercis canadensis* (eastern redbud), and *Cornus florida* (flowering dogwood). Shrubs include *Rhus copallinum* (flameleaf sumac), *Ptelea trifoliata* (common hoptree), *Viburnum rufidulum* (rusty blackhaw), *Asimina parviflora* (smallflower pawpaw), *Styrax grandifolius* (bigleaf snowbell), *Vaccinium arboreum* (farkleberry), and *Vaccinium pallidum* (Blue Ridge blueberry). The rare shrub *Amorpha schwerinii* (Schwerin's false indigo) may be present within its limited range. Some woody vines which may be present include *Cocculus carolinus* (Carolina coralbead) and *Vitis rotundifolia* (muscadine). Some typical herbs (all of which may have low cover values) may include *Schizachyrium scoparium* (little bluestem), *Tragia urticifolia* (nettleleaf noseburn), *Dichanthelium* (rosette grass) sp., *Piptochaetium avenaceum* (blackseed speargrass), *Coreopsis major* (greater tickseed), *Tephrosia virginiana* (Virginia tephrosia), *Pityopsis graminifolia* (narrowleaf silkgrass), and *Solidago odora* var. *odora* (anisescented goldenrod).

Piedmont Rocky Mesic Mafic Forest

Attributes, descriptions, and a map are shown in Table D-8 and Figure D-13.

Table D-8. Attributes and descriptions for Piedmont Rocky Mesic Mafic Forest.

Attribute	Description
CEGL Code	4542
Community Name	Piedmont Rocky Mesic Mafic Forest

Table D-8 (continued). Attributes and descriptions for Piedmont Rocky Mesic Mafic Forest.

Attribute	Description
Color	Red to pink
Tone	Light
Texture	Smooth to medium
Pattern	Medium to dense
Height	Tall
Shape	Patchy
Size	Rare class with small average size.
Location	Mesic hardwood dominated forest found in lower rocky slopes.
Association	7232, 7244
Comments	Difficult to distingush from 7244 but found in regions with greater slope.

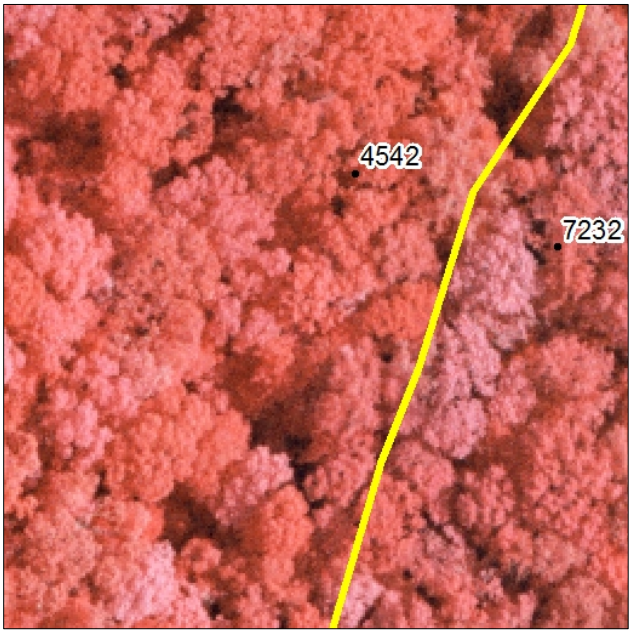


Figure D-13. Map showing Piedmont Rocky Mesic Mafic Forest (4542).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderately dense (70% cover) mature tree canopy, 35–50 meters (114.8–164 ft) tall, is codominated by *Quercus alba* (white oak) and *Tilia americana* (American basswood) along with a

lesser amount of *Carya alba* (mockernut hickory). The moderately sparse (40%) subcanopy (20–35 meters [65.6–114.8 ft]) is dominated by *Carya alba* (mockernut hickory) and *Quercus alba* (white oak) and includes *Cornus florida* (flowering dogwood) and *Juglans nigra* (black walnut). The moderate (60%) tall-shrub layer (10–15 meters [32.8–49.2 ft]) and moderately sparse (40%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are codominated by *Celtis occidentalis* (common hackberry) and *Cercis canadensis* (eastern redbud); additional shrubs found in both layers include sapling canopy species, *Acer leucoderme* (chalk maple), *Aesculus sylvatica* (painted buckeye), *Calycanthus floridus* (eastern sweetshrub), *Fraxinus americana* (white ash), *Sassafras albidum* (sassafras), and *Ulmus rubra* (slippery elm). Less common shrubs include *Asimina parviflora* (smallflower pawpaw), *Cornus alternifolia* (alternateleaf dogwood), and *Viburnum rufidulum* (rusty blackhaw). The herbaceous layer is very sparse (10%) due to the density of the upper layers; herbs present include *Arisaema triphyllum* (Jack in the pulpit), *Aristolochia serpentaria* (Virginia snakeroot), *Arundinaria gigantea* (giant cane), *Asplenium platyneuron* (ebony spleenwort), *Dichanthelium commutatum* (variable panicgrass), *Galium circaezans* (licorice bedstraw), *Polygonatum biflorum* (smooth Solomon's seal), *Polystichum acrostichoides* (Christmas fern), and *Tradescantia ohiensis* (bluejacket). Vines include *Toxicodendron radicans* (eastern poison-ivy) and *Vitis rotundifolia* (muscadine), which climb well into the tree canopy.

Global Vegetation

The mixed canopy is dominated by *Quercus alba* (white oak), *Carya alba* (mockernut hickory), *Tilia americana* var. *caroliniana* (Carolina basswood), *Quercus rubra* var. *rubra* (northern red oak), *Fraxinus americana* (white ash), *Quercus prinus* (chestnut oak), *Liquidambar styraciflua* (sweetgum) and *Liriodendron tulipifera* (tuliptree). The subcanopy is dominated by *Ostrya virginiana* (hophornbeam), *Carpinus caroliniana* (American hornbeam), and *Cornus florida* (flowering dogwood). Other common species in the canopy and subcanopy include *Acer barbatum* (southern sugar maple), *Acer leucoderme* (chalk maple), *Acer rubrum* var. *rubrum* (red maple), *Cercis canadensis* var. *canadensis* (eastern redbud), *Platanus occidentalis* (American sycamore), *Oxydendrum arboreum* (sourwood), *Juglans nigra* (black walnut), *Prunus serotina* var. *serotina* (black cherry), *Aesculus sylvatica* (painted buckeye), *Quercus phellos* (willow oak), *Quercus nigra* (water oak), *Sassafras albidum* (sassafras), and *Ulmus alata* (winged elm). Shrubs of this community include *Viburnum rufidulum* (rusty blackhaw), *Calycanthus floridus* (eastern sweetshrub), *Hydrangea arborescens* (wild hydrangea), and *Euonymus americanus* (strawberry bush). Common herbs and vines are *Actaea racemosa* (black bugbane), *Asplenium platyneuron* var. *platyneuron* (ebony spleenwort), *Galium circaezans* (licorice bedstraw), *Hepatica nobilis* var. *obtusa* (roundlobe hepatica), *Hexastylis arifolia* var. *arifolia* (littlebrownjug), *Parthenocissus quinquefolia* (Virginia creeper), *Polystichum acrostichoides* (Christmas fern), *Prenanthes altissima* (tall rattlesnakeroot), *Toxicodendron radicans* (eastern poison-ivy), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Dichanthelium* (rosette grass) spp., *Maianthemum racemosum ssp. racemosum* (feathery false lily of the valley), *Elymus virginicus* var. *virginicus* (Virginia wildrye), and *Vitis rotundifolia* (muscadine). The exotics *Ailanthus altissima* (tree of heaven), *Albizia julibrissin* (silktree), *Lonicera japonica* (Japanese honeysuckle), and *Lonicera maackii* (Amur honeysuckle) are common in this forest. *Fagus grandifolia* (American beech) is largely lacking from this oak-dominated forest (M. Schafale, pers. comm. 2001).

Successional Water Oak Forest

Attributes, descriptions, a photo, and a map are shown in Table D-9 and Figures D-14 and D-15.

Table D-9. Attributes and descriptions for Successional Water Oak Forest.

Attribute	Description
CEGL Code	4638
Community Name	Successional Water Oak Forest
Color	Pink to red
Tone	Medium
Texture	Fine to medium
Pattern	Dense canopy
Height	Medium to tall
Shape	Elongated
Size	On of the most common classes; medium sized patches with some variation.
Location	Mesic hardwood dominated forest found in past disturbed regions.
Association	7730, 6011, 4232
Comments	Photointerpretation relied upon topographic position and relative evenness of texture. Topographic position relatively low slopes; frequently as a transition between 7730 and other forest types.



Figure D-14. Example of Successional Water Oak Forest.

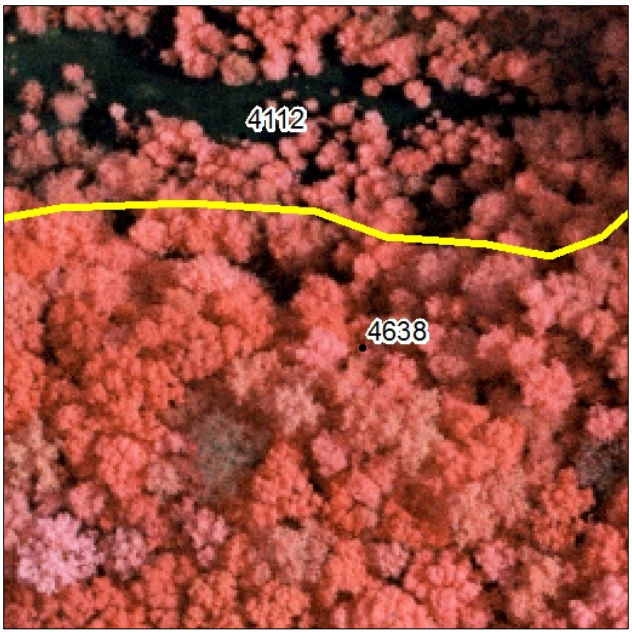


Figure D-15. Map showing Successional Water Oak Forest (4638).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderate to dense (60–80% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is dominated by *Quercus nigra* (water oak); additional species may include *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Pinus taeda* (loblolly pine), *Platanus occidentalis* (American sycamore), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak), *Quercus pagoda* (cherrybark oak), *Quercus rubra* (northern red oak), and *Quercus velutina* (black oak). The moderately sparse (20–40%) subcanopy (5–20 meters [16.4–65.6 ft]) may include *Acer rubrum* (red maple), *Carpinus caroliniana* (American hornbeam), *Carya cordiformis* (bitternut hickory), *Carya pallida* (sand hickory), *Cornus florida* (flowering dogwood), *Halesia carolina* (Carolina silverbell), and *Prunus serotina* (black cherry) but very little of the canopy species except *Liquidambar* (sweetgum), *Liriodendron* (tuliptree), and *Quercus nigra* (water oak). Common species in the moderately sparse (30–50%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) and moderately sparse (10–40%) short-shrub layer (1–2 meters [3.3–6.6 ft]) include sapling canopy species as well as *Acer barbatum* (southern sugar maple), *Acer leucoderme* (chalk maple), *Celtis occidentalis* (common hackberry), *Fagus grandifolia* (American beech), *Morus rubra* (red mulberry), *Ostrya virginiana* (hophornbeam), *Vaccinium arboreum* (farkleberry), *Vaccinium elliottii* (Elliott's blueberry), and *Viburnum rufidulum* (rusty blackhaw). The herbaceous species (5-40%) include *Arundinaria gigantea* (giant cane), *Asplenium platyneuron* (ebony spleenwort), *Chimaphila maculata* (striped prince's pine), *Dichanthelium laxiflorum* (openflower rosette grass), *Dioscorea quaternata* (fourleaf yam), *Polystichum acrostichoides* (Christmas fern), *Verbesina occidentalis* (yellow crownbeard), and others. Trailing and climbing vines of *Smilax* (greenbrier) spp., *Parthenocissus quinquefolia*

(Virginia creeper), *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine) can make up a significant component of this community. Exotic species can be problematic.

Global Vegetation

The canopy of this association is dominated by *Quercus nigra* (water oak). Other oaks may be intermixed, especially *Quercus phellos* (willow oak), as well as *Quercus falcata* (southern red oak), *Quercus hemisphaerica* (Darlington oak), *Liquidambar styraciflua* (sweetgum), remnant *Pinus palustris* (longleaf pine), weedy *Pinus elliottii* var. *elliottii* (Honduras pine), *Carya* (hickory) spp., or *Pinus taeda* (loblolly pine). In the Upper Gulf Coastal Plain of Georgia, some examples may contain *Fagus grandifolia* (American beech), *Liriodendron tulipifera* (tuliptree), *Carya alba* (mockernut hickory), and *Cornus florida* (flowering dogwood) in the subcanopy.

Blackberry–Greenbrier Successional Shrubland Thicket

Attributes, descriptions, a photo, and a map are shown in Table D-10 and Figures D-16 and D-17.

Table D-10. Attributes and descriptions for Blackberry–Greenbrier Successional Shrubland Thicket.

Attribute	Description
CEGL Code	4732
Community Name	Blackberry–Greenbrier Successional Shrubland Thicket
Color	Pink
Tone	Light
Texture	Fine to medium
Pattern	Coarse
Height	Very short
Shape	Elongated
Size	Fairly common class; medium with some variation.
Location	Mesic shrubland found in power line right-of-ways.
Association	None
Comments	Used for any overgrown shrub areas, especially along roads/power lines (e.g. areas likely to have been disturbed or maintained). Distinguished form other shrubland based on location, i.e. near trails or power lines.



Figure D-16. Example of Blackberry–Greenbrier Successional Shrubland Thicket.

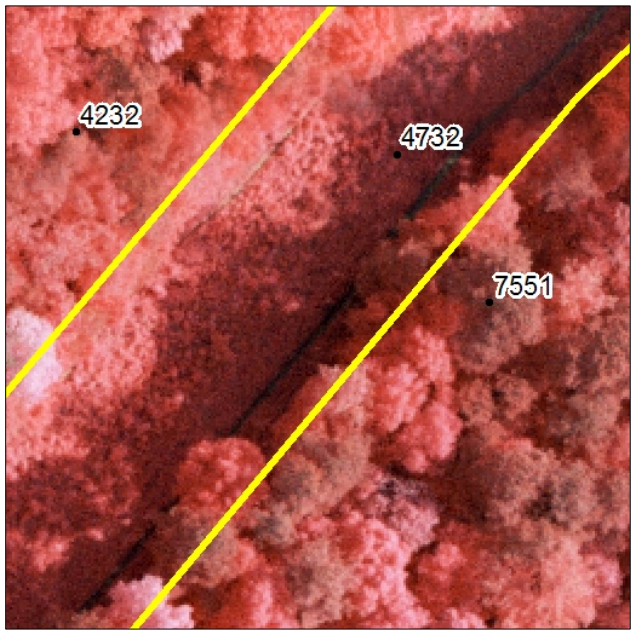


Figure D-17. Map showing Blackberry–Greenbrier Successional Shrubland Thicket (4732).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

This depauperate community is made up almost entirely of 1–2 meters (3.3–6.6 ft) tall *Rubus argutus* (sawtooth blackberry) with 100% cover. There is also a very sparse (5%) emergent layer (2–5 meters [6.6–16.4 ft]) of *Salix nigra* (black willow) and a very sparse herb layer of *Erechtites hieraciifolia* (American burnweed), *Juncus effusus* (common rush), and *Polygonum scandens* (climbing false buckwheat). This constitutes the entire floristic composition of this community.

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.

Knotweed Pondshore and Ditchbank Vegetation

Attributes, descriptions, and a map are shown in Table D-11 and Figure D-18.

Table D-11. Attributes and descriptions for Knotweed Pondshore and Ditchbank Vegetation.

Attribute	Description
CEGL Code	4966
Community Name	Knotweed Pondshore and Ditchbank Vegetation
Color	Pink to red
Tone	Dark
Texture	Medium to coarse
Pattern	Homogenous
Height	Very short
Shape	Irregular
Size	Uncommon class; small average size with little variation.
Location	Hydric graminoid/herbaceous vegetation found ringing natural or artificial ponds.
Association	4112
Comments	Distinguished from 4112 and 3866 by more texture, including some open (wetter) areas.

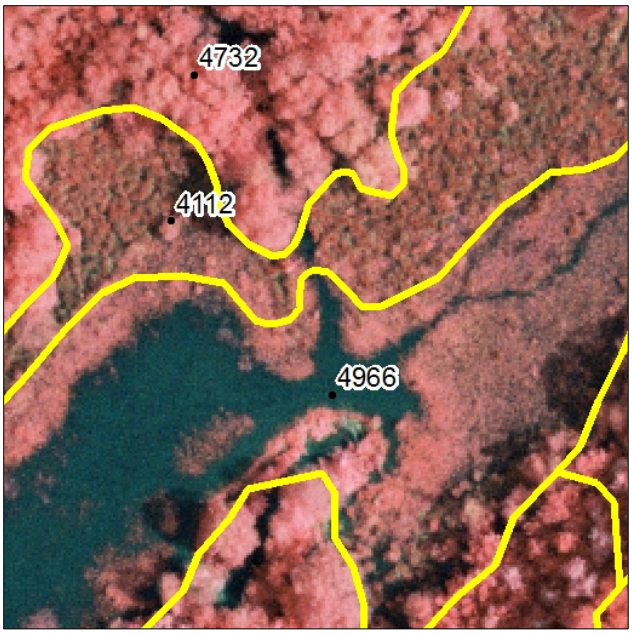


Figure D-18. Map showing Knotweed Pondshore and Ditchbank Vegetation (4966).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

This community is strongly dominated by *Polygonum densiflorum* (denseflower knotweed) in the closed (100% cover) herbaceous layer. Species diversity is low but may include substantial amounts of *Hydrolea quadrivalvis* (waterpod), *Juncus effusus* (common rush), *Ludwigia palustris* (marsh seedbox), *Sagittaria latifolia* (broadleaf arrowhead), and *Scirpus cyperinus* (woolgrass). This constitutes nearly the entire floristic composition of this community.

Global Vegetation

Stands of this association are dominated by the perennial *Polygonum densiflorum* (denseflower knotweed). Associated species include *Lemna minor* (common duckweed), *Saccharum giganteum* (sugarcane plumegrass), *Hydrocotyle umbellata* (manyflower marshpennywort), *Saururus cernuus* (lizard's-tail), *Carex lupulina* (hop sedge), *Triadenum walteri* (greater marsh St. Johnswort), *Cephalanthus occidentalis* (common buttonbush), *Leersia* (cutgrass) sp., *Ludwigia peploides* (floating primrose-willow), *Boehmeria cylindrica* (small-spike false nettle), *Juncus effusus* (common rush), *Rhynchospora corniculata* (shortbristle horned beaksedge), *Ludwigia decurrens* (wingleaf primrose-willow), *Habenaria repens* (waterspider bog orchid) (within its range), *Mikania scandens* (climbing hempvine), *Scirpus cyperinus* (woolgrass), and others.

Early- to Mid-Successional Loblolly Pine Forest

Attributes, descriptions, a photo, and a map are shown in Table D-12 and Figures D-19 and D-20.

Table D-12. Attributes and descriptions for Early- to Mid-Successional Loblolly Pine Forest.

Attribute	Description
CEGL Code	6011
Community Name	Early- to Mid-Successional Loblolly Pine Forest
Color	Purple with some pink
Tone	Medium to dark
Texture	Coarse
Pattern	Medium to dense canopy
Height	Tall
Shape	Patchy
Size	Uncommon class; medium with small variation.
Location	Pine dominated forest found in mid topographic regions.
Association	7730, 4638
Comments	Distinguished from 4232 and 7551 by smaller pine crown size; difficult to distinguish oaks from other hardwoods from summer CIR; NatureServe suggests that may need to be merged with 8462 (not in CHAT).



Figure D-19. Example of Early- to Mid-Successional Loblolly Pine Forest.

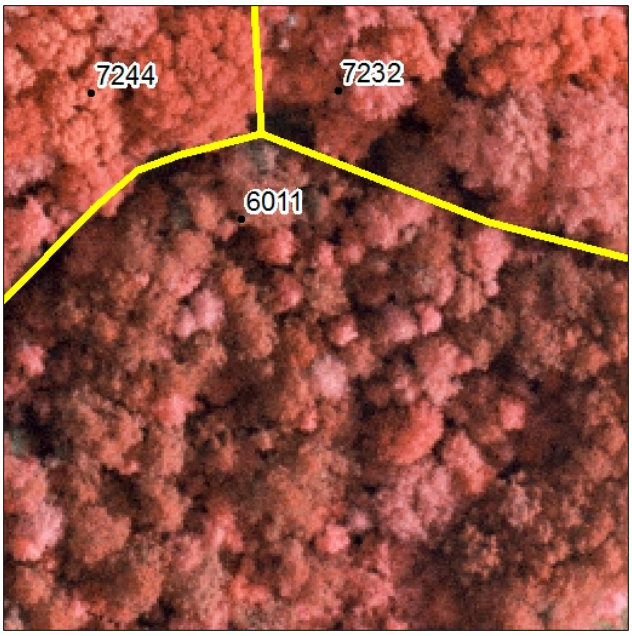


Figure D-20. Map showing Early- to Mid-Successional Loblolly Pine Forest (6011).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park
Vegetation

The moderately dense (60–70% cover) tree canopy, 20–50 meters (65.6–164 ft) tall, is dominated almost exclusively by *Pinus taeda* (loblolly pine). The sparse to moderate (10–50%) subcanopy (10–20 meters [32.8–64.6 ft]) is dominated by *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Oxydendrum arboreum* (sourwood), and/or *Ulmus rubra* (slippery elm) and may include lesser amounts of *Acer negundo* (box-elder), *Cornus florida* (flowering dogwood), *Fraxinus americana* (white ash), *Prunus serotina* (black cherry), and *Quercus alba* (white oak). The sparse to dense (10–80%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) is made up of canopy and subcanopy species as well as *Cercis canadensis* (eastern redbud), *Fagus grandifolia* (American beech), *Ilex opaca* (American holly), and *Lindera benzoin* (northern spicebush). The sparse to moderate (20–40%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is dominated by saplings of species from the upper layers and may also include *Euonymus americanus* (strawberry bush), *Phytolacca americana* (American pokeweed), and *Vaccinium stamineum* (deerberry). The herbaceous layer is sparse (5–30%) but may include *Aristolochia serpentaria* (Virginia snakeroot), *Chasmanthium sessiliflorum* (longleaf woodoats), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Dichanthelium boscii* (Bosc's panicgrass), *Lespedeza procumbens* (trailing lespedeza), *Mitchella repens* (partridgeberry), *Passiflora lutea* (yellow passionflower), *Polystichum acrostichoides* (Christmas fern), and *Toxicodendron radicans* (eastern poison-ivy). Vines trailing on the ground and climbing into the shrub layers include *Smilax glauca* (cat greenbrier), *Smilax rotundifolia* (roundleaf greenbrier), and *Vitis rotundifolia* (muscadine).

Global Vegetation

The tree canopy of *Pinus taeda* (loblolly pine) is at least 60% but may be considerably more dense, up to and including closed canopies. Tree subcanopy density varies with stand disturbance history but generally is < 50%. Shrub and herb layer coverages do not exceed 25% and decrease with increasing age of the stand. Other species of pine, especially *Pinus echinata* (shortleaf pine) and *Pinus virginiana* (Virginia pine) may be sparingly present in the canopy. Other species that may be present in the subcanopy in addition to *Liquidambar styraciflua* (sweetgum) and *Acer rubrum* var. *rubrum* (red maple) include *Quercus coccinea* (scarlet oak), *Quercus velutina* (black oak), *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Nyssa sylvatica* (blackgum), *Carya glabra* (pignut hickory), *Carya alba* (mockernut hickory), *Diospyros virginiana* (common persimmon), *Prunus serotina* (black cherry), *Cornus florida* (flowering dogwood), *Liriodendron tulipifera* (tuliptree), and *Sassafras albidum* (sassafras) (NatureServe Ecology, unpubl. data). Other species in addition to *Vaccinium stamineum* (deerberry) that may be present in the shrub stratum include *Juniperus virginiana* (eastern red-cedar), *Vaccinium arboreum* (farkleberry), *Rhus copallinum* (flameleaf sumac), *Gaylussacia baccata* (black huckleberry), *Callicarpa americana* (American beautyberry), and probably others. The herbaceous layer usually forms <5% cover and contains such species as *Gelsemium sempervirens* (evening trumpetflower), *Chimaphila maculata* (striped prince's pine), *Polystichum acrostichoides* (Christmas fern), and *Potentilla canadensis* (dwarf cinquefoil). An example from Oconee National Forest has a thinned canopy and grassy herbaceous layer.

White Pine Plantation

Attributes, descriptions, and a map are shown in Table D-13 and Figures D-21.

Table D-13. Attributes and descriptions for White Pine Plantation.

Attribute	Description
CEGL Code	7178
Community Name	White Pine Plantation
Color	Purple
Tone	Dark
Texture	Coarse
Pattern	Homogeneous
Height	Medium
Shape	Rectangular patches
Size	Rare with various sizes.
Location	Planted pine dominated forest found near disturbed areas.

Table D-13 (continued). Attributes and descriptions for White Pine Plantation.

Attribute	Description
Association	Residential and commercial areas
Comments	Trees planted in rows make this class easily distinguishable from other pine dominated forests.

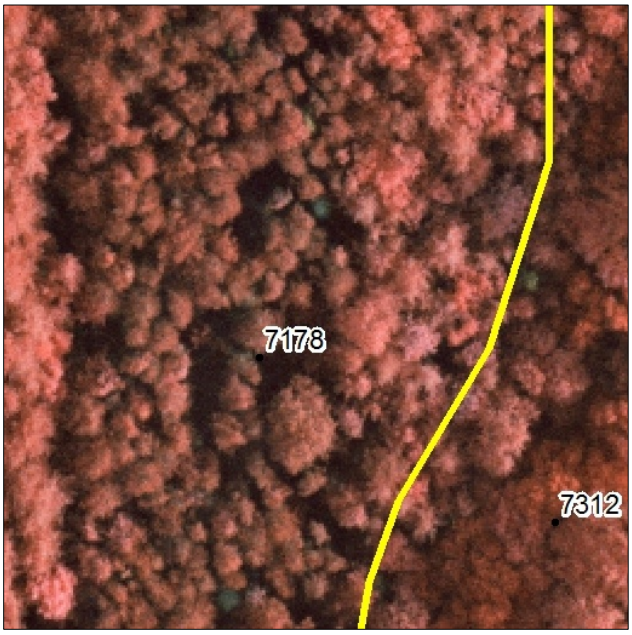


Figure D-21. Map showing White Pine Plantation (7178).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The closed (100% cover) tree canopy, 10–15 meters (32.8–49.2 ft) tall, is dominated by *Pinus strobus* (eastern white pine) along with lesser amounts of *Acer negundo* (box-elder), *Juglans nigra* (black walnut), and *Prunus serotina* (black cherry). *Acer negundo* (box-elder) and *Prunus serotina* (black cherry) also form a sparse (20%) subcanopy (5–10 meters [16.4–32.8 ft]). The very sparse (< 5%) herbaceous layer is made up solely of *Asplenium platyneuron* (ebony spleenwort) and exotic *Ligustrum sinense* (Chinese privet). This, along with *Cocculus carolinus* (Carolina coralbead), constitutes the entire floristic composition of this depauperate community.

Global Vegetation

The tree canopy at maturity is usually dense and contains a monospecific layer of *Pinus strobus* (eastern white pine). *Pinus resinosa* (red pine) or *Pinus virginiana* (Virginia pine) is occasionally present in small amounts. In older stands or gaps, regenerating trees may include *Fagus grandifolia* (American beech), *Acer saccharum* (sugar maple), *Acer rubrum* (red maple), and *Prunus serotina*

(black cherry); *Robinia pseudoacacia* (black locust) and *Betula lenta* (sweet birch) are occasionally present. *Acer pensylvanicum* (striped maple) and *Ostrya virginiana* (hophornbeam) are common small trees. The shrub layer is typically sparse and mostly consists of smaller individuals of the tree species. The field layer varies from sparse to absent; it may be locally well-developed in small openings, with variable composition. In some stands, mosses may be abundant.

Successional Tuliptree Forest (Circumneutral Type)

Attributes, descriptions, a photo, and a map are shown in Table D-14 and Figures D-22 and D-23.

Table D-14. Attributes and descriptions for Successional Tuliptree Forest (Circumneutral Type).

Attribute	Description
CEGL Code	7220
Community Name	Successional Tuliptree Forest (Circumneutral Type)
Color	Pink to purple
Tone	Medium to dark
Texture	Medium to rough
Pattern	Medium to dense canopy
Height	Medium to tall
Shape	Patchy
Size	Common class; medium individual size with some variation.
Location	Mesic hardwood dominated forest found disturbed areas with rich soils.
Association	7244, 4638
Comments	Nearly impossible to distinguish from 7221 in CIR.



Figure D-22. Example of Successional Tuliptree Forest (Circumneutral Type).

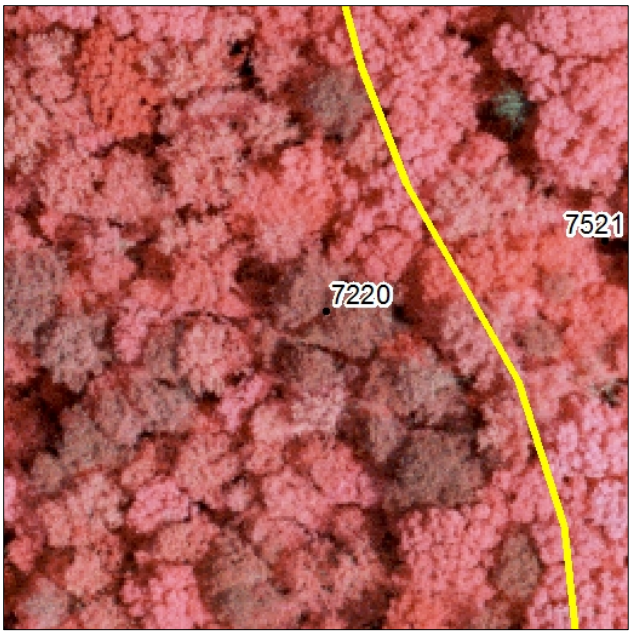


Figure D-23. Map showing Successional Tuliptree Forest (Circumneutral Type; 7220).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park
Vegetation

The moderately dense (70–80% cover) tree canopy, 20–50 meters (65.6–164 ft) tall, is dominated by *Liriodendron tulipifera* (tuliptree) and may include lesser amounts of *Carya alba* (mockernut hickory), *Liquidambar styraciflua* (sweetgum), *Pinus taeda* (loblolly pine), and *Quercus* (oak) spp. The sparse (20–40%) subcanopy (10–20 meters [32.8–65.6 ft]) typically includes *Liquidambar styraciflua* (sweetgum) and *Liriodendron tulipifera* (tuliptree). The sparse to closed (30–100%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) may be dominated by *Acer barbatum* (southern sugar maple), *Acer leucoderme* (chalk maple), *Acer rubrum* (red maple), *Carpinus caroliniana* (American hornbeam), *Cornus florida* (flowering dogwood), *Fagus grandifolia* (American beech), *Lindera benzoin* (northern spicebush) (up to 90% cover in one stand), *Magnolia macrophylla* (bigleaf magnolia), *Ostrya virginiana* (hophornbeam), and/or *Ulmus rubra* (slippery elm). The sparse to moderate (10–60%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is often dominated by *Lindera benzoin* (northern spicebush) and is made up of other species from the upper layers; it may also include small amounts of *Arundinaria gigantea* (giant cane), *Cercis canadensis* (eastern redbud), *Cornus alternifolia* (alternateleaf dogwood), *Hydrangea arborescens* (wild hydrangea), *Ligustrum sinense* (Chinese privet) (exotic), *Staphylea trifolia* (American bladdernut), and *Symplocos tinctoria* (common sweetleaf). The moderate (30–60%) herbaceous layer is dominated by tree and shrub seedlings but also includes herbs such as *Actaea racemosa* (black bugbane), *Aristolochia serpentaria* (Virginia snakeroot), *Botrychium virginianum* (rattlesnake fern), *Dioscorea quaternata* (fourleaf yam), *Elephantopus carolinianus* (Carolina elephantsfoot), *Euonymus americanus* (strawberry bush), *Panax quinquefolius* (American ginseng), *Polystichum acrostichoides* (Christmas fern), *Sanicula canadensis* (Canadian blacksnakeroot), *Xanthorhiza simplicissima* (yellowroot), and others. Vines

(5–20%) trailing on the ground and/or climbing into upper layers include *Decumaria barbara* (woodvamp), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax* (greenbrier) spp., *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine). Seven species of invasive plants were recorded from five plots. However, this community does support state-vulnerable *Magnolia macrophylla* (bigleaf magnolia), *Panax quinquefolius* (American ginseng), and *Trillium rugelii* (illscented wakerobin). It also supports state-threatened *Schisandra glabra* (bay starvine).

Global Vegetation

Stands are dominated by *Liriodendron tulipifera* (tuliptree) but also include various other species, including ones indicative of nutrient-rich or circumneutral environments. Other species include *Liquidambar styraciflua* (sweetgum), *Acer saccharum* (sugar maple), *Aesculus flava* (yellow buckeye), *Platanus occidentalis* (American sycamore), *Quercus rubra* (northern red oak), *Acer rubrum* (red maple), *Robinia pseudoacacia* (black locust), *Juglans nigra* (black walnut), *Halesia tetraptera* (mountain silverbell), *Fraxinus americana* (white ash), *Fagus grandifolia* (American beech), *Magnolia acuminata* (cucumber-tree), *Ulmus rubra* (slippery elm), *Quercus imbricaria* (shingle oak), *Quercus muehlenbergii* (chinkapin oak), and *Carya ovata* (shagbark hickory) (NatureServe Ecology, unpubl. data; Virginia Natural Heritage Program, unpubl. data; West Virginia Natural Heritage Program, unpubl. data). Species often found in the subcanopy include *Acer saccharum* (sugar maple), *Cercis canadensis* (eastern redbud), *Ulmus alata* (winged elm), *Morus rubra* (red mulberry), *Sassafras albidum* (sassafras), and *Cornus florida* (flowering dogwood). *Cercis canadensis* (eastern redbud) is often abundant on soils underlain by carbonate strata. Shrubs include saplings of the subcanopy and canopy species, as well as *Symphoricarpos orbiculatus* (coralberry), *Lindera benzoin* (northern spicebush), *Asimina triloba* (pawpaw), and *Juniperus virginiana* var. *virginiana* (eastern red-cedar). *Lindera benzoin* (northern spicebush) is often abundant in occurrences of this community in the Central Appalachians, Piedmont and inner Coastal Plain regions of Virginia, West Virginia, and Maryland. Exotic shrubs, including *Rosa multiflora* (multiflora rose), *Rubus phoenicolasius* (wine raspberry), and *Lonicera japonica* (Japanese honeysuckle), are present at some sites. Vines, which may be abundant, include *Aristolochia macrophylla* (pipevine), *Toxicodendron radicans* (eastern poison-ivy), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax tamnoides* (bristly greenbrier), and *Vitis aestivalis* var. *bicolor* (summer grape). Herbaceous species include the exotics *Microstegium vimineum* (Nepalese browntop), *Alliaria petiolata* (garlic mustard), and *Veronica hederifolia* (ivyleaf speedwell), as well as *Actaea racemosa* (black bugbane), *Ageratina altissima* (white snakeroot), *Arisaema triphyllum* (Jack in the pulpit), *Asarum canadense* (Canadian wildginger), *Caulophyllum thalictroides* (blue cohosh), *Cryptotaenia canadensis* (Canadian honewort), *Galium triflorum* (fragrant bedstraw), *Laportea canadensis* (Canadian woodnettle), *Impatiens pallida* (pale touch-me-not), *Hydrophyllum canadense* (bluntleaf waterleaf), *Osmorhiza longistylis* (longstyle sweetroot), *Adiantum pedatum* (northern maidenhair), *Polygonatum pubescens* (hairy Solomon's seal), *Polystichum acrostichoides* (Christmas fern), *Verbesina alternifolia* (wingstem), *Amphicarpaea bracteata* (American hogpeanut), *Solidago caesia* (wreath goldenrod), and *Polystichum acrostichoides* (Christmas fern). (Andreu and Tukman 1995; NatureServe Ecology, unpubl. data; Virginia Natural Heritage Program, unpubl. data; West Virginia Natural Heritage Program, unpubl. data). Examples at Fort Donelson that have been very

heavily disturbed may have local dominance by *Celtis laevigata* (sugarberry) and *Juglans nigra* (black walnut).

Successional Tuliptree Forest (Acidic Type)

Attributes, descriptions, a photo, and a map are shown in Table D-15 and Figures D-24 and D-25.

Table D-15. Attributes and descriptions for Successional Tuliptree Forest (Acidic Type).

Attribute	Description
CEGL Code	7221
Community Name	Successional Tuliptree Forest (Acidic Type)
Color	Pink to moderate
Tone	Light to medium
Texture	Moderate to coarse
Pattern	Medium to dense
Height	Medium to tall
Shape	Irregular
Size	Common class; medium sized individual areas with little variation.
Location	Mesic hardwood dominated forest, with variable environmental setting.
Association	7232, 7244
Comments	Nearly impossible to distinguish from 7220 in summer CIR.



Figure D-24. Example of Successional Tuliptree Forest (Acidic Type).

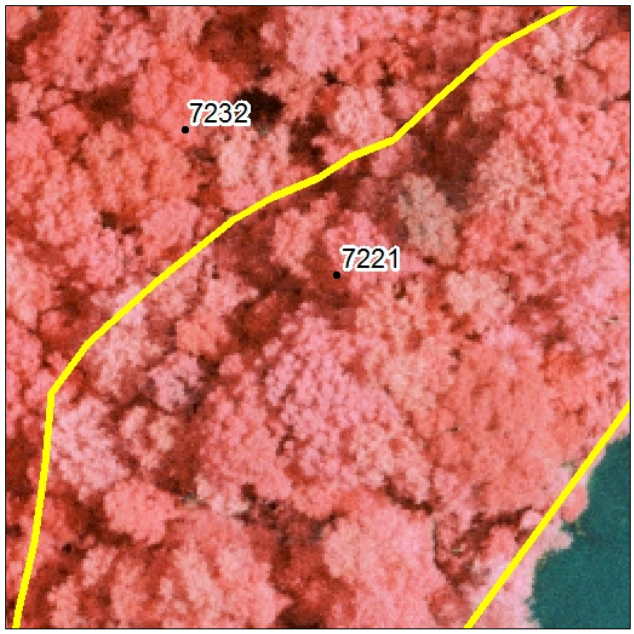


Figure D-25. Map showing Successional Tuliptree Forest (Acidic Type; 7221).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The dense (80% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is codominated by *Liriodendron tulipifera* (tuliptree), *Pinus taeda* (loblolly pine), *Quercus alba* (white oak), and *Quercus rubra* (northern red oak). The moderate (50%) subcanopy (15–20 meters [49.2–65.6 ft]) is dominated by *Carpinus caroliniana* (American hornbeam), as are the moderate (50%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) and sparse (30%) short-shrub layer (1–2 meters [3.3–6.6 ft]). Additional subcanopy species include *Acer rubrum* (red maple) and *Prunus serotina* (black cherry), and other shrubs are *Aesculus sylvatica* (painted buckeye), *Cornus florida* (flowering dogwood), *Morus rubra* (red mulberry), *Oxydendrum arboreum* (sourwood), *Rhododendron canescens* (mountain azalea), *Toxicodendron radicans* (eastern poison-ivy), and *Vaccinium fuscatum* (black highbush blueberry). The sparse (30%) herbaceous layer includes *Decumaria barbara* (woodvamp), *Elephantopus carolinianus* (Carolina elephantsfoot), *Leersia virginica* (whitegrass), *Polystichum acrostichoides* (Christmas fern), *Vitis rotundifolia* (muscadine), and others.

Global Vegetation

The canopy of this semi-natural upland association is dominated by *Liriodendron tulipifera* (tuliptree). *Quercus* (oak) species (*Quercus alba* (white oak), *Quercus rubra* (northern red oak), *Quercus falcata* (southern red oak), *Quercus nigra* (water oak), *Quercus velutina* (black oak)) are often present; additional associates may include *Acer barbatum* (southern sugar maple), *Acer rubrum* (red maple), *Carya* (hickory) spp., *Fagus grandifolia* (American beech), *Nyssa sylvatica* (blackgum), *Cornus florida* (flowering dogwood), and *Robinia pseudoacacia* (black locust). *Betula lenta* (sweet birch) is a common associate at the northern range limit. Shrub layers may include saplings of the

canopy species and *Acer pensylvanicum* (striped maple), *Amelanchier arborea* (common serviceberry), *Hamamelis virginiana* (American witch-hazel), *Lindera benzoin* (northern spicebush) (in small amounts), and *Vaccinium pallidum* (Blue Ridge blueberry). Herbs vary across the range but may include *Actaea racemosa* (black bugbane), *Dichanthelium clandestinum* (deertongue), *Dioscorea quaternata* (fourleaf yam), *Galium circaezans* (licorice bedstraw), *Geranium maculatum* (spotted geranium), *Goodyera pubescens* (downy rattlesnake plantain), *Medeola virginiana* (Indian cucumber), *Potentilla simplex* (common cinquefoil), *Scutellaria serrata* (showy skullcap), *Thelypteris noveboracensis* (New York fern), and *Uvularia perfoliata* (perfoliate bellwort). *Lycopodium digitatum* (fan clubmoss) may be abundant in some stands.

Piedmont Dry–Mesic Basic Oak Hickory Forest

Attributes, descriptions, a photo, and a map are shown in Table D-16 and Figures D-26 and D-27.

Table D-16. Attributes and descriptions for Piedmont Dry–Mesic Basic Oak Hickory Forest.

Attribute	Description
CEGL Code	7232
Community Name	Piedmont Dry–Mesic Basic Oak Hickory Forest
Color	Pink to red
Tone	Light to medium
Texture	Medium to coarse
Pattern	Moderate to dense
Height	Medium to very tall
Shape	Expansive
Size	One of the most common classes; large average size with large variations possible.
Location	Mesic hardwood dominated forest found in mostly midslopes.
Association	7244, 4232
Comments	Distinguished from 7244 by greater texture and tonal variation (i.e. greater species diversity) and topographic position resulting in more mesic conditions (moderate slope, lower down, trough or valley).
Comments	Distinguished from 7244 by greater texture and tonal variation (i.e. greater species diversity) and topographic position resulting in more mesic conditions (moderate slope, lower down, trough or valley).



Figure D-26. Example of Piedmont Dry–Mesic Basic Oak Hickory Forest.

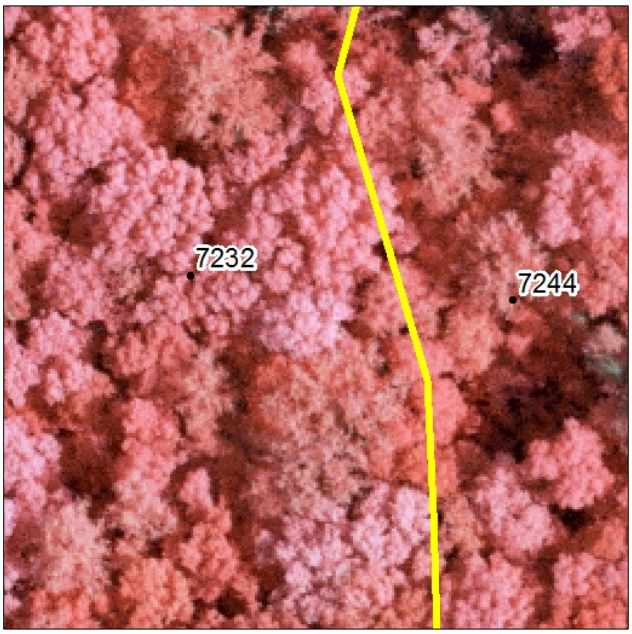


Figure D-27. Map showing Piedmont Dry–Mesic Basic Oak Hickory Forest (7232).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

This oak-hickory forest has a moderate to dense (50–90% cover) mature tree canopy, 20–50-plus meters (65.6–164-plus ft) tall, is codominated by *Carya alba* (mockernut hickory), *Quercus alba* (white oak) and *Quercus rubra* (northern red oak); additional canopy species may include *Liriodendron tulipifera* (tuliptree), *Pinus taeda* (loblolly pine), *Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak), and *Quercus stellata* (post oak). The sparse to moderate (20–50%) subcanopy (10–20 meters [32.8–65.6 ft]) includes canopy species as well as *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Fagus grandifolia* (American beech), and *Oxydendrum*

arboreum (sourwood). The moderate (30–60%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) is dominated by *Acer leucoderme* (chalk maple), *Cornus florida* (flowering dogwood), *Fraxinus americana* (white ash), *Ostrya virginiana* (hophornbeam), and *Oxydendrum arboreum* (sourwood). The short-shrub layer (1–2 meters [3.3–6.6 ft]) ranges from very sparse to moderately dense (5–70%) and is dominated by *Acer leucoderme* (chalk maple), *Aesculus sylvatica* (painted buckeye), and *Toxicodendron radicans* (eastern poison-ivy). Common herbs species in the sparse (10–40%) but often diverse herbaceous layer include *Aristolochia serpentaria* (Virginia snakeroot), *Asplenium platyneuron* (ebony spleenwort), *Aureolaria virginica* (downy yellow false foxglove), *Chimaphila maculata* (striped prince's pine), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Dichanthelium boscii* (Bosc's panicgrass), *Dichanthelium commutatum* (variable panicgrass), *Elephantopus tomentosus* (devil's grandmother), *Euphorbia corollata* (flowering spurge), *Hexastylis arifolia* (littlebrownjug), *Ligusticum canadense* (Canadian licorice-root), *Maianthemum racemosum* (feathery false lily of the valley), *Oxalis corniculata* (creeping woodsorrel), *Polygonatum biflorum* (smooth Solomon's seal), *Polystichum acrostichoides* (Christmas fern), *Sanguinaria canadensis* (bloodroot), *Sanicula smallii* (Small's blacksnakeroot), *Solidago arguta* (Atlantic goldenrod), and *Uvularia perfoliata* (perfoliate bellwort). *Hybanthus concolor* (eastern greenviolet) is a characteristic herb in one example. Common vines (5–20%) include *Parthenocissus quinquefolia* (Virginia creeper), *Smilax* (greenbrier) spp., *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine). In addition, this community supports state-vulnerable *Agrimonia microcarpa* (smallfruit agrimony), *Magnolia macrophylla* (bigleaf magnolia), *Panax quinquefolius* (American ginseng), and *Zizia trifoliata* (meadow alexanders).

Global Vegetation

Stands of this forest are dominated by *Quercus alba* (white oak) and often *Quercus rubra* (northern red oak), *Carya ovata* (shagbark hickory), and *Carya carolinae-septentrionalis* (southern shagbark hickory) in combination with other species of *Quercus* (oak) and *Carya* (hickory) (i.e., *Quercus velutina* (black oak), *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory)). Other overstory and understory species that may occur include *Liquidambar styraciflua* (sweetgum), *Carya ovalis* (red hickory), *Fraxinus americana* (white ash), *Liriodendron tulipifera* (tuliptree), *Juniperus virginiana* var. *virginiana* (eastern red-cedar), *Cercis canadensis* (eastern redbud), *Cornus florida* (flowering dogwood), *Viburnum rafinesquianum* (downy arrow-wood), *Viburnum prunifolium* (blackhaw), *Ostrya virginiana* (hophornbeam), *Chionanthus virginicus* (white fringetree), *Ulmus americana* (American elm), *Carpinus caroliniana* (American hornbeam), *Pinus taeda* (loblolly pine), and *Pinus echinata* (shortleaf pine). *Acer leucoderme* (chalk maple) is an important understory component in some Georgia Piedmont stands. Proportions of *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Acer rubrum* (red maple), and *Pinus* (pine) spp. increase following disturbance. Occurrences usually have closed canopies and moderately well-developed subcanopy and shrub layers. Herbaceous cover in this association may vary considerably with site conditions, land-use history, and levels of deer herbivory. Some stands have rather sparse herb layers with less than 25% total cover and only scattered patches of dry-mesophytic forbs and graminoids such as *Desmodium nudiflorum* (nakedflower ticktrefoil), *Galium circaezans* (licorice bedstraw), *Maianthemum racemosum ssp. racemosum* (feathery false lily of the valley), *Polygonatum biflorum* var. *biflorum* (smooth Solomon's seal), *Uvularia perfoliata* (perfoliate bellwort), *Aristolochia*

serpentaria (Virginia snakeroot), *Scleria oligantha* (littlehead nutrush), *Botrychium virginianum* (rattlesnake fern), *Agrimonia rostellata* (beaked agrimony), *Bromus pubescens* (hairy woodland brome), *Carex albicans* (whitetinge sedge), *Carex laxiflora* var. *laxiflora* (broad looseflower sedge), *Carex planispicata*, *Dichanthelium boscii* (Bosc's panicgrass), *Elymus hystrix* var. *hystrix* (eastern bottlebrush grass), *Festuca subverticillata* (nodding fescue), *Scutellaria elliptica* (hairy skullcap), and *Tiarella cordifolia* var. *collina* (heartleaf foamflower). Other stands have high cover of scrambling vines, such *Parthenocissus quinquefolia* (Virginia creeper), *Bignonia capreolata* (crossvine), and *Vitis rotundifolia* (muscadine), that preclude a diversity of herbaceous species. On the best sites, especially those not subject to heavy deer grazing, stands may have well-developed herb layers with greater than 50% cover and impressive species richness (e.g., > 80 taxa per 400 square meters [4,306 square feet {sq ft}]). A number of species with Piedmont distributions restricted to calcium- or magnesium-rich soils have been documented in this association in both Virginia and North Carolina, including *Blephilia ciliata* (downy pagoda-plant), *Clematis ochroleuca* (curlyheads), *Matelea decipiens* (oldfield milkvine), *Matelea obliqua* (climbing milkvine), *Polygala senega* (Seneca snakeroot), *Ruellia purshiana* (Pursh's wild petunia), *Salvia urticifolia* (nettleleaf sage), *Scutellaria nervosa* (veiny skullcap), *Scutellaria ovata* (heartleaf skullcap), *Scutellaria serrata* (showy skullcap), and *Triosteum angustifolium* (yellowfruit horse-gentian).

Interior Southern Red Oak–White Oak Forest

Attributes, descriptions, a photo, and a map are shown in Table D-17 and Figures D-28 and D-29.

Table D-17. Attributes and descriptions for Interior Southern Red Oak–White Oak Forest.

Attribute	Description
CEGL Code	7244
Community Name	Interior Southern Red Oak–White Oak Forest
Color	Pink to red
Tone	Light to medium
Texture	Fine to medium
Pattern	Moderate to dense canopy
Height	Medium to tall
Shape	Expansive
Size	One of the most common classes; can be largest individual areas but very large variation is possible.
Location	Dry hardwood dominated forest found in most non-lowland regions of the park.
Association	7232, 4638
Comments	Distinguished from 7232 by more even texture and tone and topographic position resulting in drier conditions (higher, steeper slopes, ridge tops).



Figure D-28. Example of Interior Southern Red Oak–White Oak Forest.

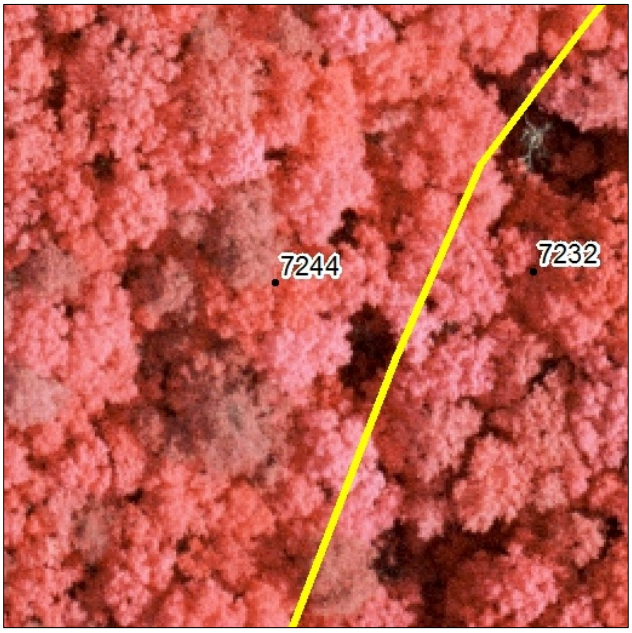


Figure D-29. Map showing Interior Southern Red Oak–White Oak Forest (7244).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderate to dense (60–80% cover) mature tree canopy, 20–50 meters (65.6–164 ft) tall, is dominated by *Quercus falcata* (southern red oak); possible codominants include *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory), *Liriodendron tulipifera* (tuliptree), *Pinus echinata* (shortleaf pine), *Pinus taeda* (loblolly pine), and more commonly *Quercus alba* (white oak),

Quercus stellata (post oak), and *Quercus velutina* (black oak). The sparse to moderate (30–60%) subcanopy (10–35 meters [32.8–114.8 ft]) is made up of canopy species as well as *Cornus florida* (flowering dogwood) and *Oxydendrum arboreum* (sourwood). The sparse (10–30%) tall-shrub layer (2–15 meters [6.6–49.2 ft]) and sparse (10–30%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are made up mostly of saplings of the canopy species but may also include *Acer leucoderme* (chalk maple), *Acer rubrum* (red maple), *Amelanchier arborea* (common serviceberry), *Aralia spinosa* (devil's walkingstick), *Asimina parviflora* (smallflower pawpaw), *Diospyros virginiana* (common persimmon), *Nyssa sylvatica* (blackgum), *Prunus serotina* (black cherry), *Sassafras albidum* (sassafras), and *Vaccinium arboreum* (farkleberry), several of which may dominate. The sparse to moderate (10–40%) herbaceous layer is comprised mainly of tree and shrub seedlings but may also include small amounts of *Asplenium platyneuron* (ebony spleenwort), *Botrychium virginianum* (rattlesnake fern), *Chimaphila maculata* (striped prince's pine), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Dichanthelium commutatum* (variable panicgrass), *Piptochaetium avenaceum* (blackseed speargrass), and *Polystichum acrostichoides* (Christmas fern). Common vines found trailing on the ground and climbing into the upper layers include *Parthenocissus quinquefolia* (Virginia creeper), *Smilax glauca* (cat greenbrier), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison-ivy), *Vitis aestivalis* (summer grape), and *Vitis rotundifolia* (muscadine). This community also supports state-vulnerable *Castanea dentata* (American chestnut).

Global Vegetation

The vegetation is dominated by *Quercus* (oak) spp. and lesser amounts of *Carya* (hickory) spp. The canopy is continuous, and several species of *Quercus* (oak) may be present (e.g., *Quercus falcata* (southern red oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), and *Quercus stellata* (post oak)). The subcanopy closure is variable, ranging from less than 25% to more than 40% cover, and the shrub and herb layers generally are sparse. Subcanopy species include canopy species and *Acer rubrum* (red maple), *Liriodendron tulipifera* (tuliptree), *Oxydendrum arboreum* (sourwood), *Liquidambar styraciflua* (sweetgum), *Ulmus alata* (winged elm), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Juniperus virginiana* var. *virginiana* (eastern red-cedar), and *Vaccinium arboreum* (farkleberry). The tall-shrub stratum may contain *Rhododendron canescens* (mountain azalea) and *Vaccinium arboreum* (farkleberry). The low-shrub stratum is dominated by various ericaceous shrubs such as *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium fuscatum* (black highbush blueberry), and *Gaylussacia baccata* (black huckleberry). *Smilax glauca* (cat greenbrier) and *Vitis rotundifolia* (muscadine) are common vines. Herbaceous species that may be present include *Aristolochia serpentaria* (Virginia snakeroot), *Symphyotrichum dumosum* (rice button aster), *Clitoria mariana* (Atlantic pigeonwings), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Euphorbia corollata* (flowering spurge), *Galium circaezans* (licorice bedstraw), *Chimaphila maculata* (striped prince's pine), *Polystichum acrostichoides* (Christmas fern), *Asplenium platyneuron* (ebony spleenwort), *Hexastylis arifolia* (littlebrownjug), *Coreopsis major* (greater tickseed), *Solidago odora* (anisescented goldenrod), *Tephrosia virginiana* (Virginia tephrosia), *Potentilla simplex* (common cinquefoil), *Porteranthus stipulatus* (Indian physic), *Pteridium aquilinum* (western brackenfern), *Lespedeza* (lespedeza) spp., *Dichanthelium* (rosette grass) spp., and *Hieracium venosum* (rattlesnakeweed). At Shiloh (western Tennessee) this association is documented from three plots;

the canopy is dominated by *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus stellata* (post oak), *Ulmus alata* (winged elm), and *Carya alba* (mockernut hickory). *Quercus muehlenbergii* (chinkapin oak) is also present as a canopy species in one of the plots. Subcanopy dominants are *Liquidambar styraciflua* (sweetgum), *Ulmus alata* (winged elm), *Nyssa sylvatica* (blackgum), *Fraxinus americana* (white ash), and *Carya glabra* (pignut hickory). Other subcanopy trees are *Quercus rubra* (northern red oak), *Quercus alba* (white oak), *Carya alba* (mockernut hickory), *Juniperus virginiana* var. *virginiana* (eastern red-cedar), *Carya ovalis* (red hickory), *Diospyros virginiana* (common persimmon), and *Fagus grandifolia* (American beech). The most abundant tall shrubs are *Carya alba* (mockernut hickory), *Quercus falcata* (southern red oak), *Ulmus alata* (winged elm), and *Liquidambar styraciflua* (sweetgum). Other tall shrubs are *Carya ovalis* (red hickory), *Sassafras albidum* (sassafras), *Quercus alba* (white oak), *Nyssa sylvatica* (blackgum), *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), and less abundant *Quercus velutina* (black oak), *Quercus rubra* (northern red oak), *Fagus grandifolia* (American beech), *Fraxinus americana* (white ash), *Acer rubrum* (red maple), *Smilax rotundifolia* (roundleaf greenbrier), and *Ilex opaca* (American holly). Short shrubs are diverse; *Quercus falcata* (southern red oak), *Vitis rotundifolia* (muscadine), *Vaccinium stamineum* (deerberry), and *Carya alba* (mockernut hickory) are the most abundant. Other short shrubs are *Quercus velutina* (black oak), *Ulmus alata* (winged elm), *Quercus alba* (white oak), *Nyssa sylvatica* (blackgum), *Parthenocissus quinquefolia* (Virginia creeper), *Prunus serotina* (black cherry), and *Sassafras albidum* (sassafras). Short shrubs which are sparse include *Amelanchier arborea* (common serviceberry), *Vaccinium arboreum* (farkleberry), *Juniperus virginiana* var. *virginiana* (eastern red-cedar), *Diospyros virginiana* (common persimmon), *Hypericum hypericoides* (St. Andrew's cross), *Fraxinus americana* (white ash), *Smilax rotundifolia* (roundleaf greenbrier), *Ilex opaca* (American holly), *Acer rubrum* (red maple), *Quercus phellos* (willow oak), *Celtis occidentalis* (common hackberry), *Rubus argutus* (sawtooth blackberry), *Morus rubra* (red mulberry), *Smilax bona-nox* (saw greenbrier), *Ilex decidua* (possumhaw), *Toxicodendron radicans* (eastern poison-ivy), and *Carya ovalis* (red hickory). In one of the plots *Chasmanthium sessiliflorum* (longleaf woodoats) is the dominant herb, in the other plots there is no single dominant and herbs are all sparse. Other herbs include *Dichanthelium boscii* (Bosc's panicgrass), *Carex complanata* (hirsute sedge), *Dichanthelium laxiflorum* (openflower rosette grass), *Danthonia spicata* (poverty oatgrass), *Lespedeza repens* (creeping lespedeza), *Lespedeza procumbens* (trailing lespedeza), *Carex leavenworthii* (Leavenworth's sedge), *Schizachyrium scoparium* (little bluestem) and present a in trace amounts *Carex swanii* (Swan's sedge), *Dichanthelium dichotomum* var. *dichotomum* (cypress panicgrass), *Sericocarpus linifolius* (narrowleaf whitetop aster), *Galium circaezans* (licorice bedstraw), *Panicum anceps* (beaked panicgrass), *Tridens flavus* (purpletop tridens), *Aristolochia serpentaria* (Virginia snakeroot), *Dichanthelium acuminatum* var. *acuminatum* (tapered rosette grass), *Galium pilosum* (hairy bedstraw), *Solidago rugosa* (wrinkleleaf goldenrod), *Erechtites hieraciifolia* (American burnweed), *Sanicula canadensis* (Canadian blacksnakeroot), *Asplenium platyneuron* (ebony spleenwort), *Acalypha rhomboidea* (Virginia threeseed mercury), *Mimosa microphylla* (littleleaf sensitive-briar), *Conyza canadensis* (Canadian horseweed), and *Penstemon calycosus* (longsepal beardtongue).

River Birch Levee Forest

Attributes, descriptions, a photo, and a map are shown in Table D-18 and Figures D-30 and D-31.

Table D-18. Attributes and descriptions for River Birch Levee Forest.

Attribute	Description
CEGL Code	7312
Community Name	River Birch Levee Forest
Color	White to pink
Tone	Light
Texture	Medium to rough
Pattern	Sparse to medium
Height	Medium
Shape	Elongated, patchy
Size	Uncommon class; medium sized with little variation.
Location	Hardwood dominated forest found in wetland areas near water.
Association	7730,4048, 4638
Comments	Almost impossible to distinguish from 7730 using summer CIR, but usually appears whiter.



Figure D-30. Example of River Birch Levee Forest.

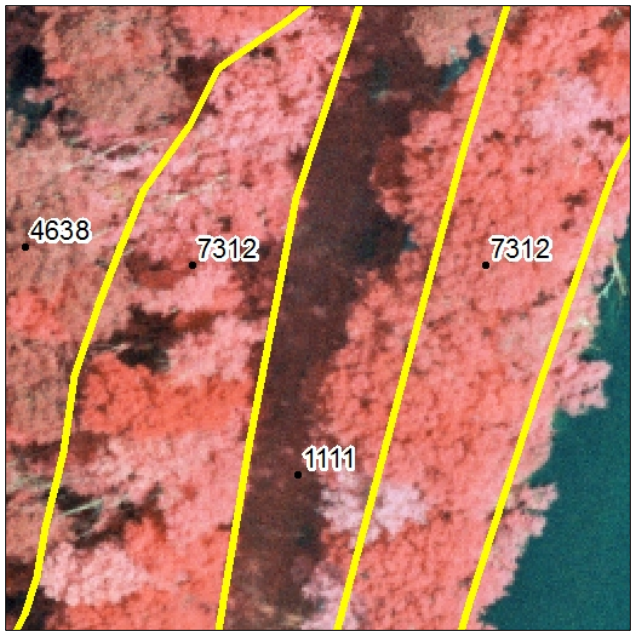


Figure D-31. Map showing River Birch Levee Forest (7312).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderate to dense (60–80% cover) tree canopy, 20–50 meters (65.6–164 ft) tall, is dominated by *Betula nigra* (river birch); additional species may include *Acer leucoderme* (chalk maple), *Celtis laevigata* (sugarberry), *Juglans nigra* (black walnut), *Liriodendron tulipifera* (tuliptree), *Pinus taeda* (loblolly pine), *Platanus occidentalis* (American sycamore), *Prunus serotina* (black cherry), and *Quercus nigra* (water oak). The moderately sparse (40%) subcanopy (15–20 meters [49.2–65.6 ft]) is made up of *Acer negundo* (box-elder), *Betula nigra* (river birch), *Carpinus caroliniana* (American hornbeam), *Celtis laevigata* (sugarberry), *Juglans nigra* (black walnut), and *Quercus nigra* (water oak). The sparse to moderately dense (10–70%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) includes many subcanopy species as well as *Acer barbatum* (southern sugar maple), *Cornus florida* (flowering dogwood), *Halesia* (silverbell) spp., *Ilex opaca* (American holly), and others. The sparse to very dense (20–90%) short-shrub layer (1–2 meters [3.3–6.6 ft]) shares the same composition as the tall-shrub layer along with *Arundinaria gigantea* (giant cane), *Asimina triloba* (pawpaw), *Lindera benzoin* (northern spicebush), and others. The herbaceous layer is highly variable, ranging from very sparse to complete (5–100%); species may include *Asplenium platyneuron* (ebony spleenwort), *Campsis radicans* (trumpet creeper), *Hypericum* (St. Johnswort) spp., *Parthenocissus quinquefolia* (Virginia creeper), *Polystichum acrostichoides* (Christmas fern), *Verbesina alternifolia* (wingstem), and *Verbesina occidentalis* (yellow crownbeard). At one location, the exotic invasive *Microstegium vimineum* (Nepalese browntop) covers the entire ground surface. In addition, this community supports state-vulnerable *Magnolia macrophylla* (bigleaf magnolia).

Global Vegetation

Betula nigra (river birch) contributes at least 50%, and often more, of the tree density of stands of this community. *Platanus occidentalis* (American sycamore) may be codominant, or at least prominent, with large individuals overtopping the *Betula* (birch), which tends to have a greater number of stems, but *Platanus occidentalis* (American sycamore) may be more conspicuous because of its larger size. Other canopy associates include *Liriodendron tulipifera* (tuliptree), *Liquidambar styraciflua* (sweetgum), *Acer rubrum* (red maple), *Acer negundo* (box-elder), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Celtis* (hackberry) spp., and *Quercus* (oak) spp. *Pinus echinata* (shortleaf pine), *Pinus strobus* (eastern white pine), or *Pinus virginiana* (Virginia pine) may be found in some montane or submontane examples. The subcanopy or tall-shrub strata may include *Cornus florida* (flowering dogwood) and *Carpinus caroliniana* (American hornbeam), along with *Acer rubrum* (red maple), *Ilex opaca* (American holly), *Ulmus alata* (winged elm), *Prunus serotina* (black cherry), and *Carya* (hickory) spp. Shrubs and woody vines may include *Alnus serrulata* (hazel alder), *Euonymus americanus* (strawberry bush), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine). Herbs may include *Boehmeria cylindrica* (small-spike false nettle), *Polygonum virginianum* (jumpseed), *Rudbeckia laciniata* (cutleaf coneflower), *Sanicula* (sanicle) sp., *Symphyotrichum lateriflorum* (calico aster), *Thalictrum dioicum* (early meadowrue), *Viola sororia* (common blue violet), *Polystichum acrostichoides* (Christmas fern), *Woodwardia areolata* (netted chainfern), *Botrychium dissectum* (cutleaf grapefern), *Botrychium virginianum* (rattlesnake fern), and *Impatiens capensis* (jewelweed). The exotics *Ligustrum sinense* (Chinese privet), *Lonicera japonica* (Japanese honeysuckle), *Microstegium vimineum* (Nepalese browntop), and *Rosa multiflora* (multiflora rose) may spread into disturbed examples of this community. No effort has been made to subdivide this type into northern and southern, or Coastal Plain and Interior variants, although there are undoubtedly some floristic differences between these extremes, at least in the lower strata.

Successional Tuliptree–Loblolly Pine Upland Forest

Attributes, descriptions, a photo, and a map are shown in Table D-19 and Figures D-32 and D-33.

Table D-19. Attributes and descriptions for Successional Tuliptree–Loblolly Pine Upland Forest.

Attribute	Description
CEGL Code	7521
Community Name	Successional Tuliptree–Loblolly Pine Upland Forest
Color	Pink to red
Tone	Light to medium
Texture	Rough
Pattern	Sparse to medium canopy

Table D-19 (continued). Attributes and descriptions for Successional Tuliptree–Loblolly Pine Upland Forest.

Attribute	Description
Height	Medium
Shape	Patchy to elongated
Size	Uncommon class; medium individual size with some variation.
Location	Sparse hardwood forest found in areas with large pine bark beetle (PBB) infestations.
Association	4232, 7244
Comments	Downed pine from PBB difficult to determine from summer CIR; similar to 6011 but generally less pines.



Figure D-32. Example of Successional Tuliptree–Loblolly Pine Upland Forest.

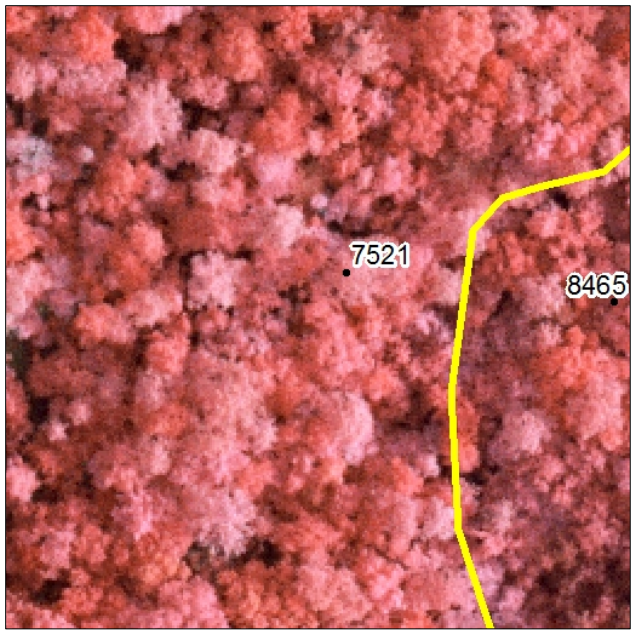


Figure D-33. Map showing Successional Tuliptree–Loblolly Pine Upland Forest (7521).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The sparse (30% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is dominated by *Liriodendron tulipifera* (tuliptree) and includes lesser amounts of *Acer rubrum* (red maple) and *Quercus nigra* (water oak). The moderate (40%) subcanopy (10–15 meters [32.8–49.2 ft]) is codominated by *Cornus florida* (flowering dogwood) and *Oxydendrum arboreum* (sourwood) and includes canopy species as well as *Fagus grandifolia* (American beech), *Liquidambar styraciflua* (sweetgum), and *Pinus virginiana* (Virginia pine). The moderate (50%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) and sparse (20%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are diverse mixes of canopy species, *Carya* (hickory) spp., *Quercus* (oak) spp., *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood), *Prunus serotina* (black cherry), and *Vaccinium* (blueberry) spp. The very sparse (10%) herbaceous layer is made up of *Andropogon gerardii* (big bluestem), *Antennaria plantaginifolia* (woman's tobacco), *Chimaphila maculata* (striped prince's pine), *Dichanthelium commutatum* (variable panicgrass), *Dichanthelium laxiflorum* (openflower rosette grass), *Hypericum hypericoides* (St. Andrew's cross), and *Polystichum acrostichoides* (Christmas fern). Vines (5%) include *Vitis rotundifolia* (muscadine).

Global Vegetation

Stands of this forest community are strongly dominated by *Liriodendron tulipifera* (tuliptree) and *Pinus taeda* (loblolly pine) which together contribute more than 75% canopy cover. Other canopy species include *Liquidambar styraciflua* (sweetgum) and *Acer rubrum* (red maple). The understory and ground layers are very sparse with much open ground present.

Loblolly Pine–Tuliptree Successional Forest

Attributes, descriptions, a photo, and a map are shown in Table D-20 and Figures D-34 and D-35.

Table D-20. Attributes and descriptions for Loblolly Pine–Tuliptree Successional Forest.

Attribute	Description
CEGL Code	7546
Community Name	Loblolly Pine–Tuliptree Successional Forest
Color	Red and purple
Tone	Light to dark
Texture	Rough
Pattern	Medium to dense
Height	Medium to tall
Shape	Patchy
Size	Common class; large individual patches with large variations.
Location	Mesic hardwood dominated forest found in old disturbed regions.
Association	7232, 4232, 4638
Comments	Difficult to interpret species diversity from summer CIR. Crown sizes can be quite larger (i.e. not early successional) than 6011.



Figure D-34. Example of Loblolly Pine–Tuliptree Successional Forest.

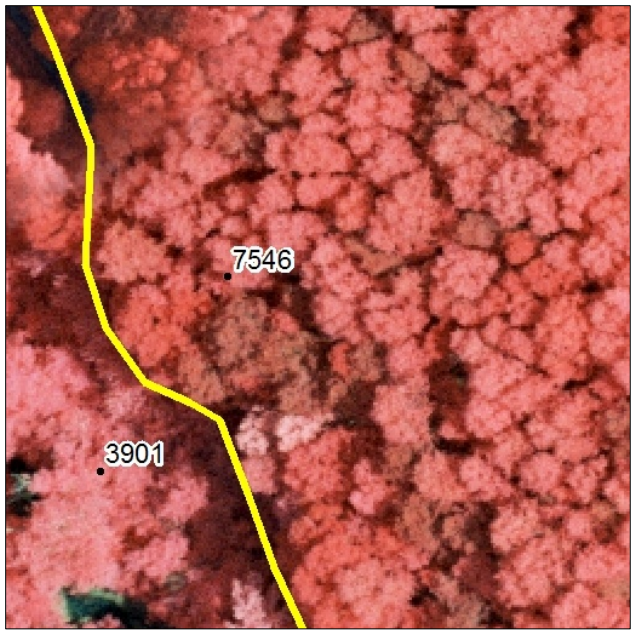


Figure D-35. Map showing Loblolly Pine–Tuliptree Successional Forest (7546).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderately dense (70% cover) tree canopy, 35–50 meters (114.8–164 ft) tall, is codominated by *Liriodendron tulipifera* (tuliptree) and *Pinus taeda* (loblolly pine) along with a lesser amount of *Quercus nigra* (water oak). The sparse (30%) subcanopy (15–20 meters [49.2–65.6 ft]) is dominated by *Liriodendron tulipifera* (tuliptree). The moderate (60%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) and moderate (60%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are codominated by *Acer negundo* (box-elder) and the invasive exotic *Ligustrum sinense* (Chinese privet). The sparse (20%) herbaceous layer includes tree and shrub seedlings and *Toxicodendron radicans* (eastern poison-ivy). Vines include *Vitis rotundifolia* (muscadine) and the exotic *Lonicera japonica* (Japanese honeysuckle).

Global Vegetation

This successional vegetation is dominated by *Pinus taeda* (loblolly pine) and *Liriodendron tulipifera* (tuliptree), but many other canopy species are usually present. *Lindera benzoin* (northern spicebush) is a typical shrub, and *Carex crinita* (fringed sedge) is a typical herb. More information is needed on the detailed floristics of this association. Other woody species that may be present include *Liquidambar styraciflua* (sweetgum), *Platanus occidentalis* (American sycamore), *Cornus florida* (flowering dogwood), *Acer rubrum* (red maple), *Nyssa biflora* (swamp tupelo), *Quercus alba* (white oak), *Fagus grandifolia* (American beech), *Morus rubra* (red mulberry), *Betula nigra* (river birch), *Fraxinus americana* (white ash), *Ilex opaca* (American holly), *Lindera benzoin* (northern spicebush), and *Asimina parviflora* (smallflower pawpaw). Woody species common in the Piedmont portion of the range include *Aesculus sylvatica* (painted buckeye) and *Acer negundo* (box-elder). Herbaceous and woody vine species that may occur include *Carex crinita* (fringed sedge), *Botrychium*

virginianum (rattlesnake fern), *Eupatorium purpureum* (sweetscented joepyeweed), *Polystichum acrostichoides* (Christmas fern), *Arundinaria gigantea* (giant cane), *Toxicodendron radicans ssp. radicans* (eastern poison-ivy), *Asplenium platyneuron* (ebony spleenwort), *Woodwardia areolata* (netted chainfern), *Osmunda cinnamomea* (cinnamon fern), *Ophioglossum vulgatum* (southern adderstongue), *Actaea racemosa* (black bugbane), *Dulichium arundinaceum* (threeway sedge), *Carex albolutescens* (greenwhite sedge), *Hypericum nudiflorum* (early St. Johnswort), *Corydalis flavula* (yellow fumewort), and others. The exotics *Ligustrum sinense* (Chinese privet) and *Lonicera japonica* (Japanese honeysuckle) commonly occur in forests of this alliance. The preceding information is from the related alliance description (Weakley et al. 1998), and these floristics were included in a 1995 CCA for the '*Pinus taeda - Liriodendron tulipifera / Lindera benzoin / Carex crinita* Successional Forest' (1C03B020.01F), on which this association is apparently based. It is not clear where these data originated. Some of the taxa mentioned (e.g., *Eupatorium purpureum* (sweetscented joepyeweed)) seem "suspicious" and out of place. Apparently related vegetation from the Savannah River Site cited in Jones et al. (1981) indicates dominance of some stands by *Pinus taeda* (loblolly pine), *Nyssa biflora* (swamp tupelo), and *Liriodendron tulipifera* (tuliptree) in the canopy, with *Persea palustris* (swamp bay), *Magnolia virginiana* (sweetbay), *Acer rubrum* (red maple), and *Nyssa biflora* (swamp tupelo) in the subcanopy. Other species present include *Vaccinium formosum* (southern blueberry), *Viburnum nudum* (possumhaw), *Arundinaria gigantea* (giant cane), *Toxicodendron radicans ssp. radicans* (eastern poison-ivy), *Mitchella repens* (partridgeberry), *Osmunda cinnamomea* (cinnamon fern), and *Onoclea sensibilis* (sensitive fern).

Piedmont Loblolly Pine Mixed Oak Floodplain Forest

Attributes, descriptions, a photo, and a map are shown in Table D-21 and Figures D-36 and D-37.

Table D-21. Attributes and descriptions for Piedmont Loblolly Pine Mixed Oak Floodplain Forest.

Attribute	Description
CEGL Code	7551
Community Name	Piedmont Loblolly Pine Mixed Oak Floodplain Forest
Color	Pink to purple
Tone	Light to medium
Texture	Medium to coarse
Pattern	Dense canopy
Height	Tall
Shape	Patchy
Size	Common class; medium sized with some variation.
Location	Pine dominated forest found in low topographic areas.

Table D-21 (continued). Attributes and descriptions for Piedmont Loblolly Pine Mixed Oak Floodplain Forest.

Attribute	Description
Association	7221,6011, 7730, 4232, 7244, 7232
Comments	Distinguished from 6011 by larger, sometimes variable, pine crown sizes. Distinguished from 4232 by lower topographic position and relative lack of slope. Differs from 7551 because pines are not planted in rows.



Figure D-36. Example of Piedmont Loblolly Pine Mixed Oak Floodplain Forest.

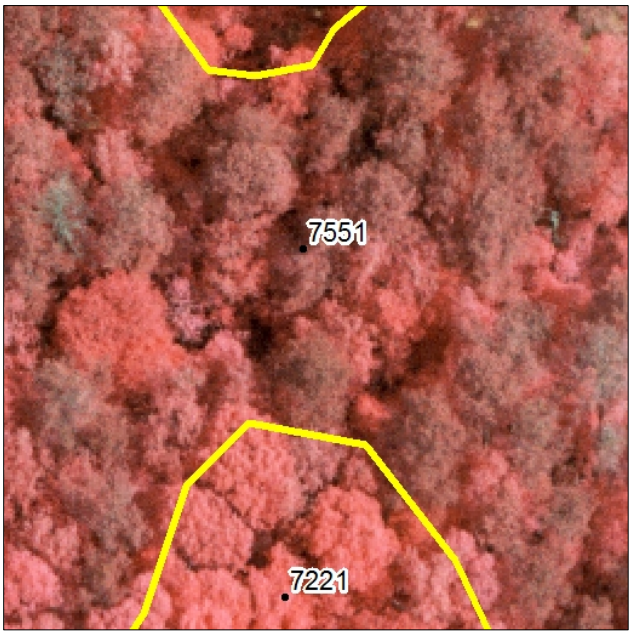


Figure D-37. Map showing Piedmont Loblolly Pine Mixed Oak Floodplain Forest (7551).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderately dense (70% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is dominated by exclusively by *Pinus taeda* (loblolly pine). The moderate (40%) subcanopy (10–15 meters [32.8–49.2 ft]) is dominated by *Liriodendron tulipifera* (tuliptree) along with nearly equal amounts of *Acer rubrum* (red maple), *Fraxinus americana* (white ash), *Liquidambar styraciflua* (sweetgum), *Nyssa sylvatica* (blackgum), *Quercus alba* (white oak), *Quercus nigra* (water oak), and *Sassafras albidum* (sassafras). The moderate (50%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) and moderate (40%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are codominated by *Carpinus caroliniana* (American hornbeam) and *Nyssa sylvatica* (blackgum). Additional shrubs include sapling canopy species and *Acer leucoderme* (chalk maple), *Carya alba* (mockernut hickory), *Halesia carolina* (Carolina silverbell), *Ostrya virginiana* (hophornbeam), *Vaccinium elliottii* (Elliott's blueberry), and *Viburnum* (viburnum) spp. Herbs in the very sparse (10%) herbaceous layer include *Aesculus sylvatica* (painted buckeye), *Chasmanthium latifolium* (Indian woodoats), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Galium tinctorium* (stiff marsh bedstraw), *Mitchella repens* (partridgeberry), *Passiflora lutea* (yellow passionflower), and *Polystichum acrostichoides* (Christmas fern). Vines are diverse and include *Bignonia capreolata* (crossvine), *Decumaria barbara* (woodvamp), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax* (greenbrier) spp., *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine).

Global Vegetation

Stands are dominated by *Pinus taeda* (loblolly pine) with *Quercus nigra* (water oak) and/or *Quercus phellos* (willow oak), with *Liquidambar styraciflua* (sweetgum) and/or *Liriodendron tulipifera* (tuliptree). *Quercus laurifolia* (laurel oak) is possible in some stands in the Upper East Gulf Coastal Plain. Some other trees that may be present include *Acer rubrum* (red maple), *Fraxinus americana* (white ash), *Nyssa sylvatica* (blackgum), *Quercus alba* (white oak), and *Sassafras albidum* (sassafras). Shrubs may include *Acer leucoderme* (chalk maple), *Aesculus sylvatica* (painted buckeye), *Carya alba* (mockernut hickory), *Halesia carolina* (Carolina silverbell), *Ostrya virginiana* (hophornbeam), *Vaccinium elliottii* (Elliott's blueberry), and *Viburnum* (viburnum) spp. Herbs may include *Chasmanthium latifolium* (Indian woodoats), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Galium tinctorium* (stiff marsh bedstraw), *Mitchella repens* (partridgeberry), *Passiflora lutea* (yellow passionflower), and *Polystichum acrostichoides* (Christmas fern). Vines may include *Bignonia capreolata* (crossvine), *Decumaria barbara* (woodvamp), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax* (greenbrier) spp., *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine) (NatureServe Ecology, unpubl. data).

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

Attributes, descriptions, a photo, and a map are shown in Table D-22 and Figures D-38 and D-39.

Table D-22. 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	Usually dense
Height	Medium to tall
Shape	Elongated
Size	One of the most common classes; small average size with some variation.
Location	Hardwood dominated forest found in lower topographic areas near water.
Association	7734, 7312
Comments	Typically lightest tones on the map, but can be confused with nearly all other groups due to the wide range of species that can be found in this class. Difficult to distingush from 7312 but usually more diverse.



Figure D-38. Example of American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest.

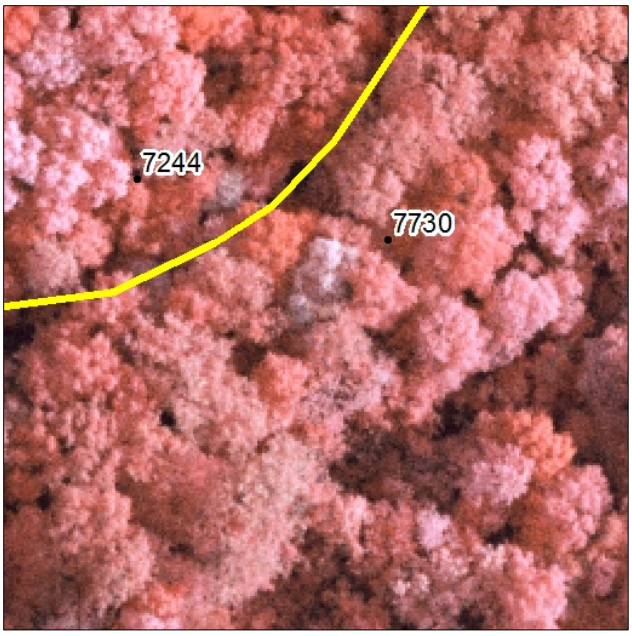


Figure D-39. Example of American Sycamore—Sugarberry—Green Ash/Northern Spicebush—Possumhaw/Reflexed Sedge Forest (7730).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderately dense (70% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is dominated by various combinations of *Celtis laevigata* (sugarberry), *Fraxinus pennsylvanica* (green ash), *Juglans nigra* (black walnut), *Liriodendron tulipifera* (tuliptree), and *Platanus occidentalis* (American sycamore); additional canopy species may include *Betula nigra* (river birch), *Carya cordiformis* (bitternut hickory), *Liquidambar styraciflua* (sweetgum), *Pinus taeda* (loblolly pine), *Quercus nigra* (water oak), and *Quercus rubra* (northern red oak). The sparse (30–40%) subcanopy (10–20 meters [32.8–65.6 ft]) may include canopy species as well as *Acer barbatum* (southern sugar maple), *Carpinus caroliniana* (American hornbeam), *Fagus grandifolia* (American beech), *Halesia tetraptera* (mountain silverbell), *Morus rubra* (red mulberry), *Ostrya virginiana* (hophornbeam), and *Ulmus rubra* (slippery elm). Dominants in the moderate (40–60%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) include *Acer barbatum* (southern sugar maple), *Carpinus caroliniana* (American hornbeam), *Lindera benzoin* (northern spicebush), *Morus rubra* (red mulberry), and the exotic *Ligustrum sinense* (Chinese privet). The sparse to dense (40–80%) short-shrub layer (1–2 meters [3.3–6.6 ft]) may include tall-shrub species along with *Asimina triloba* (pawpaw), *Staphylea trifolia* (American bladdernut), and *Toxicodendron radicans* (eastern poison-ivy). Herbs in the sparse (20–30%) herbaceous layer include *Ageratina altissima* (white snakeroot), *Bignonia capreolata* (crossvine), *Botrychium biternatum* (sparselobe grapefern), *Chasmanthium latifolium* (Indian woodoats), *Chasmanthium laxum* (slender woodoats), *Elephantopus carolinianus* (Carolina elephantsfoot), *Geum canadense* (white avens), *Laportea canadensis* (Canadian woodnettle), *Onoclea sensibilis* (sensitive fern), *Passiflora lutea* (yellow passionflower), *Polystichum*

acrostichoides (Christmas fern), and *Verbesina occidentalis* (yellow crownbeard). Vines include *Decumaria barbara* (woodvamp), *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 important in the well-developed subcanopy also. 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.

Xeric Ridgetop Chestnut Oak Forest

Attributes, descriptions, a photo, and a map are shown in Table D-23 and Figures D-40 and D-41.

Table D-23. Attributes and descriptions for Xeric Ridgetop Chestnut Oak Forest.

Attribute	Description
CEGL Code	8431
Community Name	Xeric Ridgetop Chestnut Oak Forest
Color	Pink to red
Tone	Light to medium
Texture	Medium
Pattern	Moderate to dense

Table D-23 (continued). Attributes and descriptions for Xeric Ridgetop Chestnut Oak Forest.

Attribute	Description
Height	Medium to tall
Shape	Circular, found on ridge tops
Size	Uncommon class with small average size.
Location	Xeric hardwood dominated forest found on ridge tops.
Association	7244, 4415
Comments	Difficult to distinguish from 4416 using amount of rhododendron or lack of mafic indicator species. Relying upon topographic position on ridge top and possible presence of pines.



Figure D-40. Example of Xeric Ridgetop Chestnut Oak Forest.

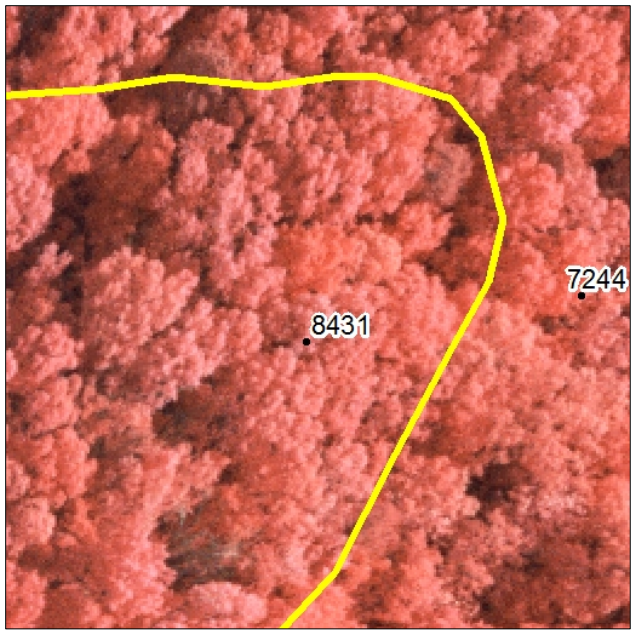


Figure D-41. Map showing Xeric Ridgetop Chestnut Oak Forest (8431).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderately dense (70–80% cover) tree canopy is variable in height, ranging from 15–50 meters (49.2–164 ft) tall. It is dominated by *Quercus prinus* (chestnut oak); additional species may include *Carya alba* (mockernut hickory), *Carya pallida* (sand hickory), *Pinus echinata* (shortleaf pine), *Pinus taeda* (loblolly pine), *Quercus falcata* (southern red oak), and *Quercus stellata* (post oak). The sparse to moderate (20–50%) subcanopy (10–20 meters [16.4–65.6 ft]) is also dominated by *Quercus prinus* (chestnut oak). The sparse (20–30%) tall-shrub layer (5–10 meters [16.4–32.8 ft]) and sparse (20–30%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are made up of saplings of tree species as well as *Acer rubrum* (red maple), *Amelanchier arborea* (common serviceberry), *Fagus grandifolia* (American beech), *Fraxinus americana* (white ash), *Nyssa sylvatica* (blackgum), *Rhododendron minus* (piedmont rhododendron), *Toxicodendron radicans* (eastern poison-ivy), *Vaccinium* (blueberry) spp., *Viburnum acerifolium* (mapleleaf viburnum), and others. The sparse (5–40%) herbaceous layer is dominated by tree and shrub seedlings along with small amounts of *Chimaphila maculata* (striped prince's pine), *Coreopsis major*, *Dichanthelium acuminatum*, *Dryopteris intermedia* (intermediate woodfern), *Polystichum acrostichoides* (Christmas fern), and *Solidago arguta* (Atlantic goldenrod). Vines, particularly *Vitis rotundifolia* (muscadine), may cover much of the ground surface and climb into the upper layers.

Global Vegetation

This is a closed-canopy, deciduous forest with open to sparse shrub layers and a sparse to absent herb layer. The canopy is dominated by *Quercus prinus* (chestnut oak) sometimes sharing dominance with *Quercus coccinea* (scarlet oak) (and in some Piedmont examples, with *Quercus coccinea* (scarlet

oak) as the dominant canopy tree). Other oaks in the canopy can include *Quercus velutina* (black oak), *Quercus stellata* (post oak), and *Quercus alba* (white oak), although these oaks are not dominant. Hickories (e.g., *Carya glabra* (pignut hickory), *Carya pallida* (sand hickory)) may be present in the canopy and/or subcanopy. Some examples may have coverage of pine in the canopy, most commonly *Pinus virginiana* (Virginia pine) and *Pinus echinata* (shortleaf pine). The most common subcanopy trees are *Acer rubrum* (red maple), *Carya pallida* (sand hickory), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), and *Oxydendrum arboreum* (sourwood). Other minor species in the canopy and subcanopy can include *Carya glabra* (pignut hickory), *Castanea dentata* (American chestnut), and *Magnolia macrophylla* (bigleaf magnolia). The most constant shrub species are *Chimaphila maculata* (striped prince's pine), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Diospyros virginiana* (common persimmon), and *Sassafras albidum* (sassafras). Other shrubs that can occur in examples of this community are *Lyonia ligustrina* (maleberry), *Castanea pumila* (chinkapin), *Viburnum acerifolium* (mapleleaf viburnum), *Rhododendron alabamense* (Alabama azalea), and *Rhododendron canescens* (mountain azalea). Herb coverage is sparse, with little constancy among examples. Some of the more typical herb species are *Euphorbia corollata* (flowering spurge), *Hieracium venosum* (rattlesnakeweed), *Carex nigromarginata* (black edge sedge), and *Solidago odora* (anisescented goldenrod), but many other species may occur. In the lower Piedmont of Georgia, some additional herbs may include *Schizachyrium scoparium* (little bluestem), *Dichanthelium boscii* (Bosc's panicgrass), *Piptochaetium avenaceum* (blackseed speargrass), *Tephrosia virginiana* (Virginia tephrosia), *Verbesina virginica* (white crownbeard), *Hypoxis hirsuta* (common goldstar), *Tragia urticifolia* (nettleleaf noseburn), *Brickellia eupatorioides* (false boneset), *Scutellaria elliptica* (hairy skullcap), *Arnoglossum atriplicifolium* (pale Indian plaintain), *Pityopsis aspera* (pineland silkgrass), and *Coreopsis major* (greater tickseed).

Piedmont Acidic Mesic Mixed Hardwood Forest

Attributes, descriptions, a photo, and a map are shown in Table D-24 and Figures D-42 and D-43.

Table D-24. Attributes and descriptions for Piedmont Acidic Mesic Mixed Hardwood Forest.

Attribute	Description
CEGL Code	8465
Community Name	Piedmont Acidic Mesic Mixed Hardwood Forest
Color	Pink to red
Tone	Light
Texture	Fine to medium
Pattern	Dense
Height	Tall
Shape	Patchy following topography

Table D-24. (continued) Attributes and descriptions for Piedmont Acidic Mesic Mixed Hardwood Forest.

Attribute	Description
Size	Uncommon class with some large individual regions.
Location	Mesic hardwood dominated forest found in sheltered, north facing slopes near streams.
Association	7551, 7244
Comments	Difficult to distinguish from 7232 and 7244, but usually found on northern facing slopes.



Figure D-42. Example of Piedmont Acidic Mesic Mixed Hardwood Forest.

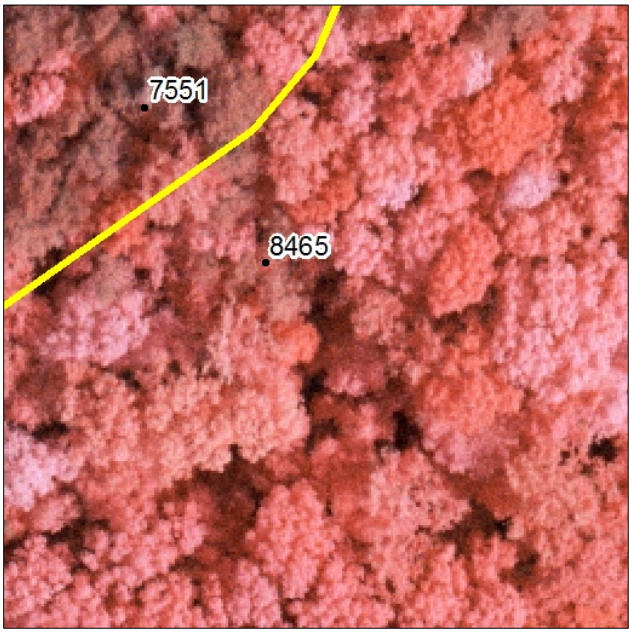


Figure D-43. Map showing Piedmont Acidic Mesic Mixed Hardwood Forest (8465).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderate to dense (50–80% cover) tree canopy, 20–50 meters (65.6–164 ft) tall, is codominated by *Fagus grandifolia* (American beech), *Liriodendron tulipifera* (tuliptree), and *Quercus alba* (white oak). *Fagus grandifolia* (American beech) and *Oxydendrum arboreum* (sourwood) often dominate the sparse (10–40%) subcanopy (10–20 meters [32.8–65.6 ft]). Common and/or dominant species in the very sparse to moderate (5–60%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) include *Acer leucoderme* (chalk maple), *Carpinus caroliniana* (American hornbeam), *Fagus grandifolia* (American beech), *Liriodendron tulipifera* (tuliptree), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood), and *Rhododendron canescens* (mountain azalea). The very sparse to sparse (5–40%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is made up of tall-shrub species as well as *Aesculus sylvatica* (painted buckeye), *Amelanchier arborea* (common serviceberry), *Asimina parviflora* (smallflower pawpaw), *Calycanthus floridus* (eastern sweetshrub), *Cornus florida* (flowering dogwood), *Lindera benzoin* (northern spicebush), *Toxicodendron radicans* (eastern poison-ivy), *Vaccinium stamineum* (deerberry), *Viburnum acerifolium* (mapleleaf viburnum), and others. The herbaceous layer may have sparse to moderate cover (20–60%); common and/or dominant species include *Actaea racemosa* (black bugbane), *Chimaphila maculata* (striped prince's pine), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Dichanthelium commutatum* (variable panicgrass), *Dioscorea quaternata* (fourleaf yam), *Eurybia divaricata* (white wood aster), *Hexastylis arifolia* (littlebrownjug), *Parthenocissus quinquefolia* (Virginia creeper), *Polygonatum biflorum* (smooth Solomon's seal), *Polystichum acrostichoides* (Christmas fern), *Tipularia discolor* (crippled cranefly), *Xanthorhiza simplicissima* (yellowroot), and many others. Vines (5-10%) include *Decumaria barbara* (woodvamp), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison-ivy), and *Vitis rotundifolia* (muscadine) and may be found trailing along the ground and/or climbing into upper layers. Several exotic species have invaded this community. However, it also supports state-vulnerable species, including *Agrimonia microcarpa* (smallfruit agrimony), *Castanea dentata* (American chestnut), *Collinsonia tuberosa* (deepwoods horsebalm), and *Dirca palustris* (eastern leatherwood).

Global Vegetation

The canopy of stands of this association is dominated by mesophytic trees such as *Fagus grandifolia* (American beech), *Quercus rubra* (northern red oak), *Liriodendron tulipifera* (tuliptree), *Acer rubrum* (red maple), and in the western Piedmont, *Tsuga canadensis* (eastern hemlock). Typical understory trees include *Cornus florida* (flowering dogwood), *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), and *Ilex opaca* (American holly). Shrub species may include *Vaccinium stamineum* (deerberry), *Viburnum rafinesquianum* (downy arrow-wood), *Euonymus americanus* (strawberry bush), and sometimes *Kalmia latifolia* (mountain laurel). The herb layer is often moderately dense and diverse, though it may be sparse under heavy shade. Herb species may include *Polystichum acrostichoides* (Christmas fern), *Viola* (violet) spp., *Dichanthelium* (rosette grass) spp., *Galium circaezans* (licorice bedstraw), *Hexastylis arifolia* (littlebrownjug), *Hexastylis minor* (little

heartleaf), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Erythronium umbilicatum ssp. umbilicatum* (dimpled troutlily), *Chamaelirium luteum* (fairywand), *Epifagus virginiana* (beechdrops), *Tiarella cordifolia* var. *collina* (heartleaf foamflower), *Heuchera americana* (American alumroot), *Stellaria pubera* (star chickweed), *Podophyllum peltatum* (mayapple), *Prenanthes serpentaria* (cankerweed), *Thalictrum thalictroides* (rue-anemone), *Chrysogonum virginianum* var. *virginianum* (green and gold), *Hepatica nobilis* var. *obtusa* (roundlobe hepatica), *Thelypteris noveboracensis* (New York fern), and *Botrychium virginianum* (rattlesnake fern) (Schafale and Weakley 1990). Exact composition varies locally with position on slope and nature of soil. Western Piedmont sites often have increasing importance of *Tsuga canadensis* (eastern hemlock), *Rhododendron* (rhododendron) spp., and other species that are more typical of the Southern Blue Ridge.

Southeastern Alder Swamp

Attributes, descriptions, a photo, and a map are shown in Table D-25 and Figures D-44 and D-45.

Table D-25. Attributes and descriptions for Southeastern Alder Swamp.

Attribute	Description
CEGL Code	8474
Community Name	Southeastern Alder Swamp
Color	Pink
Tone	Light
Texture	Medium to coarse
Pattern	Scattered to dense
Height	Very short
Shape	Elongated
Size	Very rare and very small.
Location	Hydric shrubland found in low, wet areas.
Association	4112, 2191
Comments	Used for shrub cover in wetland areas only. Difficult to distinguish species composition from summer CIR. Distinguished from 2191 because of sparser vegetation.



Figure D-44. Example of Southeastern Alder Swamp.

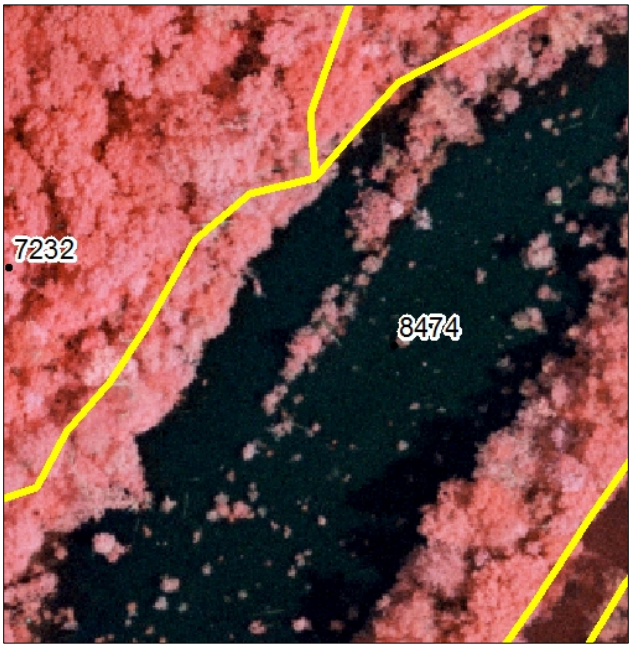


Figure D-45. Map showing Southeastern Alder Swamp (8474).

Summary

Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park Vegetation

The moderate (50% cover) tall-shrub layer (2–5 meters [6.6–16.4 ft]) and moderate (40%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are codominated by *Alnus serrulata* (hazel alder) and *Cephalanthus occidentalis* (common buttonbush). In addition, there is a very sparse (5%) emergent tree layer (5–10 meters [16.4–32.8 ft]) of *Nyssa biflora* (swamp tupelo). The very sparse (5%) herbaceous layer is comprised of *Juncus effusus* (common rush), *Triadenum walteri* (greater marsh St. Johnswort), and *Hypericum mutilum* (dwarf St. Johnswort).

Global Vegetation

Stands of this vegetation are dominated by tall shrubs and are characterized by some combination of *Alnus serrulata* (hazel alder), *Viburnum* (viburnum) spp., *Cornus* (dogwood) spp., and *Salix* (willow) spp. In addition, saplings of *Acer rubrum* (red maple) are typical. Other shrubs present may include *Cephalanthus occidentalis* (common buttonbush), *Decodon verticillatus* (swamp-loosestrife), and *Ilex verticillata* (common winterberry). Herbaceous associates include *Osmunda regalis* (royal fern), *Thelypteris palustris* (eastern marsh fern), *Boehmeria cylindrica* (small-spike false nettle), *Polygonum sagittatum* (arrowleaf tearthumb), *Commelina virginica* (Virginia dayflower), *Galium* (bedstraw) spp., *Lycopus* (waterhorehound) spp., *Typha latifolia* (broadleaf cattail), *Peltandra virginica* (green arrow-arum), *Mikania scandens* (climbing hempvine), and *Carex* (sedge) spp. (e.g., *Carex crinita* (fringed sedge), *Carex atlantica* (prickly bog sedge)). Tree species such as *Acer rubrum* (red maple) and *Juglans nigra* (black walnut) may exist on the fringes of such an association, occasionally overshadowing parts of it. The exotic *Murdannia keisak* (wartremoving herb) may also be present.

Literature Cited

Literature Citations from the Vegetation Description of each CEGL Code provided by NatureServe.

Andreu, M. G., and M. L. Tukman. 1995. Forest communities of the Tellico Lake Area, East Tennessee. Duke University, School of Environment, Durham, NC.

Jones, S. M., D. H. Van Lear, and S. K. Cox. 1981. Major forest community types of the Savannah River Plant: A field guide. US Department of Energy Savannah River Plant. SRO-NERP-9. 79 pages plus 24 illustrations.

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Associations and Alliances of Chattahoochee River National Recreation Area and Kennesaw Mountain National Battlefield Park. NatureServe, Arlington, VA.

Schafale, M. 2001. Ecologist. North Carolina Department of Environment, Health, and Natural Resources, Division of Parks and Recreation, Natural Heritage Program. Raleigh, NC.

Schafale, M. P., and A. S. Weakley. 1990. Classification of tte natural communities of North Carolina. Third approximation. North Carolina Department of Environment, Health, and Natural Resources, Division of Parks and Recreation, Natural Heritage Program, Raleigh, NC.

Schotz, A. Community Ecologist. Alabama Natural Heritage Program. Huntingond College, Massey Hall, 1500 East Fairview Avenue, Montgomery, AL 36106-2148.

Weakley, A. S., S. Patterson, S. Landaal, M. Pyne, and compilers. 1998. International classification of ecological communities: Terrestrial vegetation of hte the Southeastern United States. Working draft of March 1998. The Nature Conservancy, Southeast Regional Office, Southern Conservation Science Department, Community Ecology Group, Chapel Hill, NC.

Wharton, C. H. 1978. The natural environments of Georgia. Georgia Department of Natural Resources, Atlanta, GA.

Appendix E. Field Data Point Locations

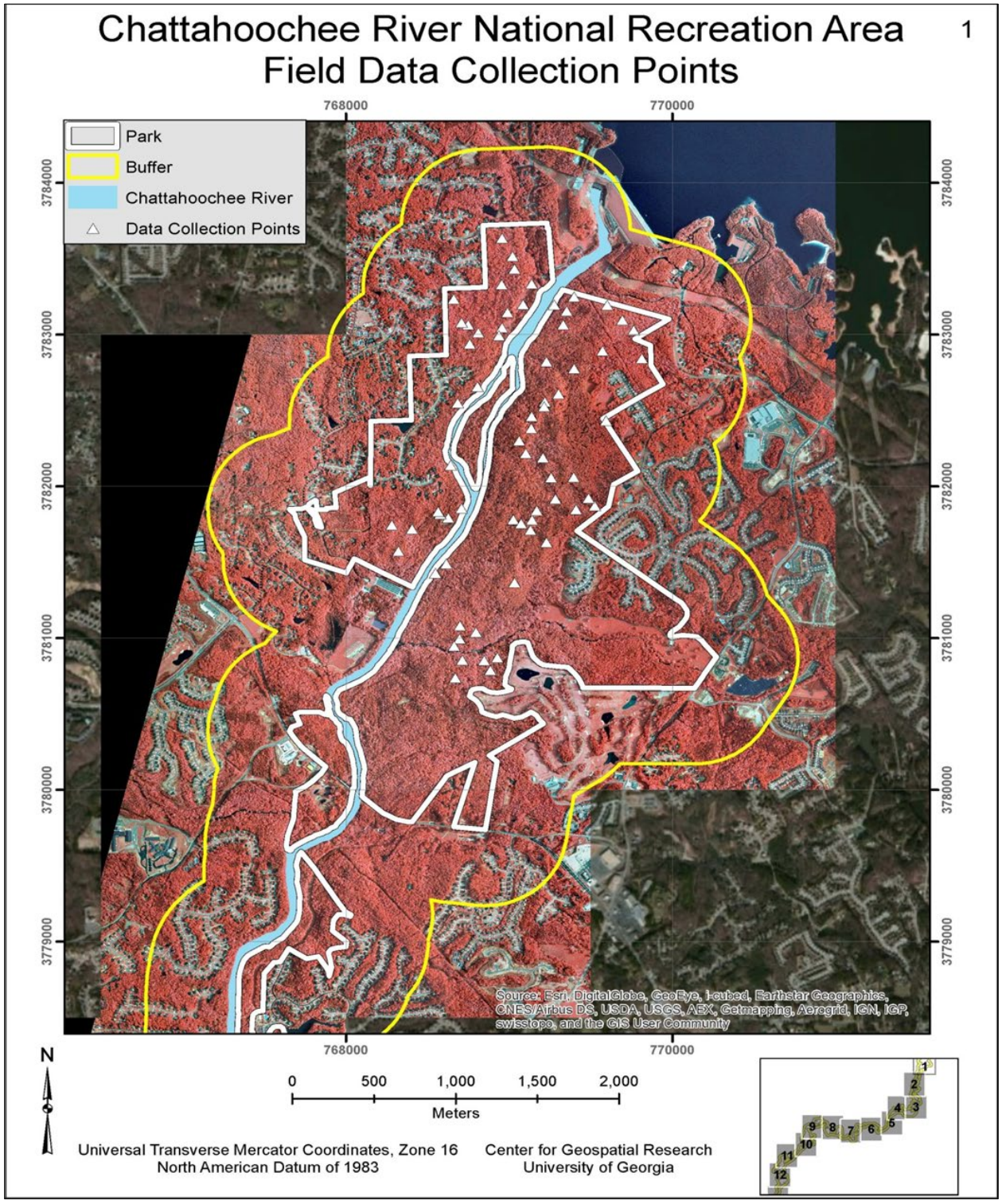


Figure E-1. Location of field data collection points within Section 1 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

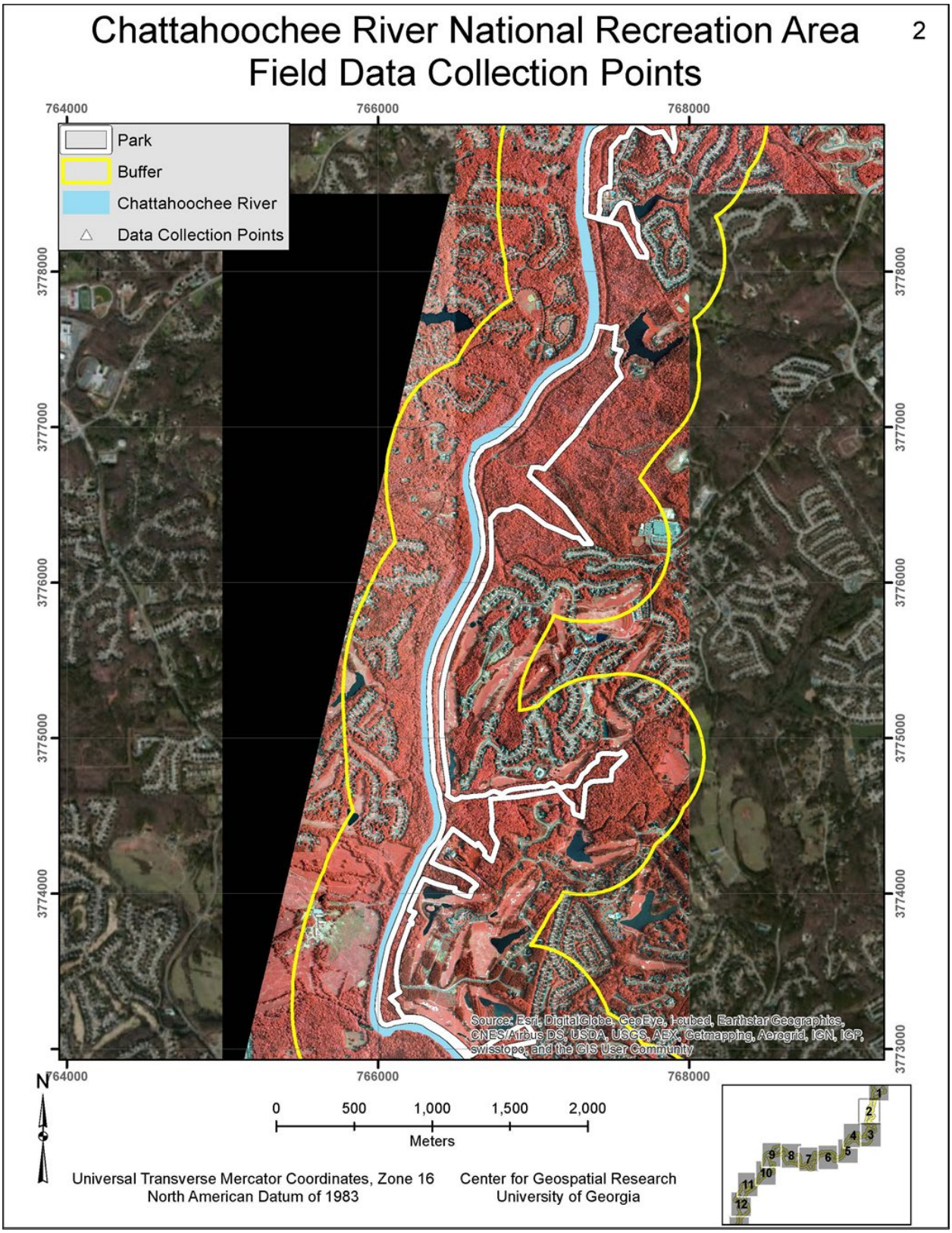


Figure E-2. Location of field data collection points within Section 2 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

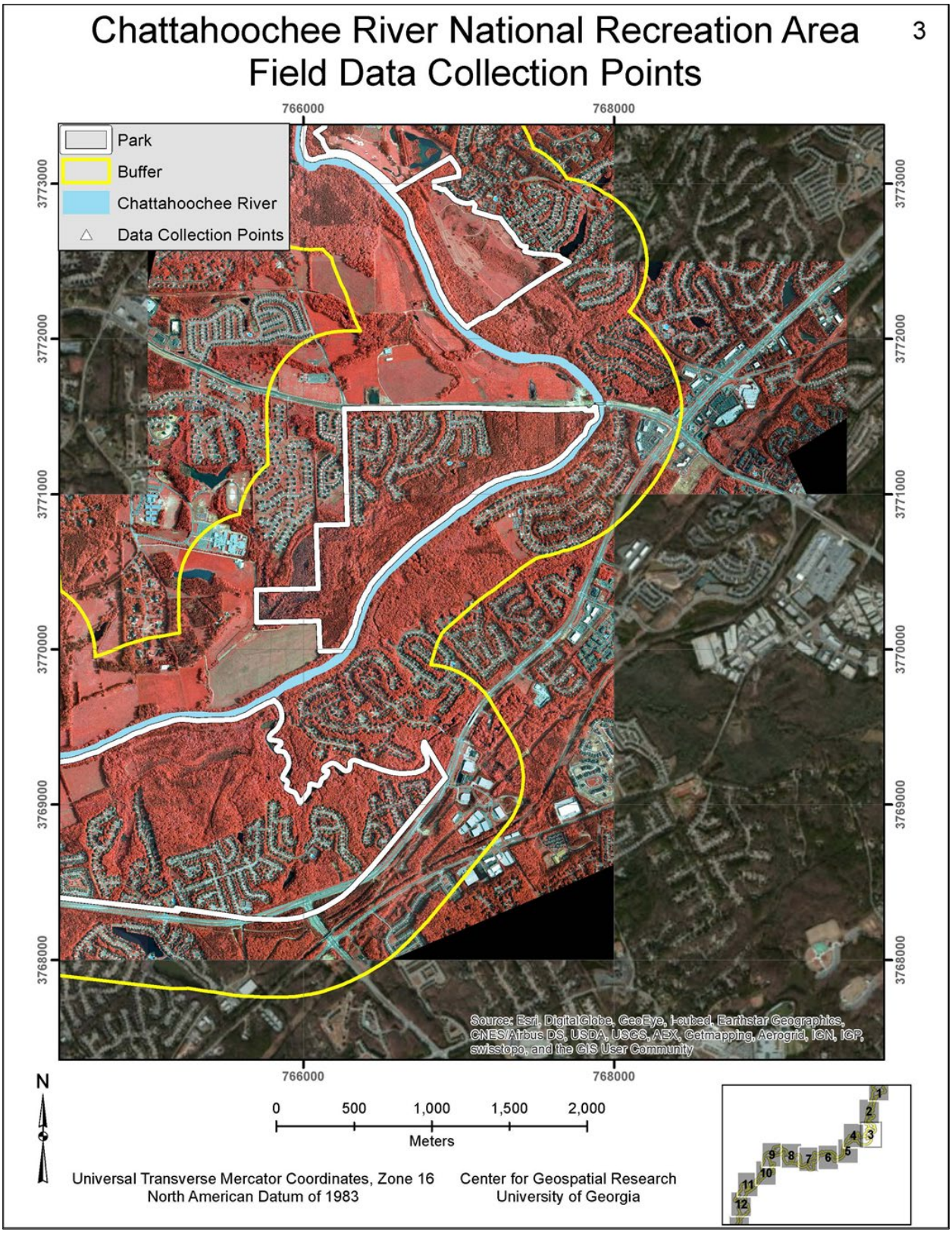


Figure E-3. Location of field data collection points within Section 3 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

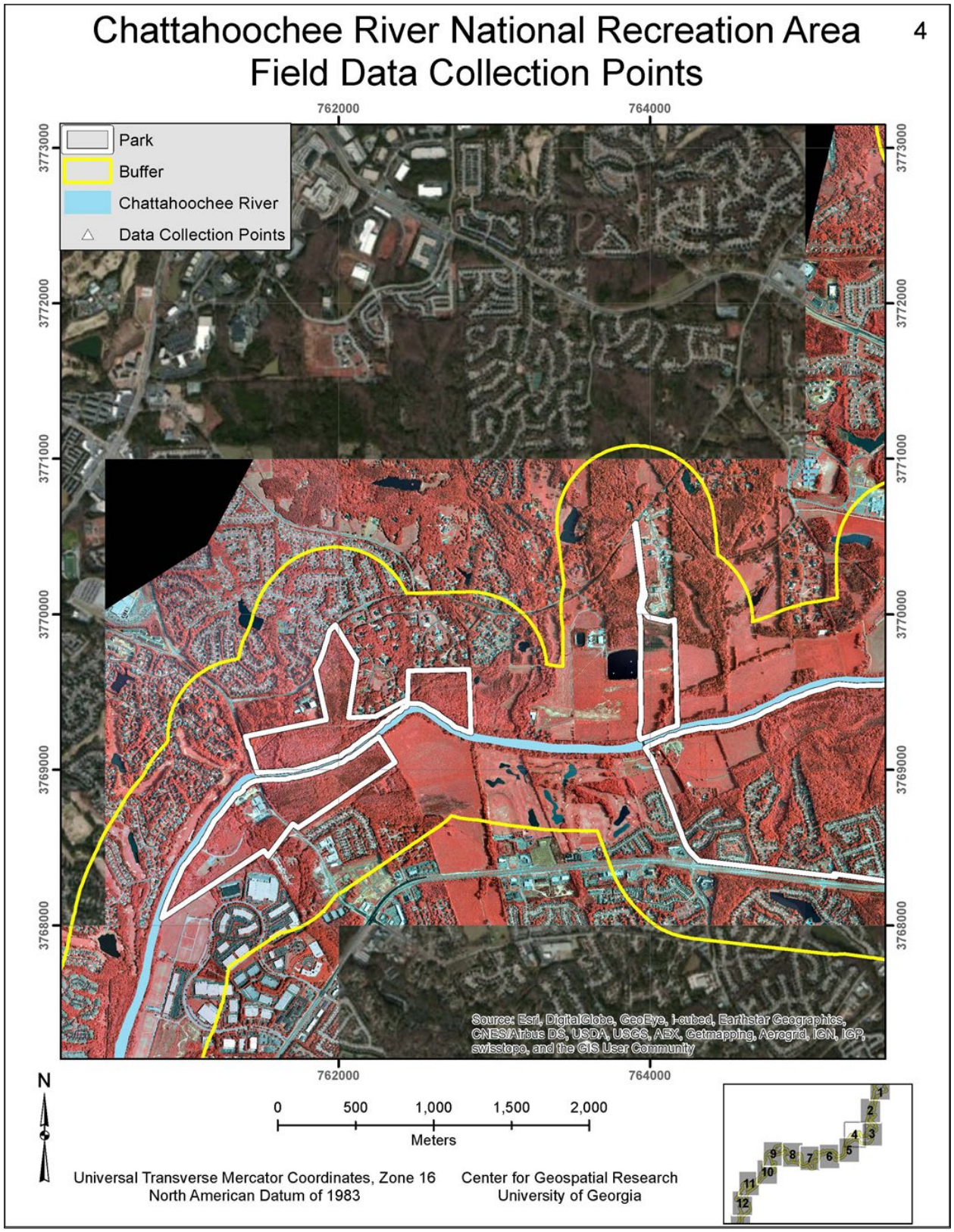


Figure E-4. Location of field data collection points within Section 4 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

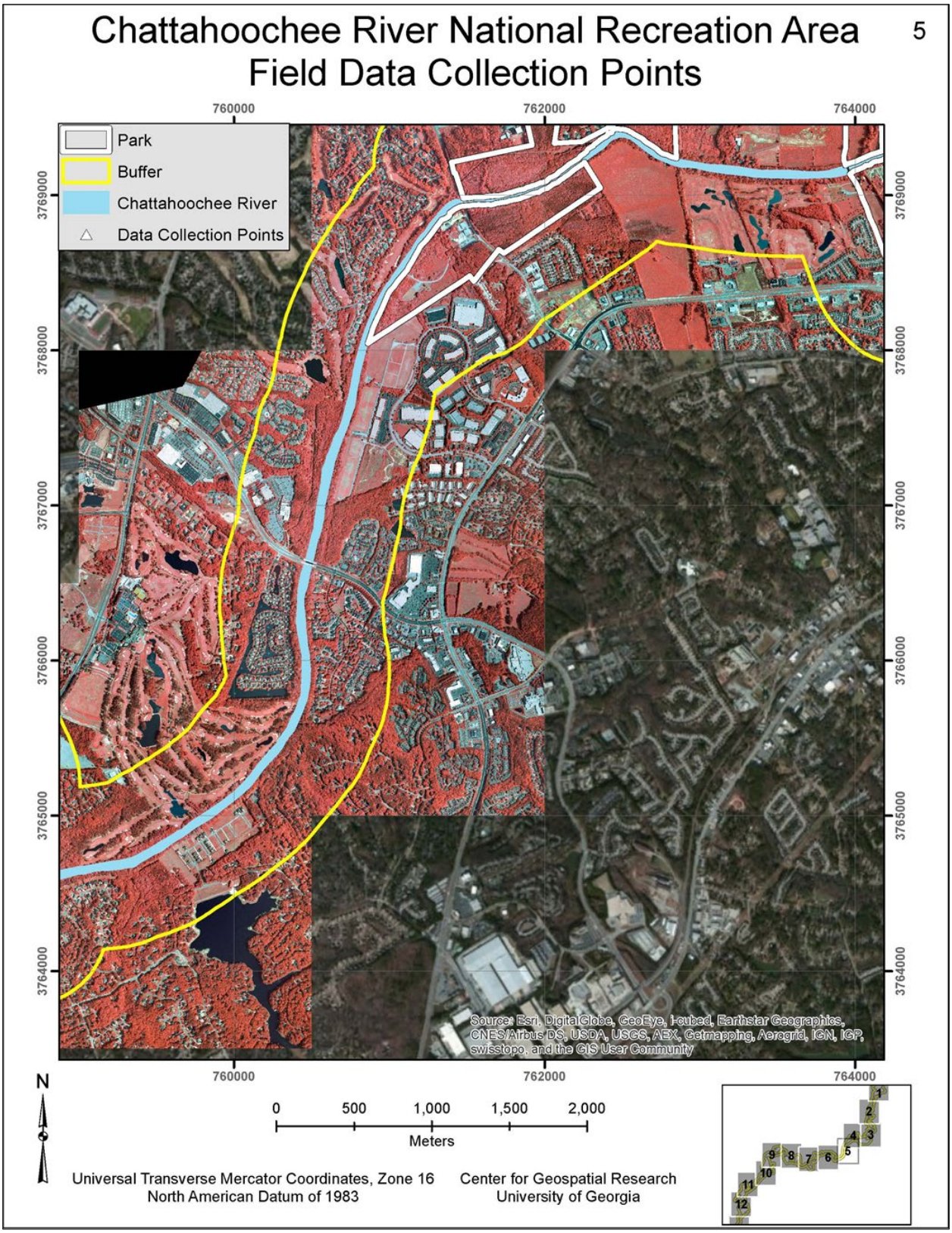


Figure E-5. Location of field data collection points within Section 5 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

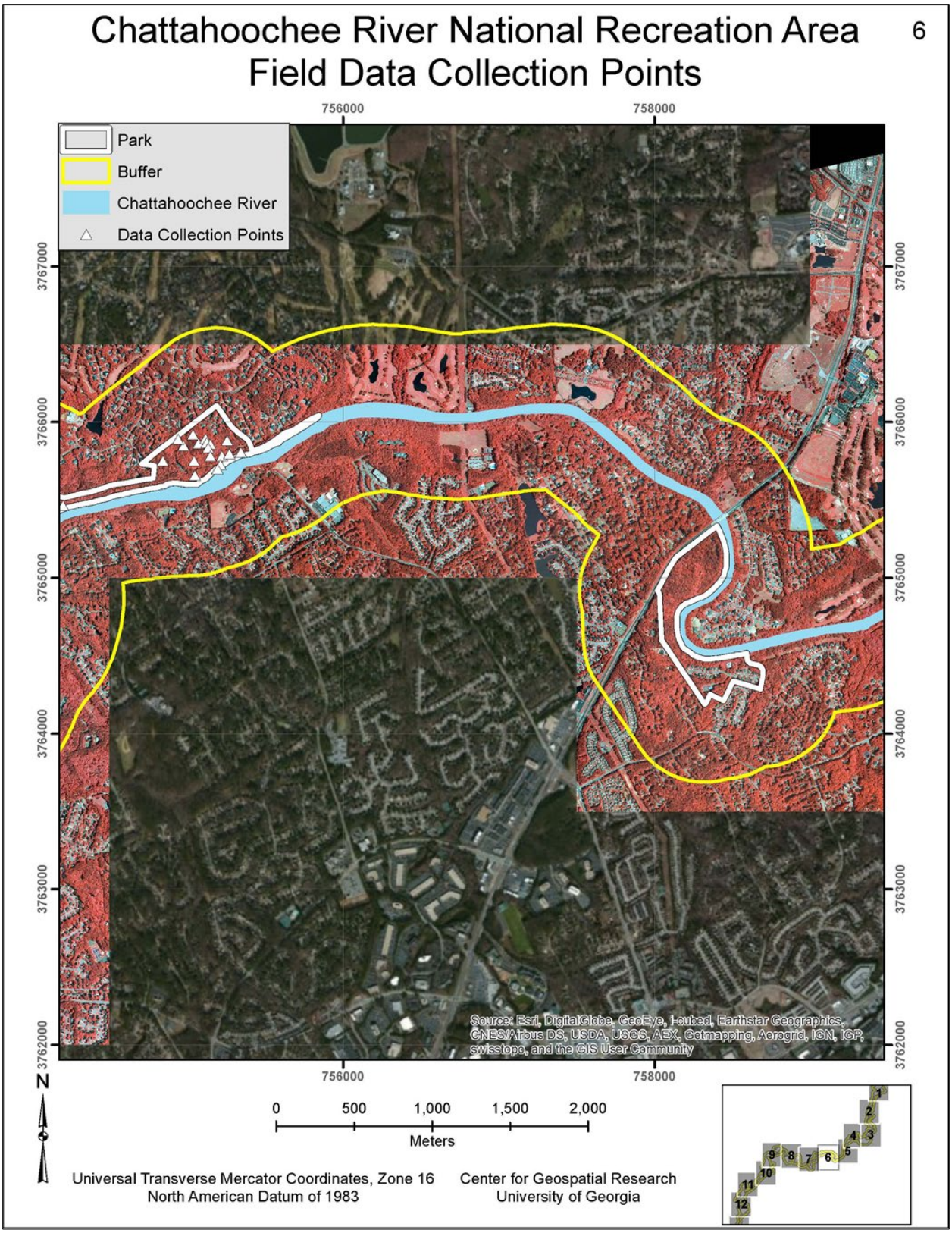


Figure E-6. Location of field data collection points within Section 6 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

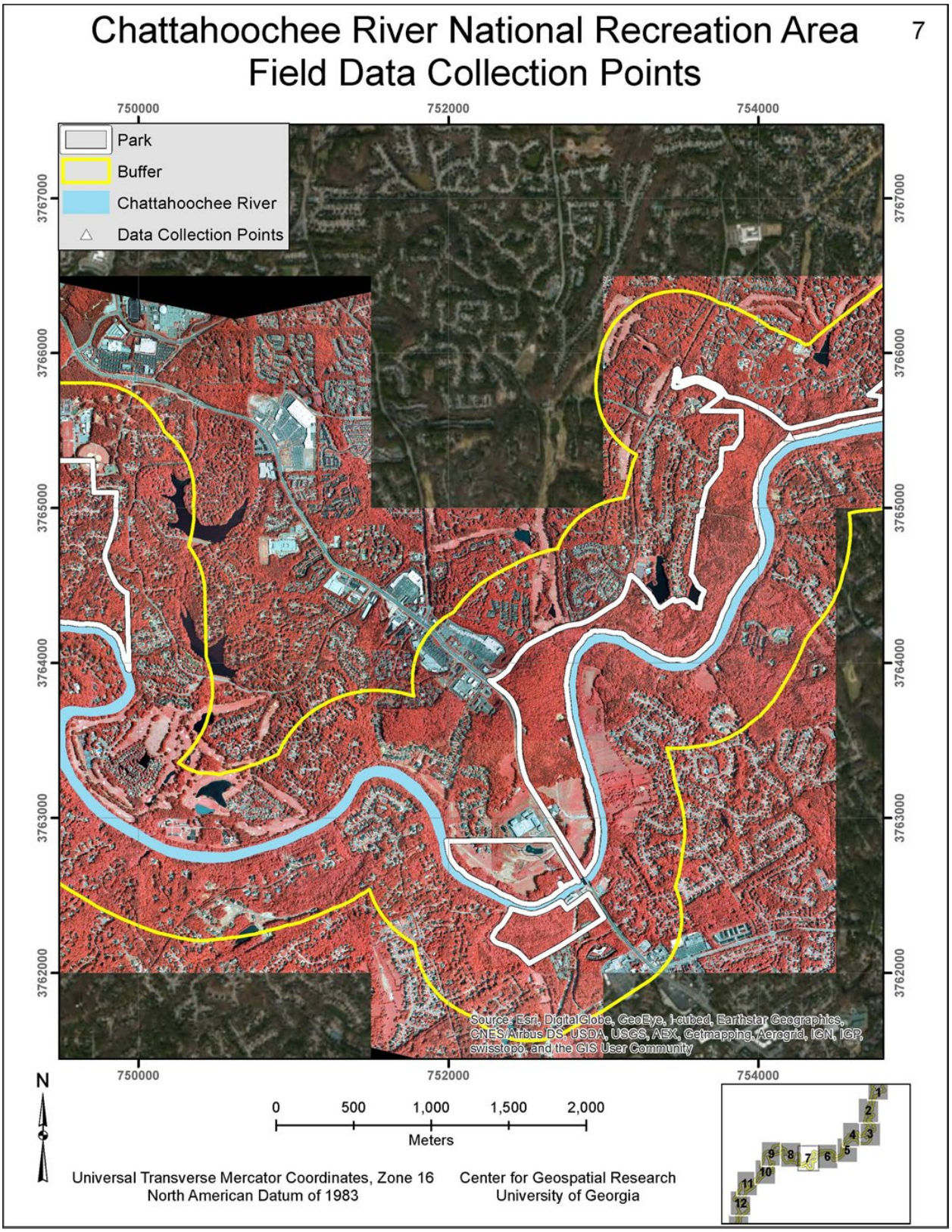


Figure E-7. Location of field data collection points within Section 7 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

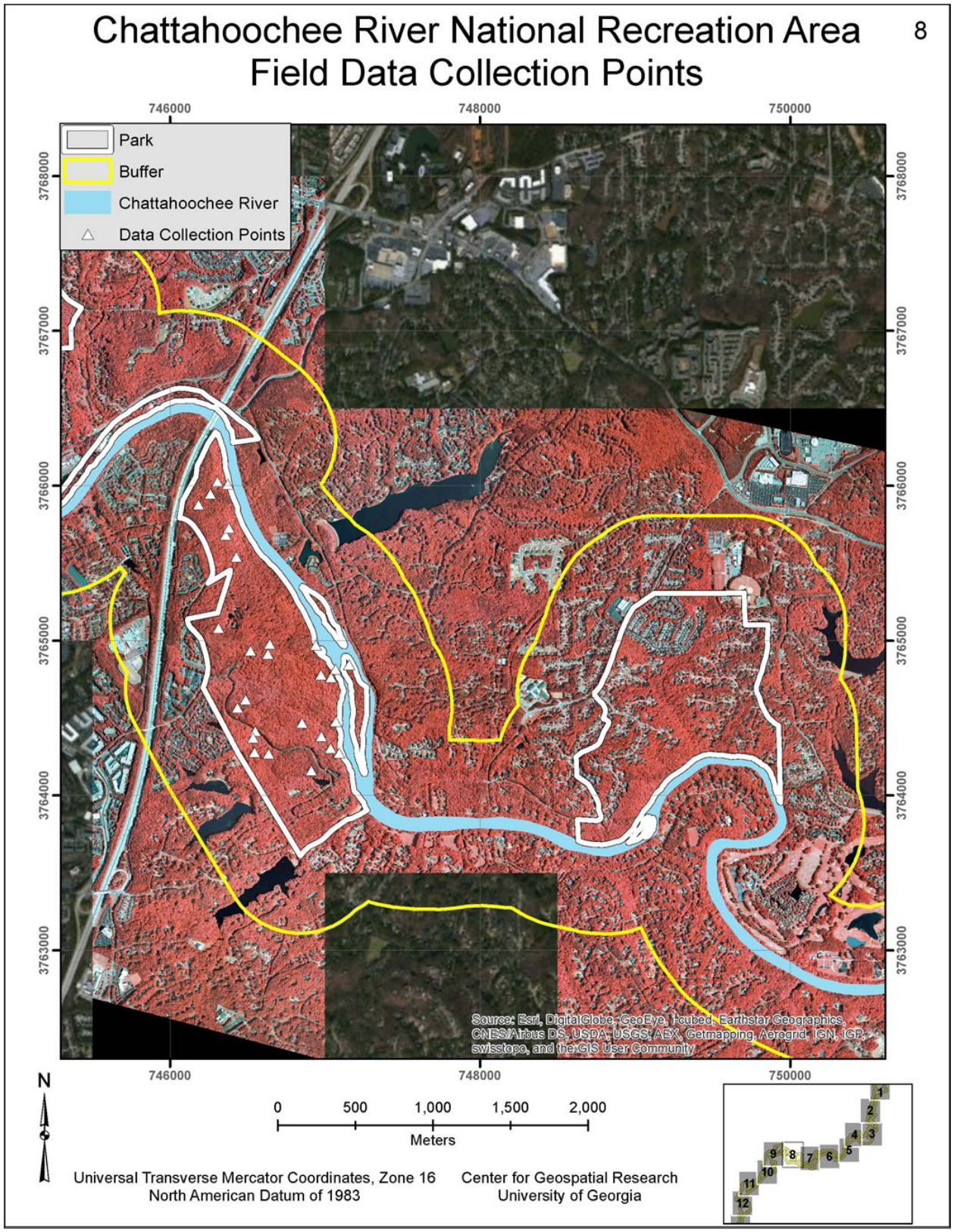


Figure E-8. Location of field data collection points within Section 8 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

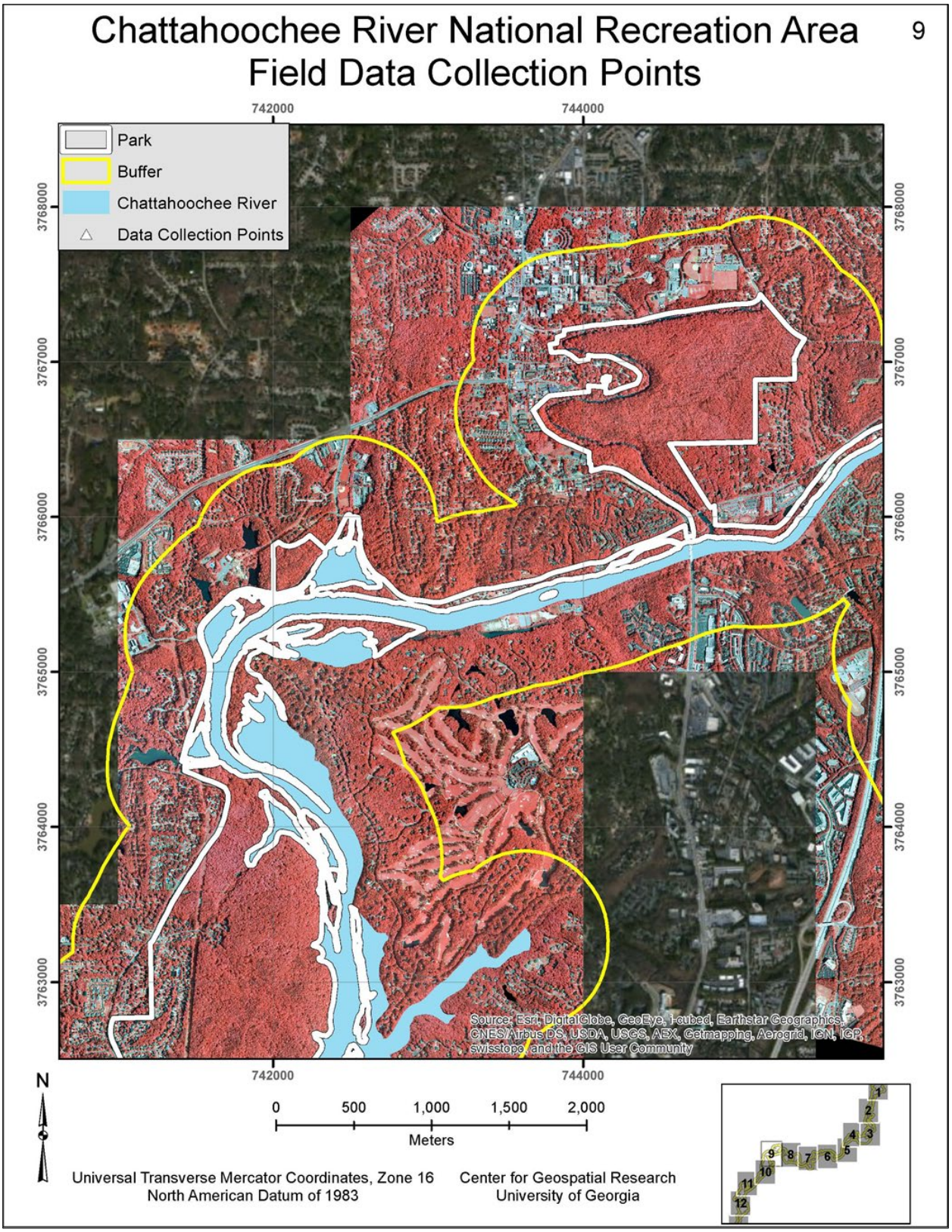


Figure E-9. Location of field data collection points within Section 9 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

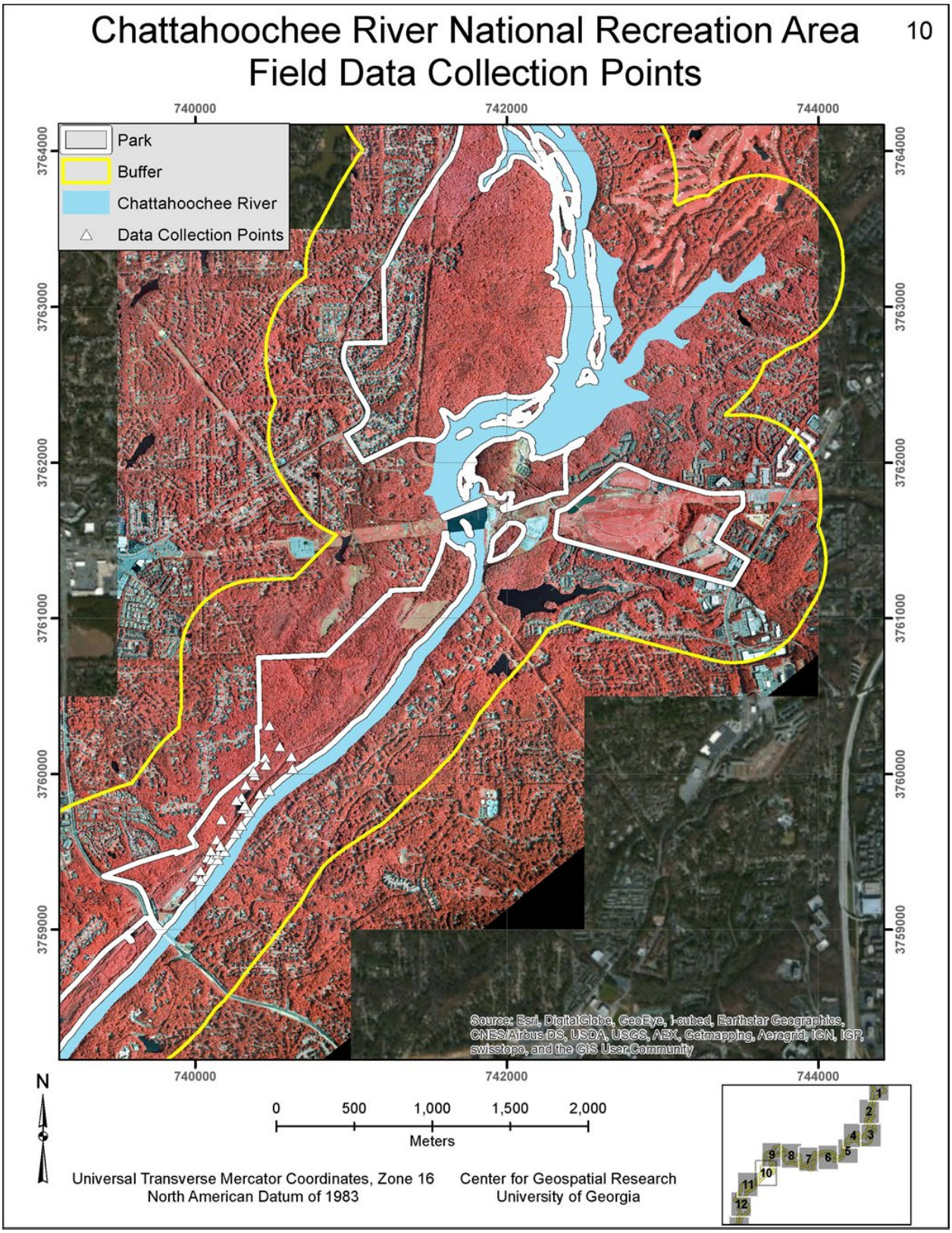


Figure E-10. Location of field data collection points within Section 10 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

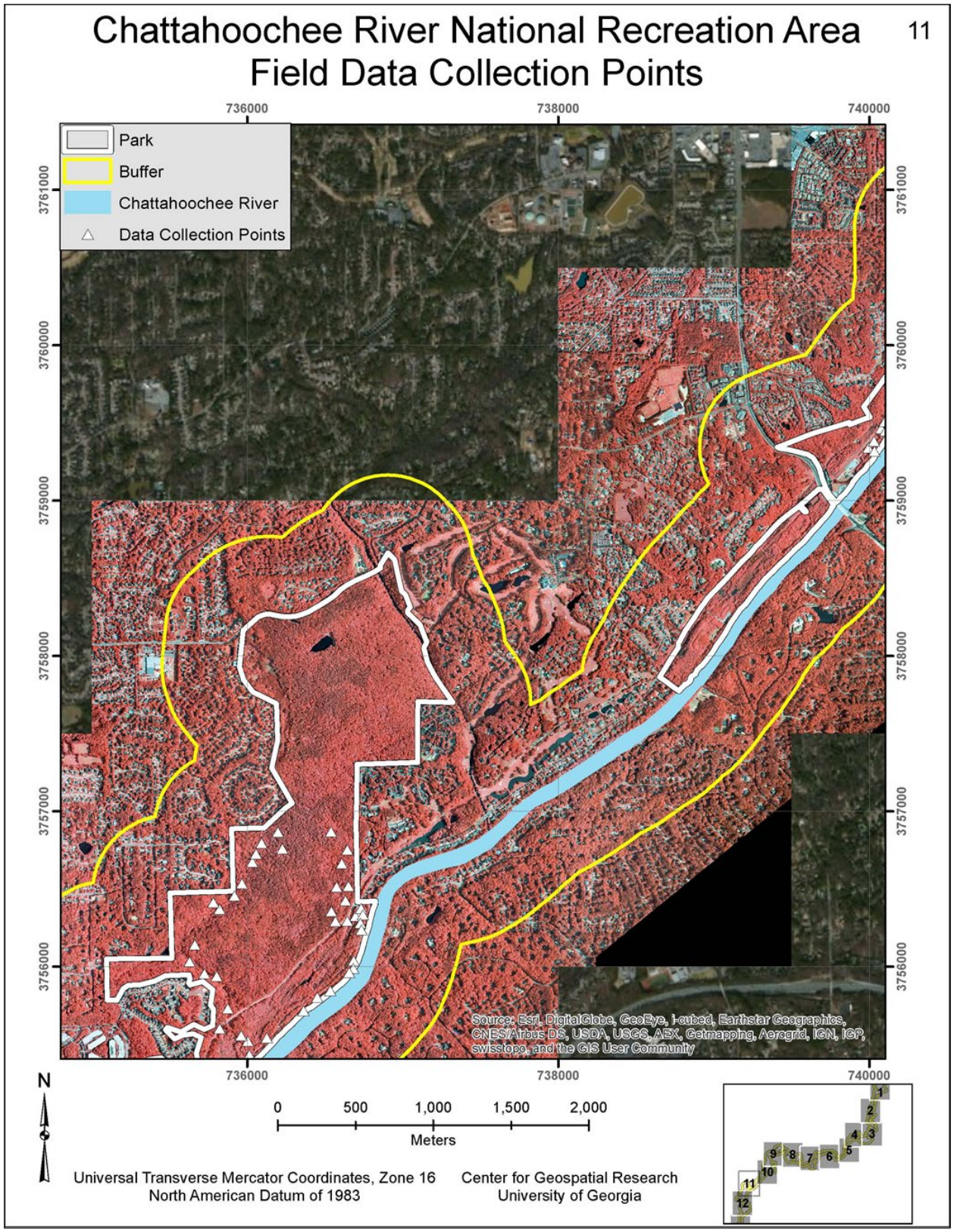


Figure E-11. Location of field data collection points within Section 11 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

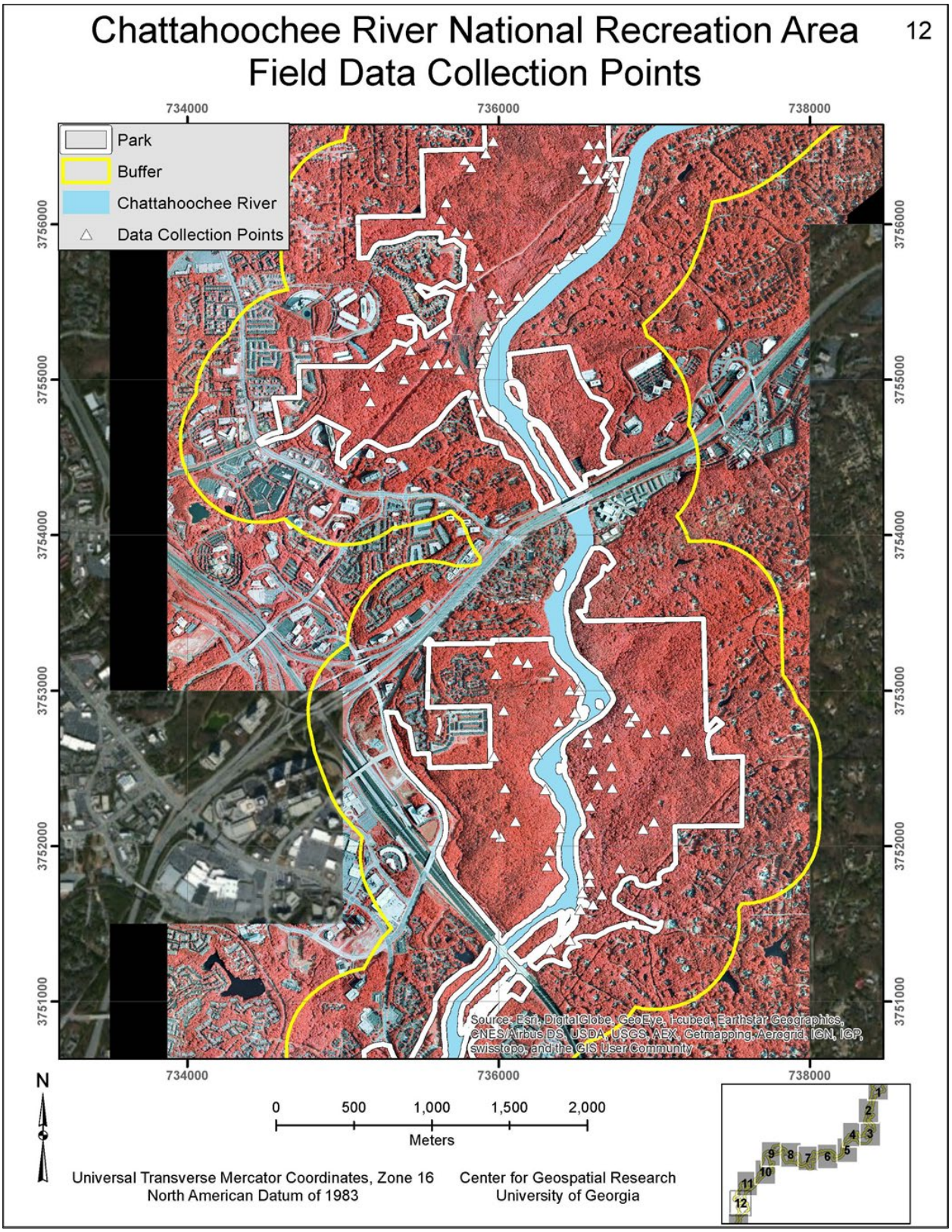


Figure E-12. Location of field data collection points within Section 12 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

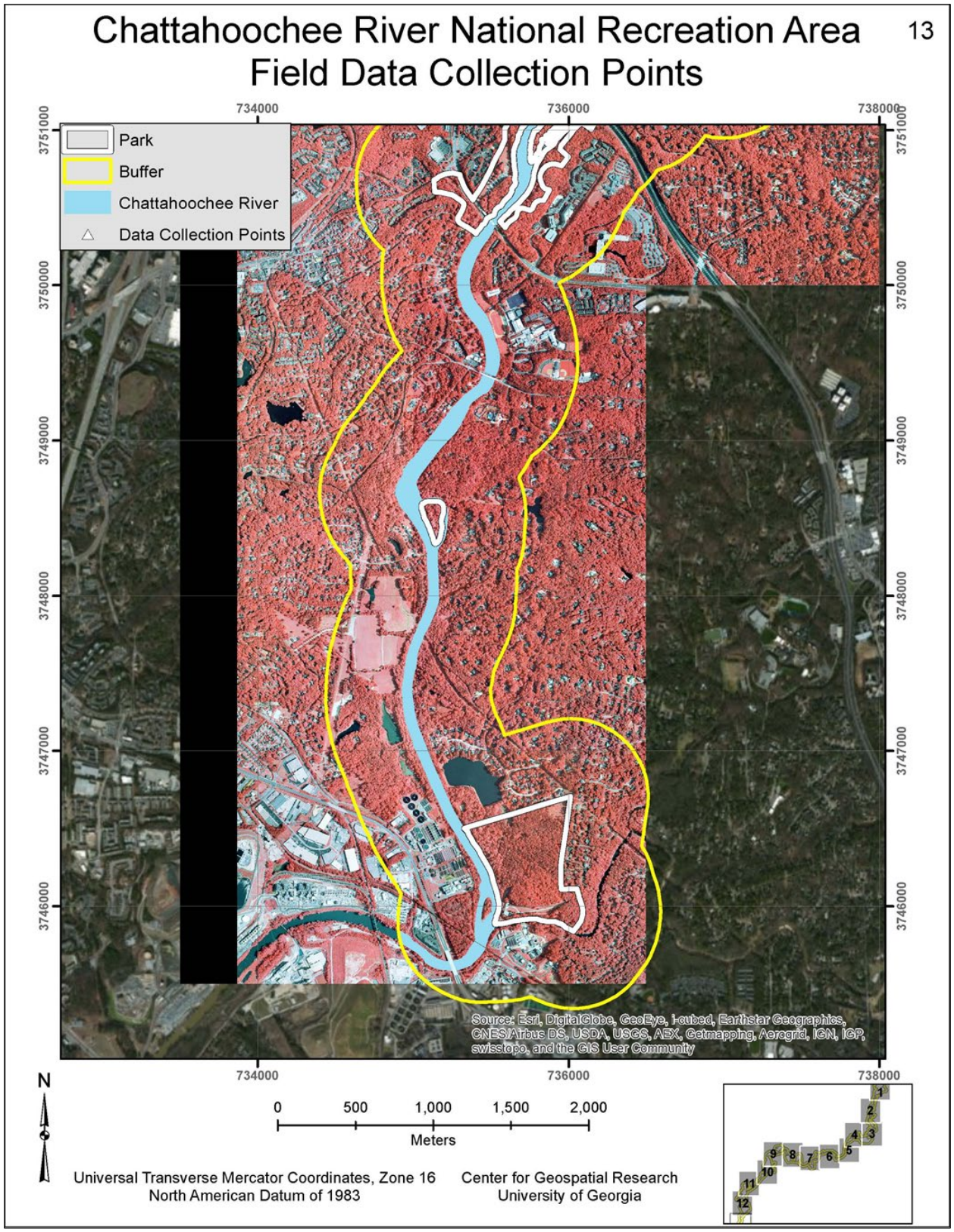


Figure E-13. Location of field data collection points within Section 13 of Chattahoochee River National Recreation Area overlaid on CIR and visible imagery.

Appendix F. Final Vegetation Maps

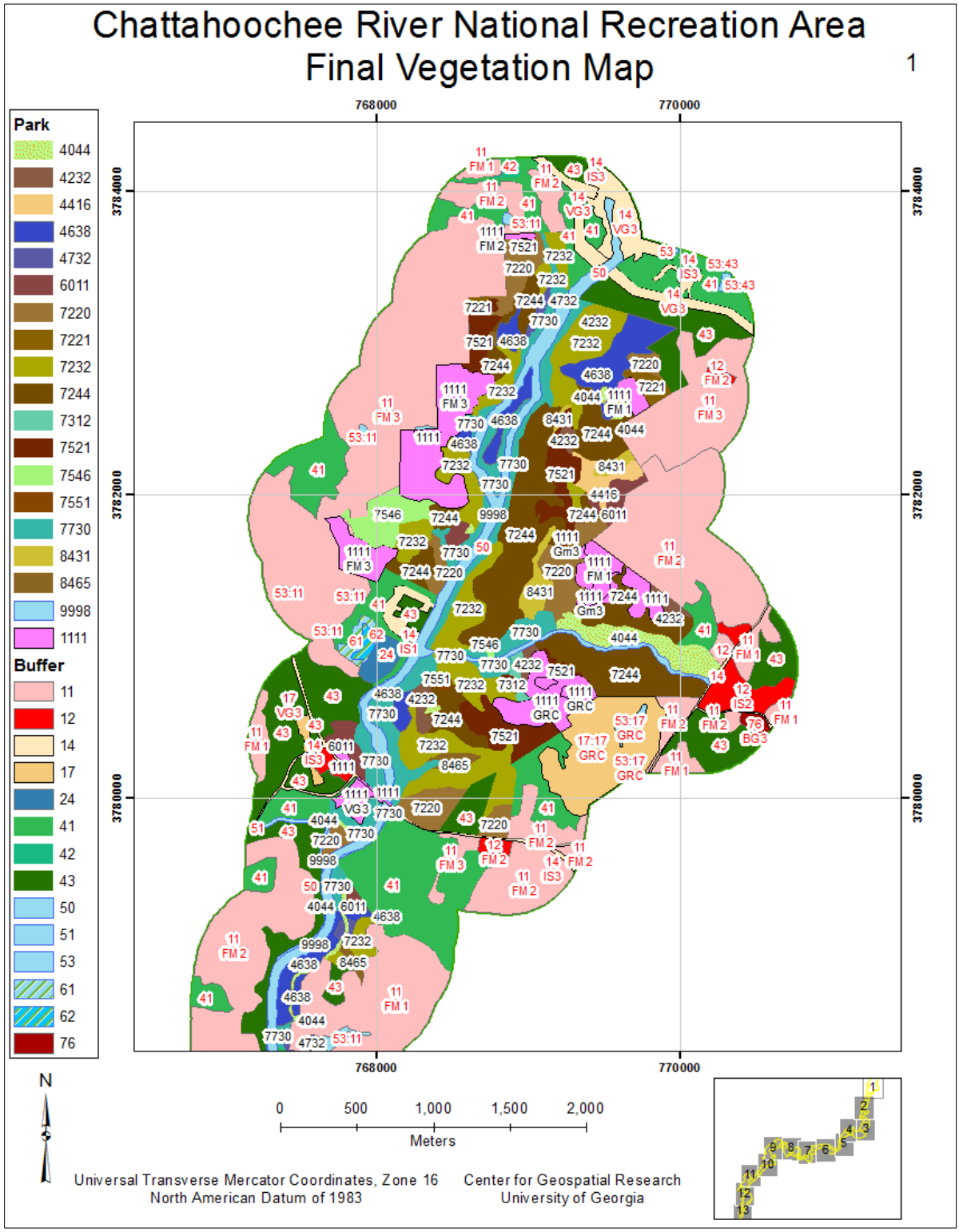


Figure F-1. Section 1 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

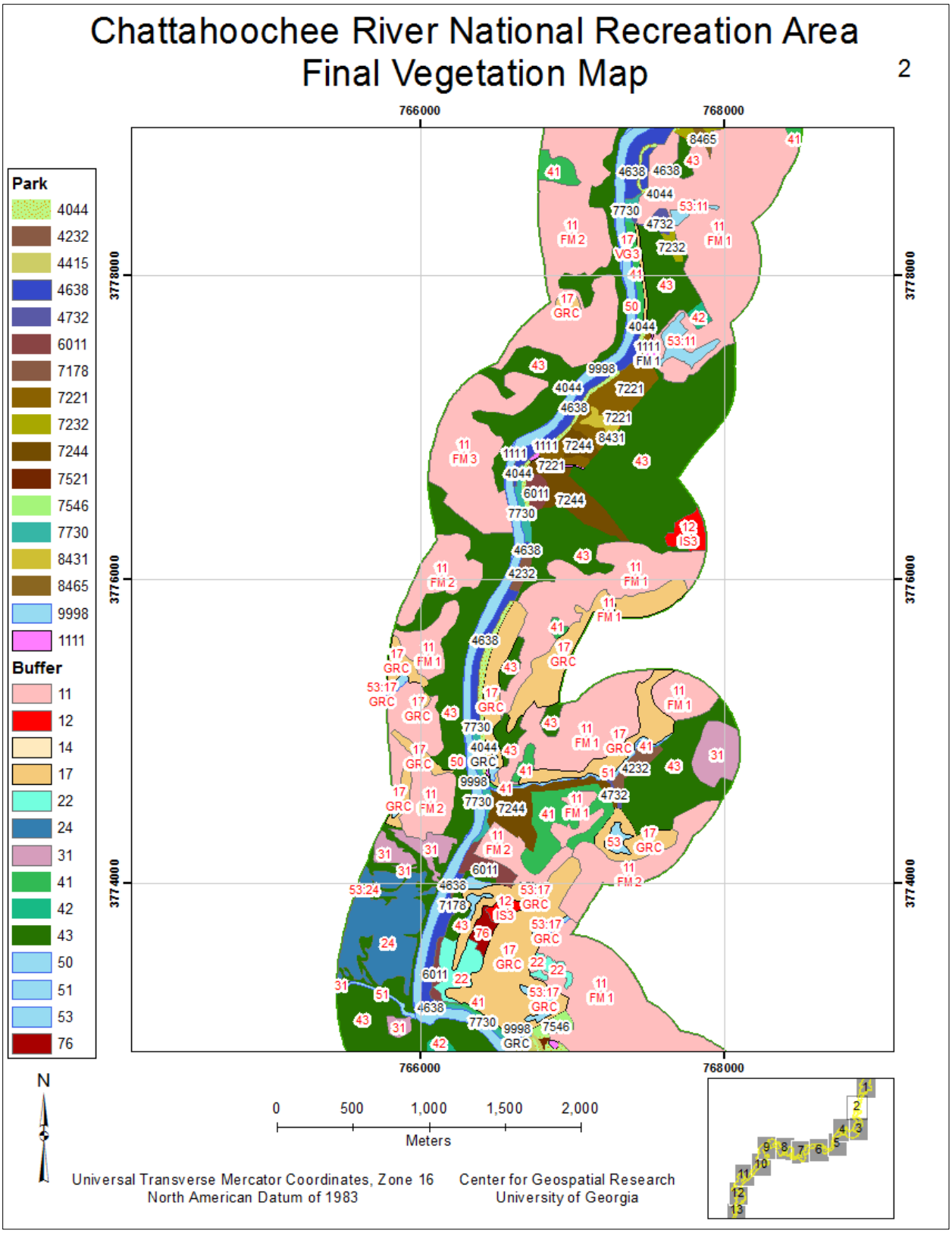


Figure F-2. Section 2 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

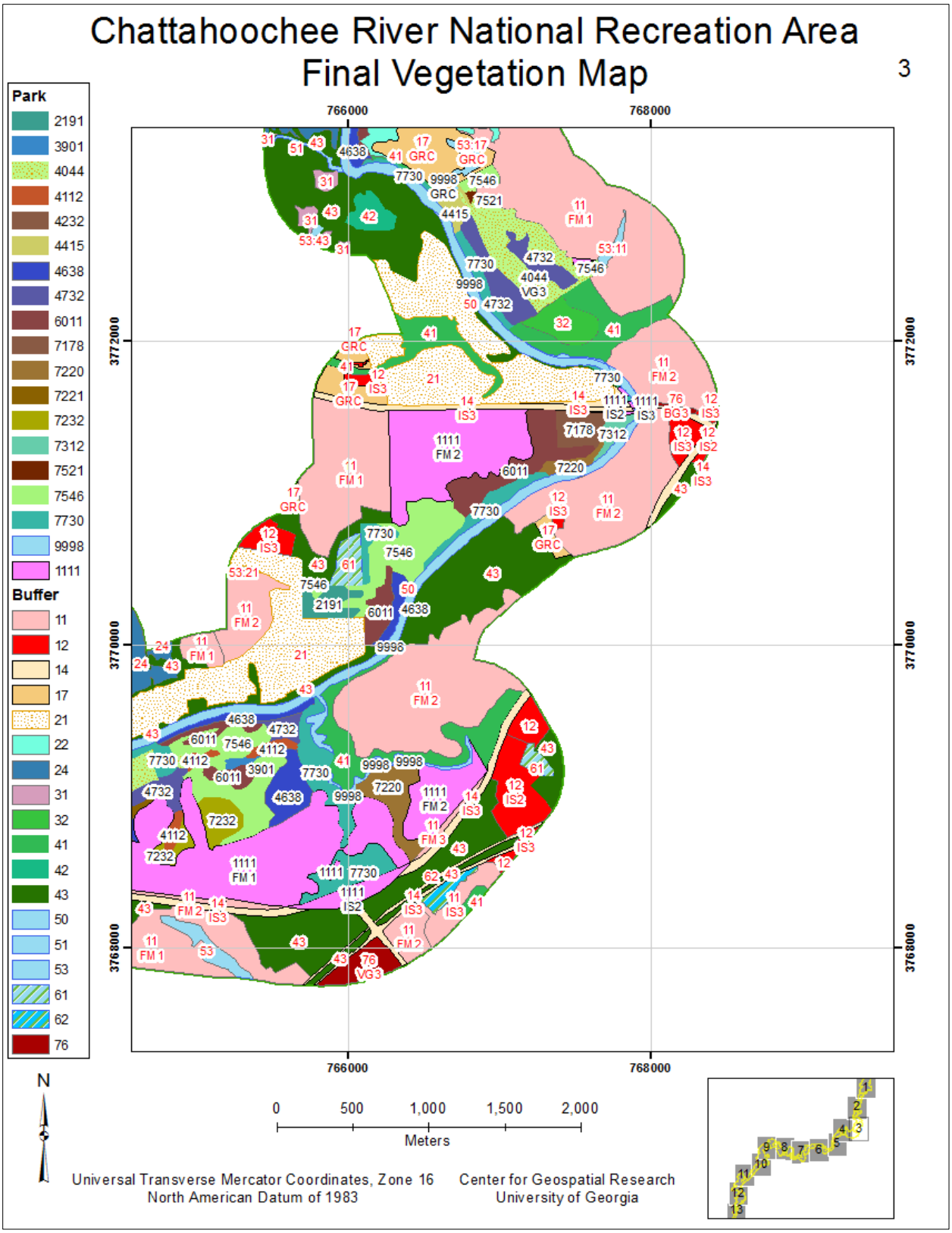


Figure F-3. Section 3 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

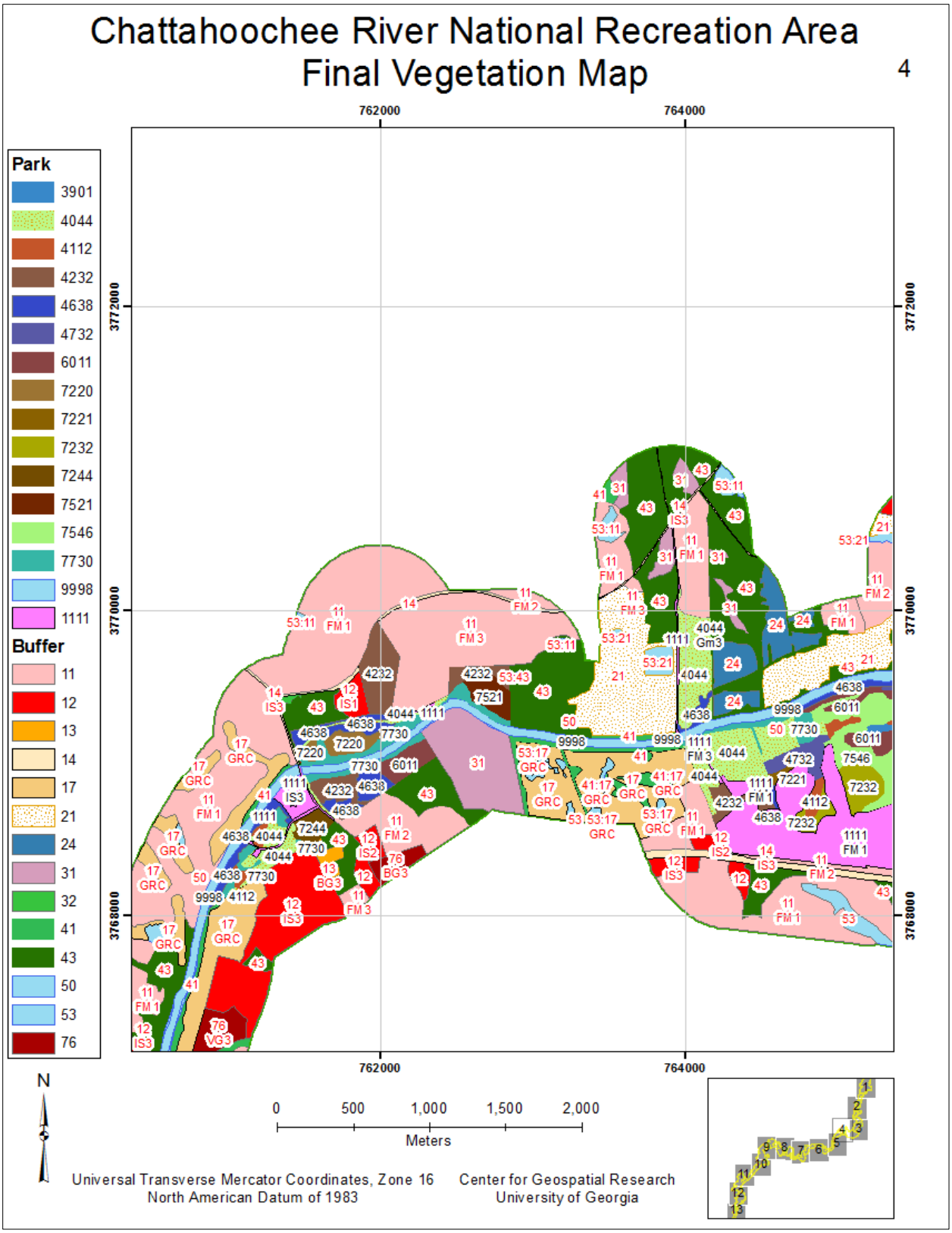


Figure F-4. Section 4 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

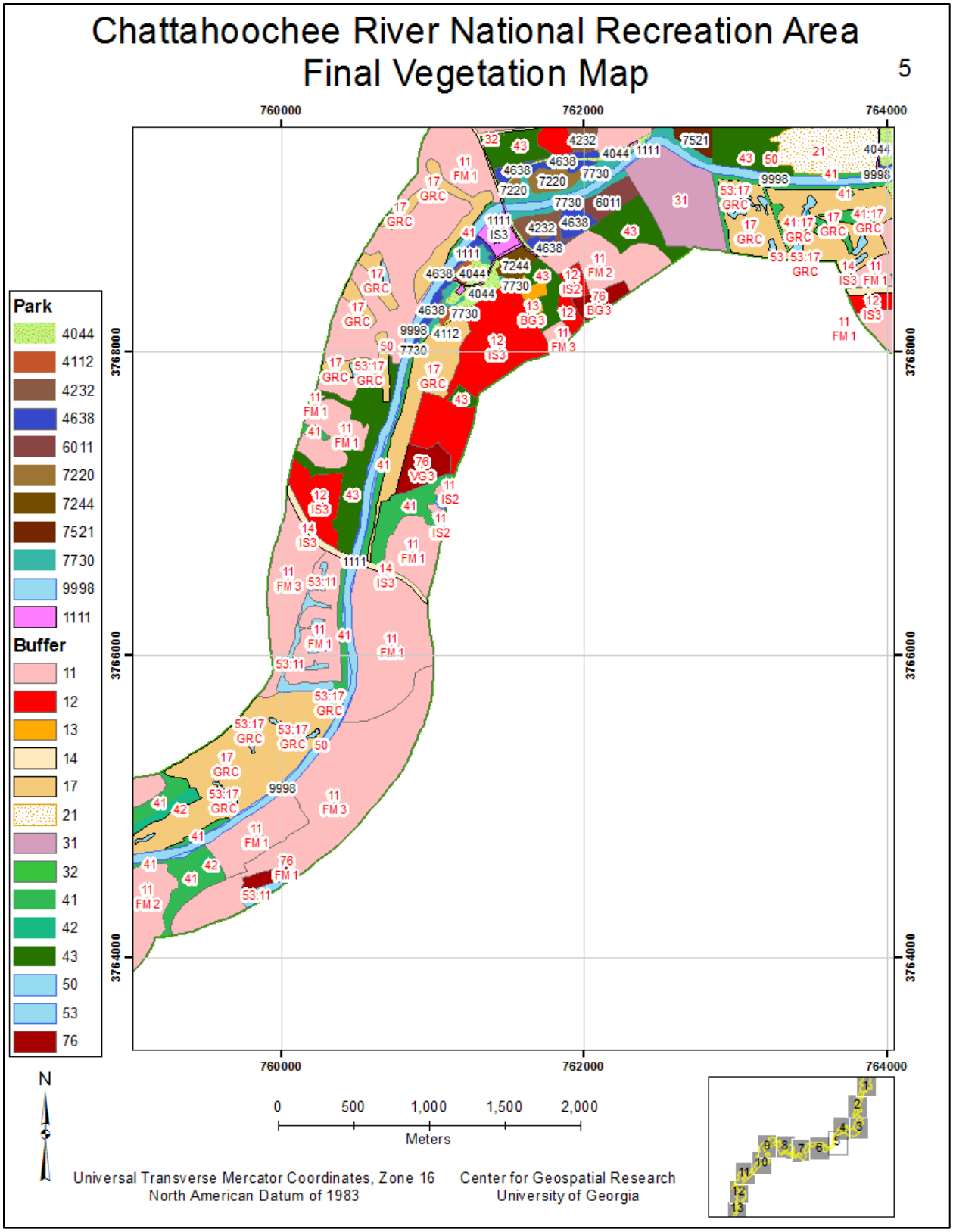


Figure F-5. Section 5 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

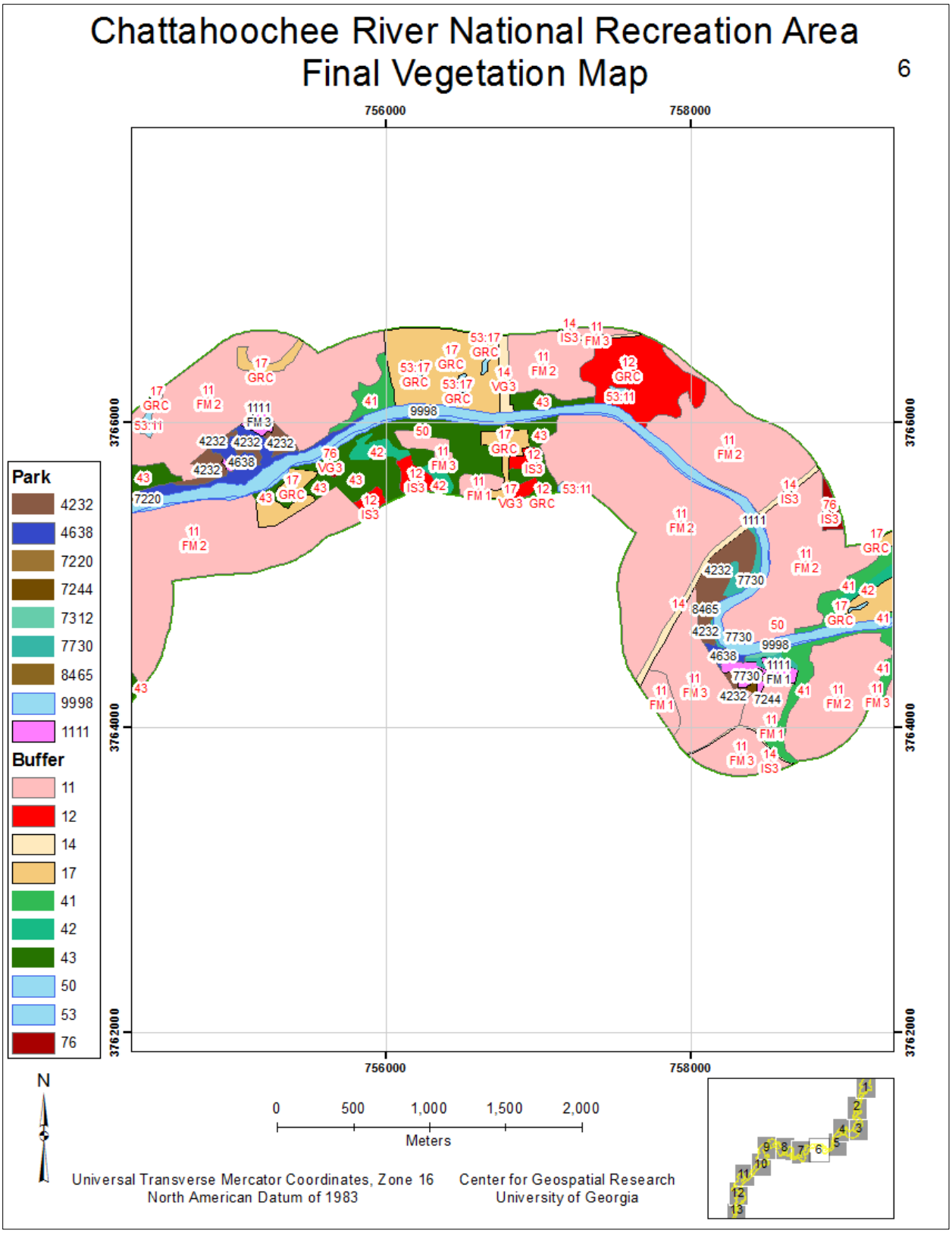


Figure F-6. Section 6 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

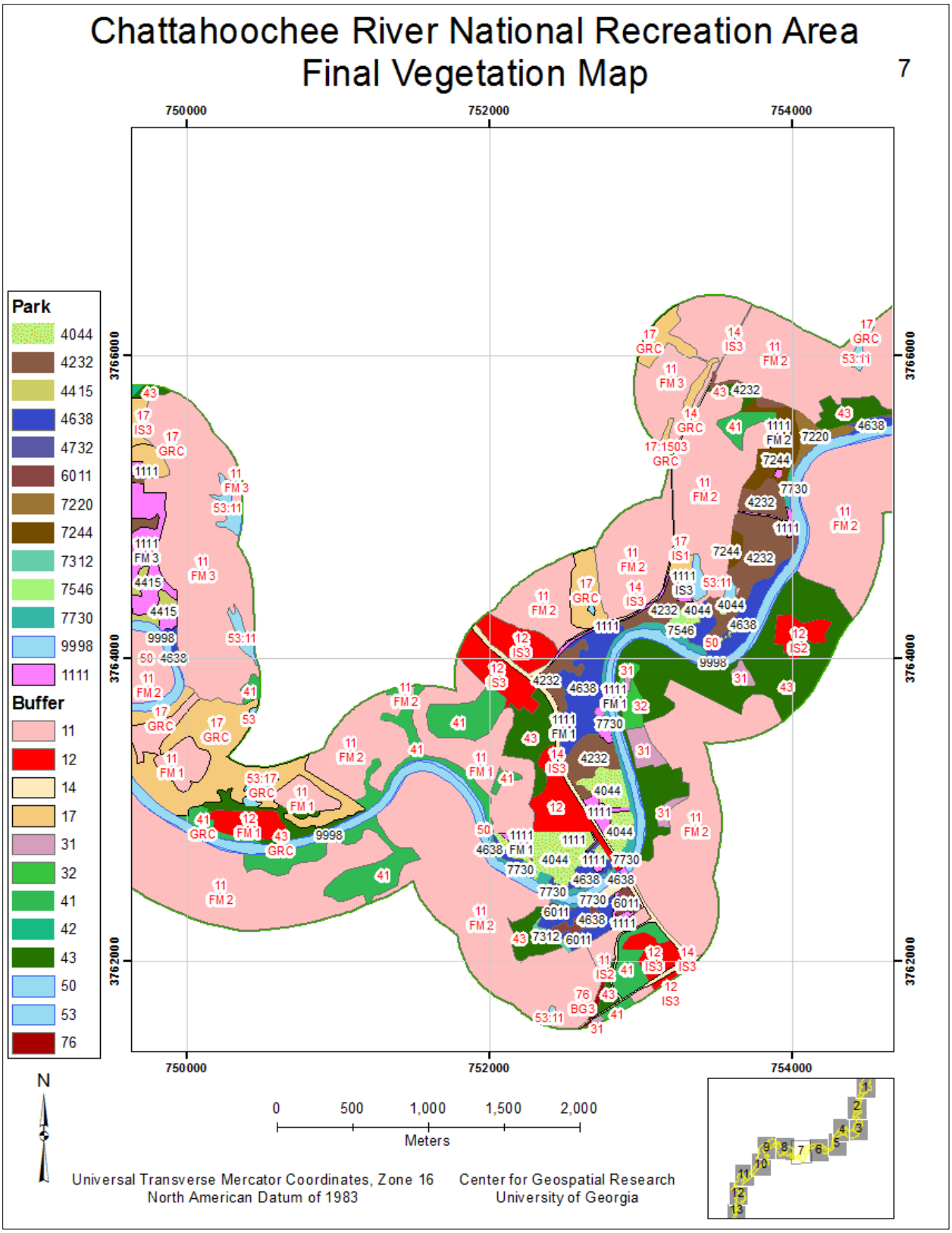


Figure F-7. Section 7 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

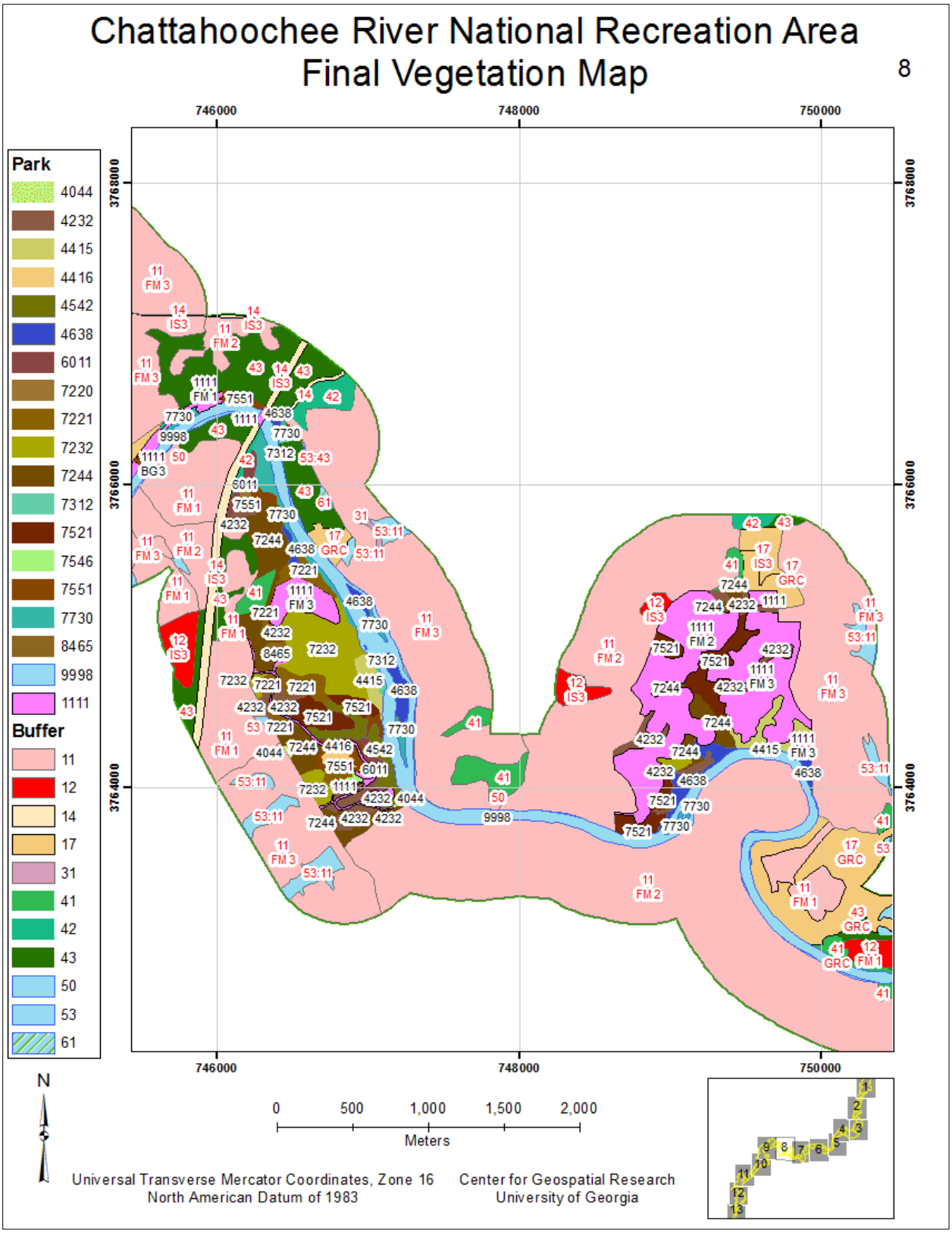


Figure F-8. Section 8 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

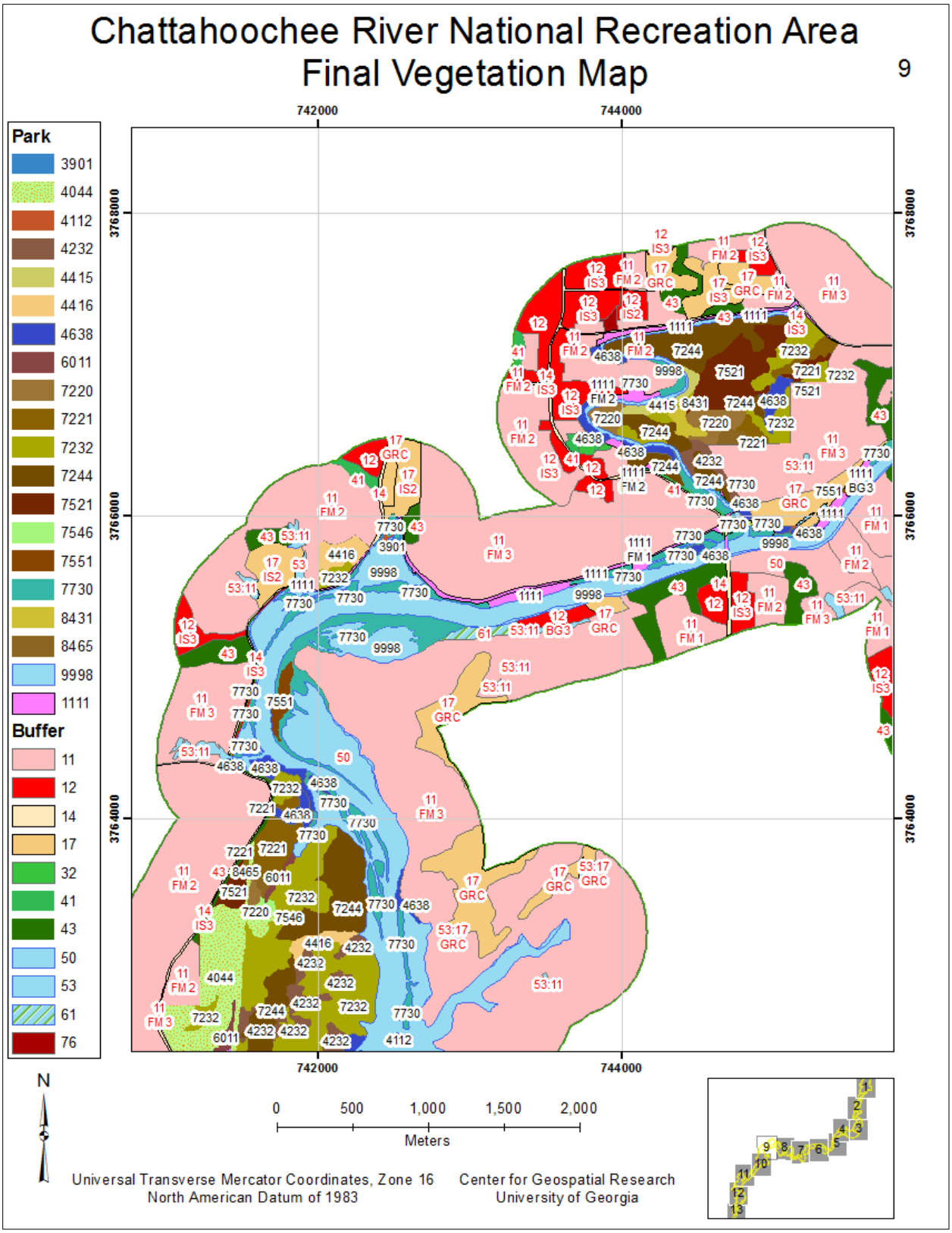


Figure F-9. Section 9 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

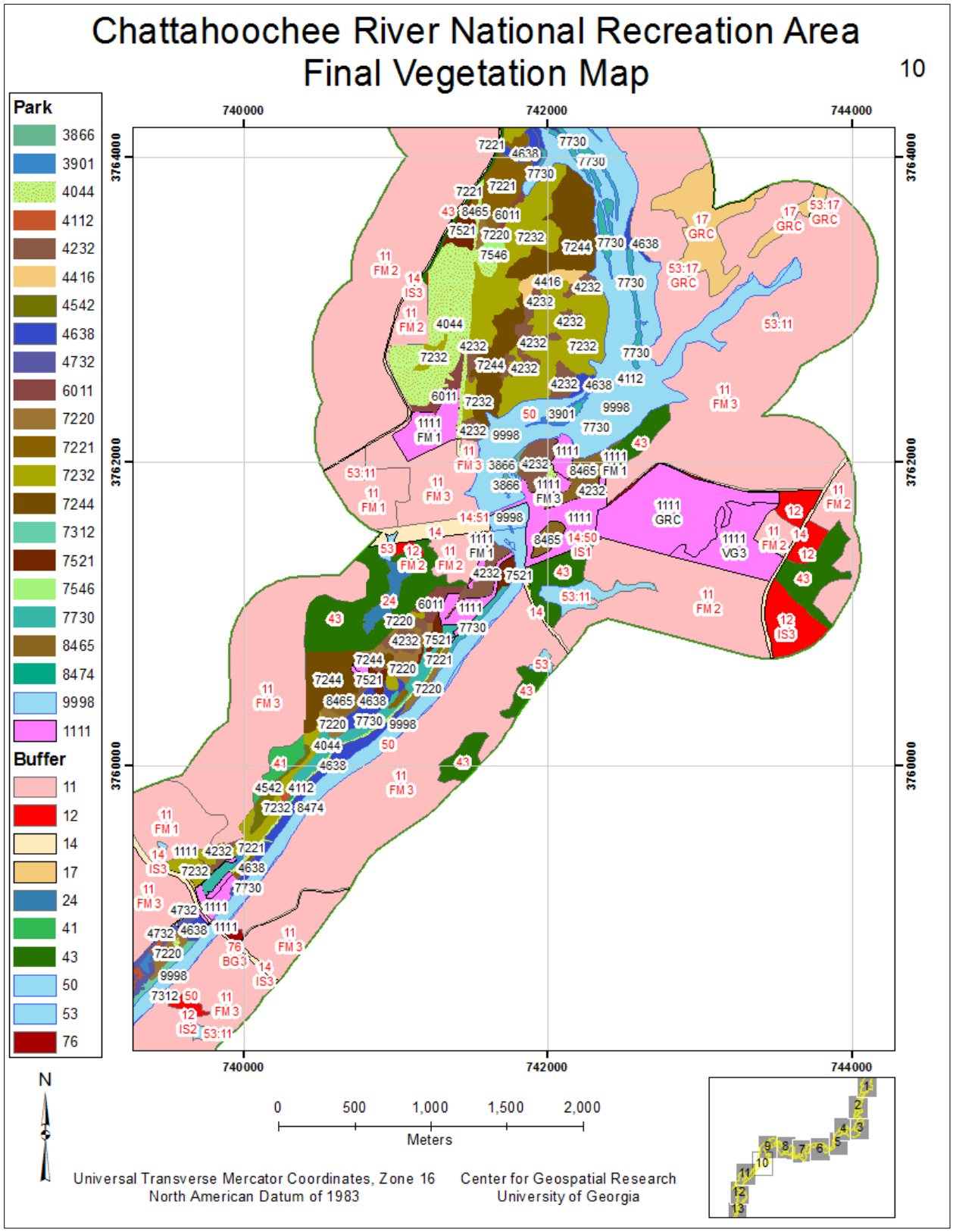


Figure F-10. Section 10 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

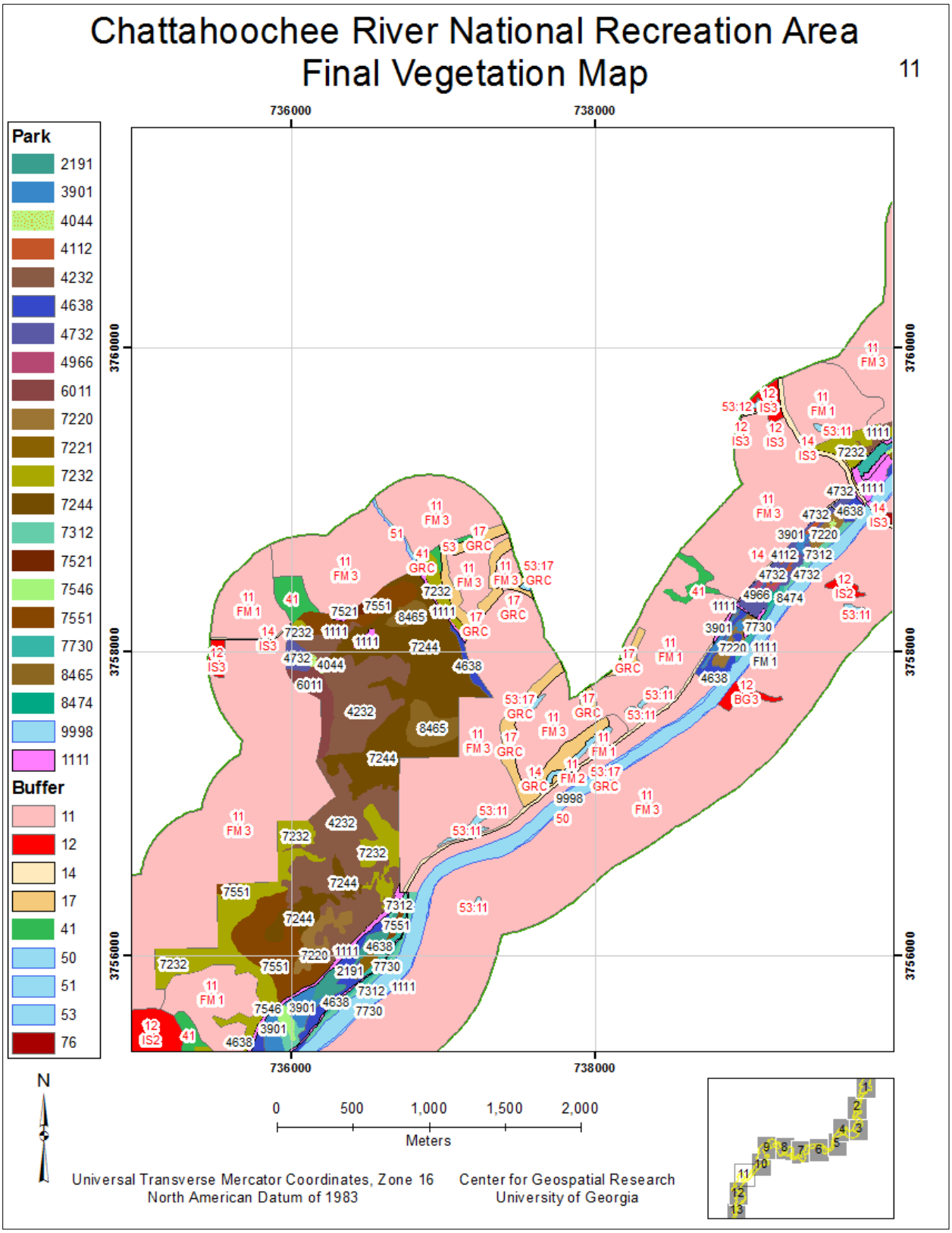


Figure F-11. Section 11 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

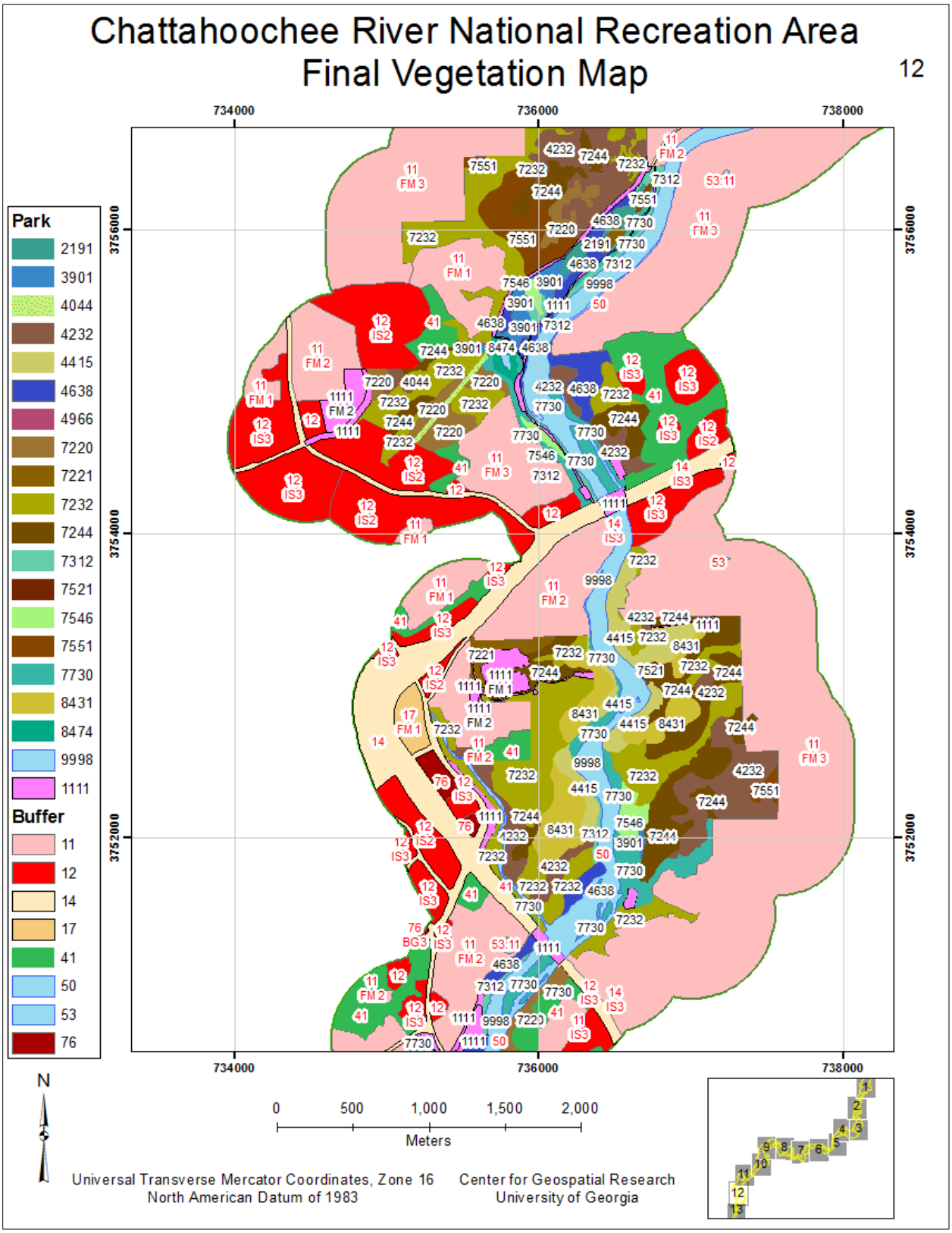


Figure F-12. Section 12 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

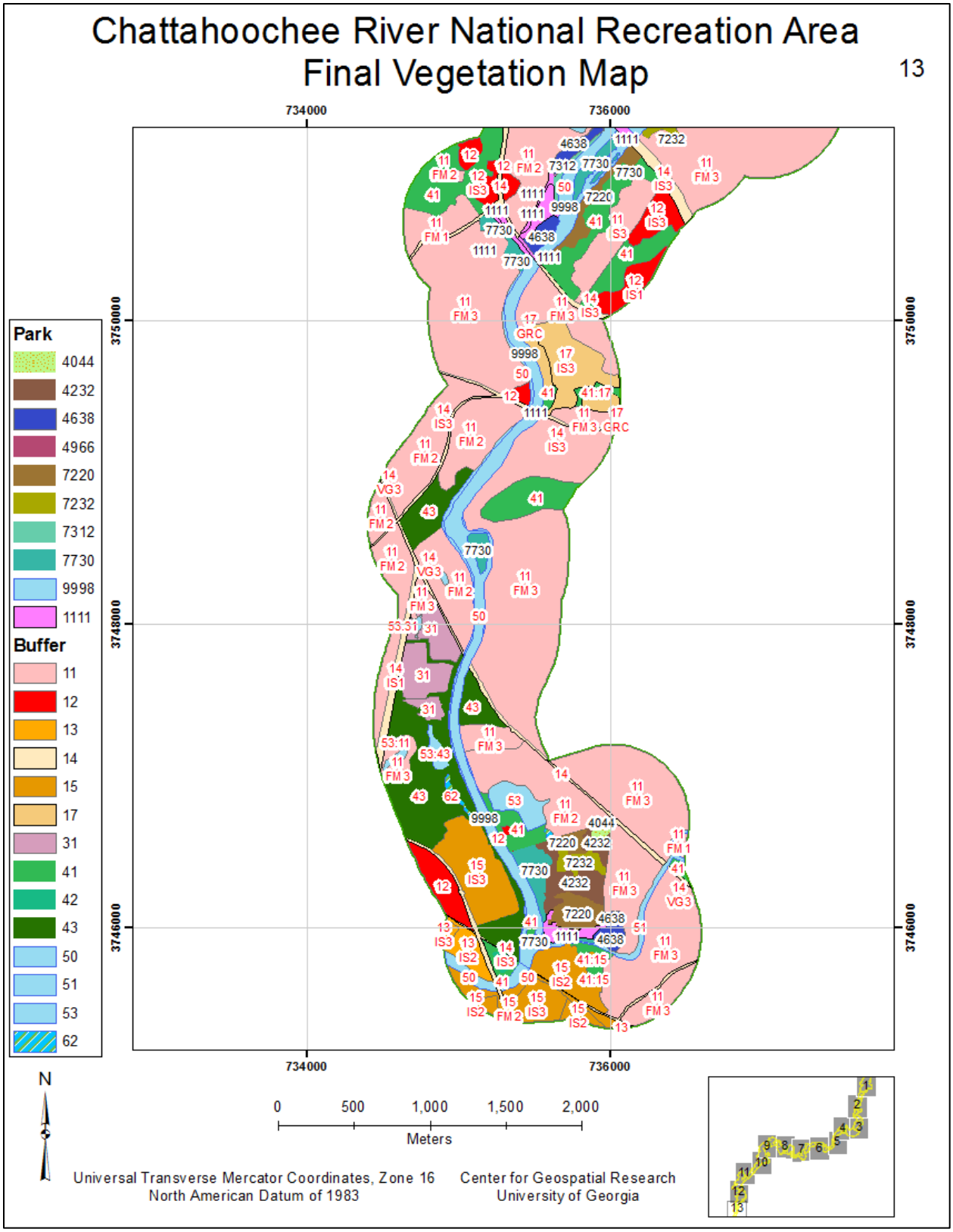


Figure F-13. Section 13 of Chattahoochee River National Recreation Area Final vegetation map based on 2011 imagery.

Appendix G. Accuracy Assessment Point Locations

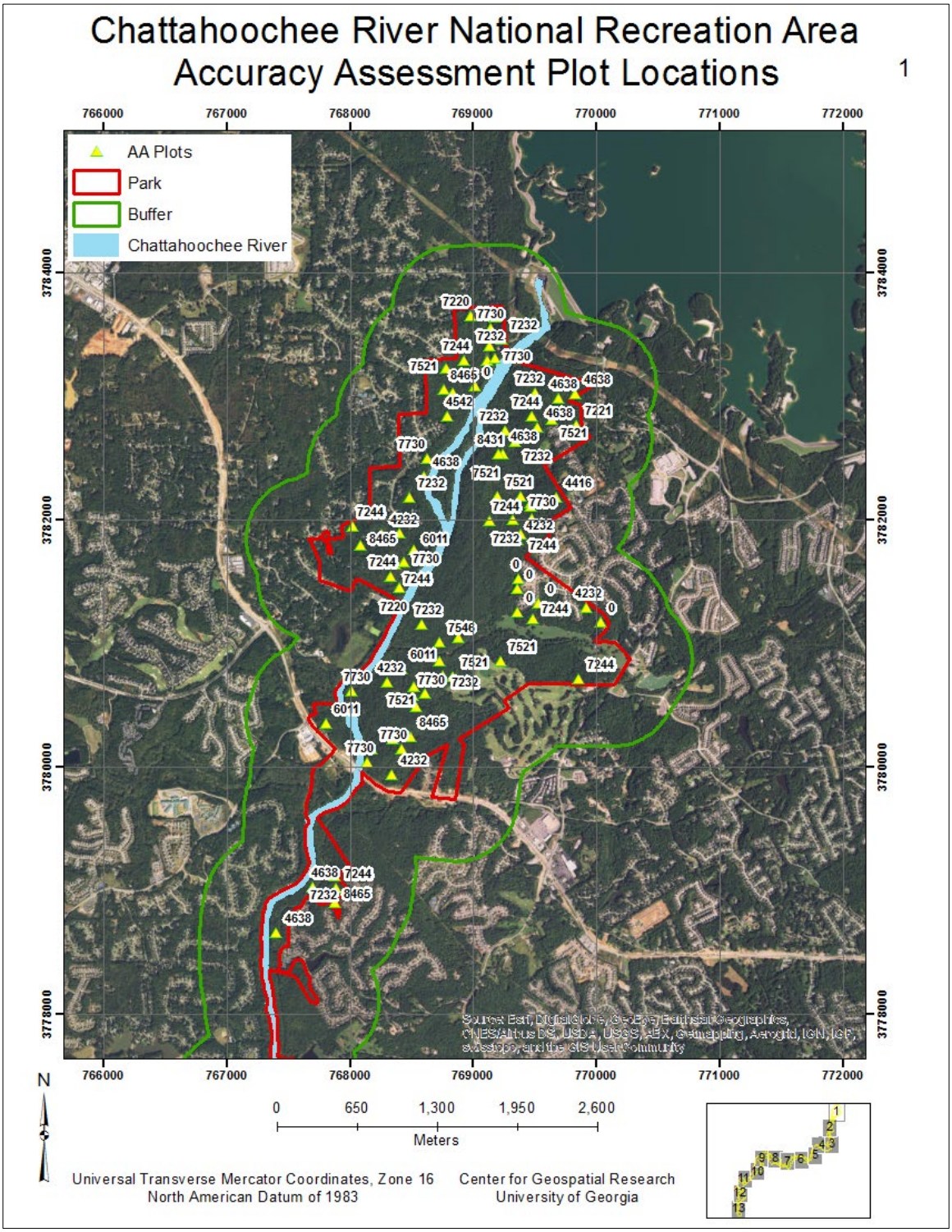


Figure G-1. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 1.

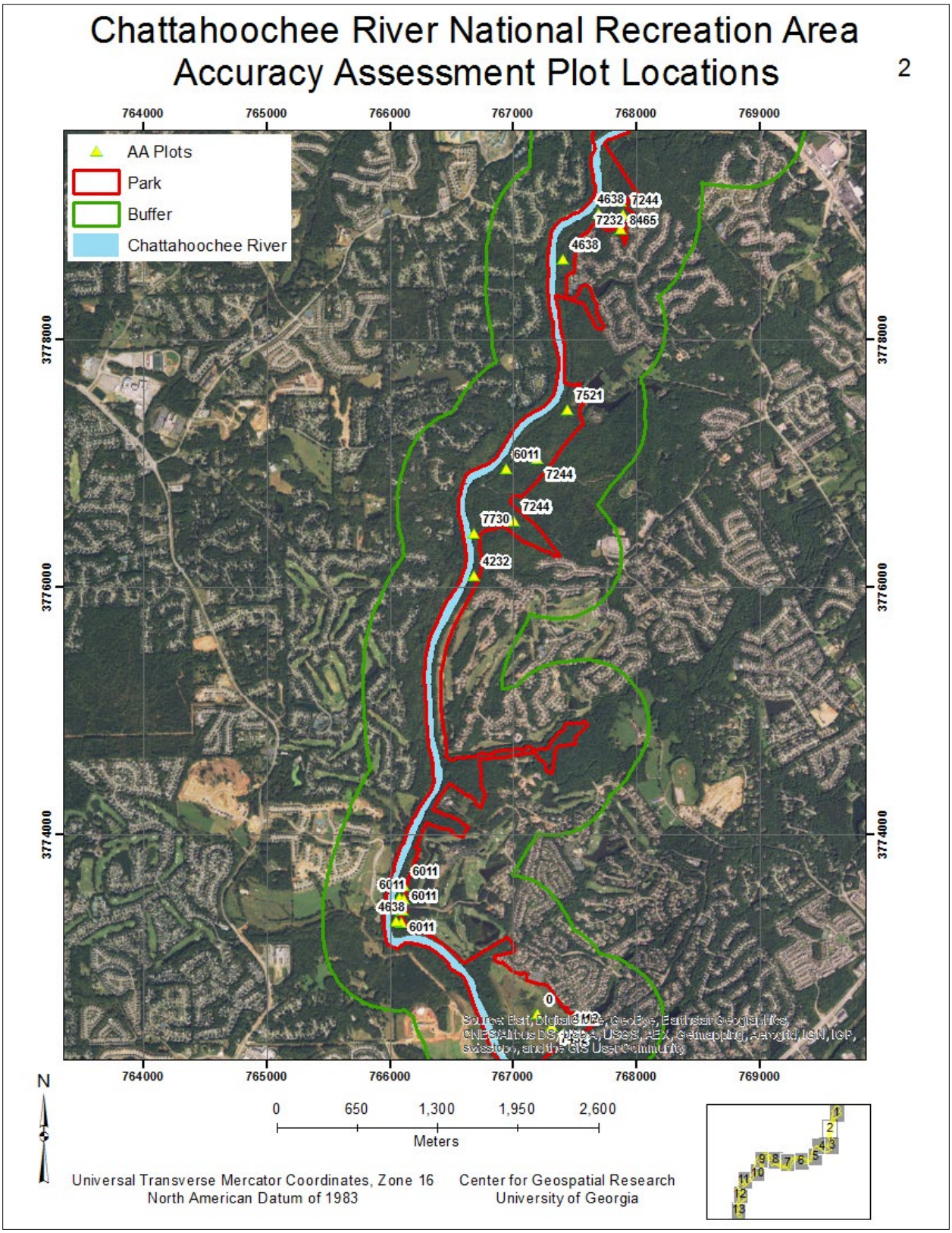


Figure G-2. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 2.

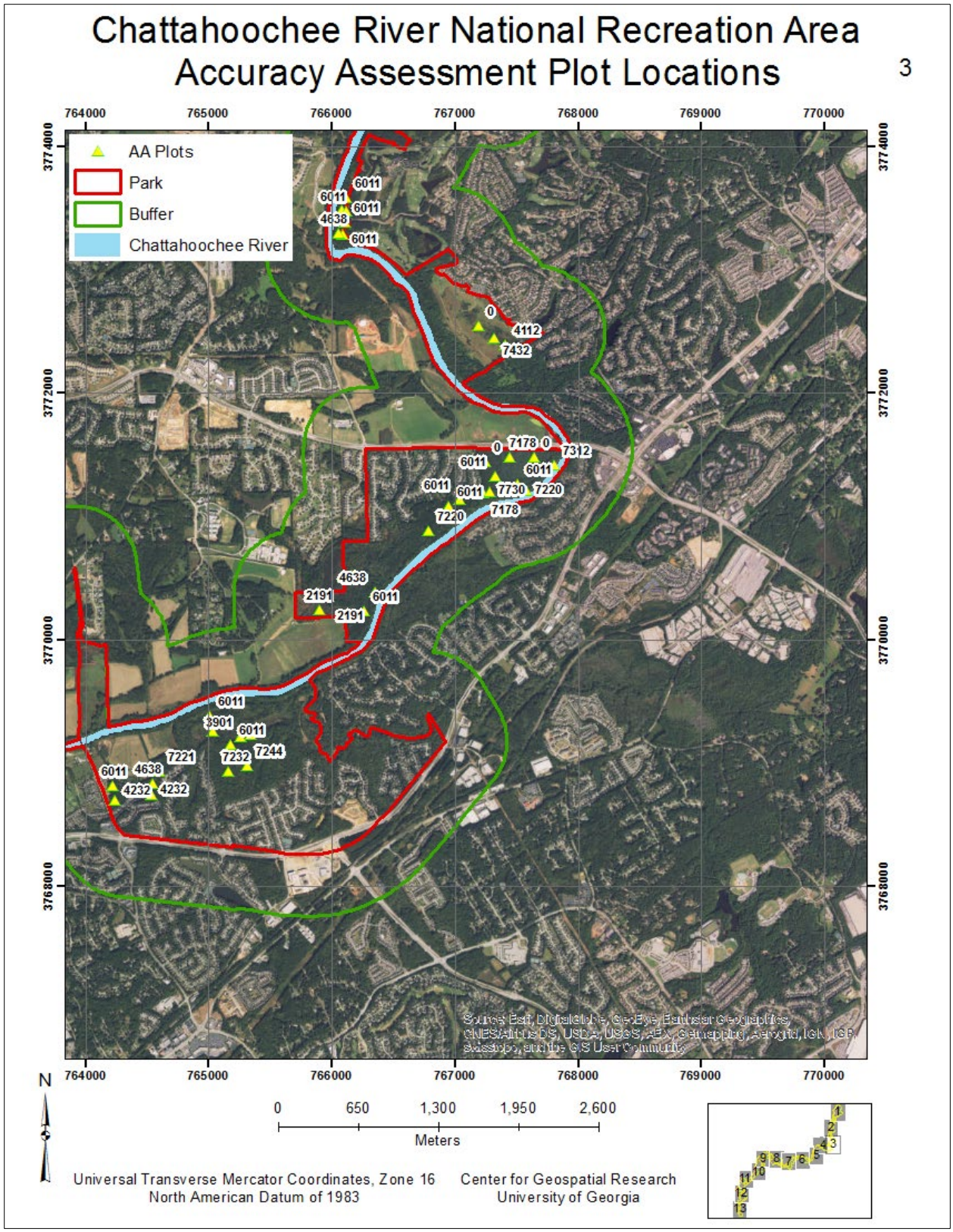


Figure G-3. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 3.

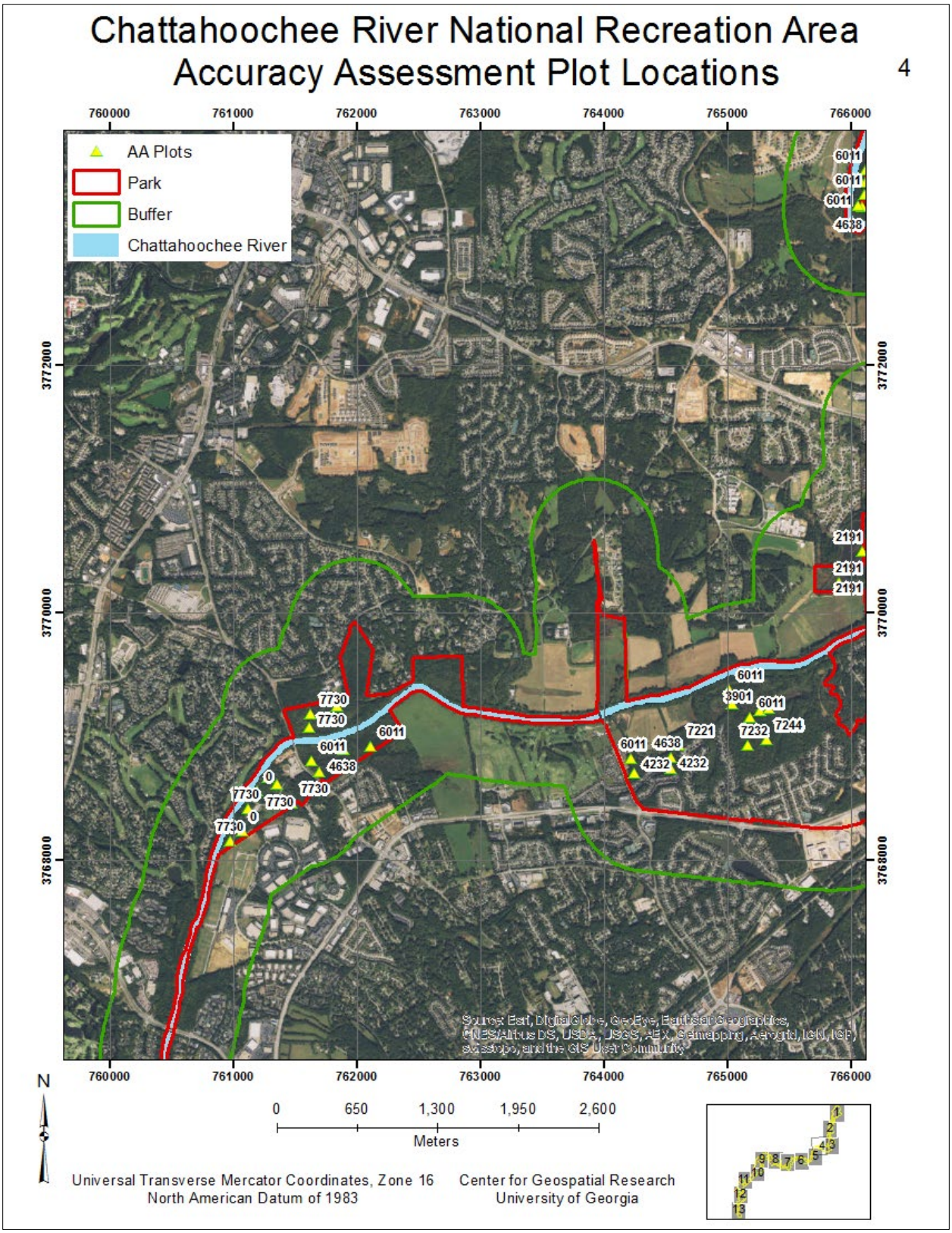


Figure G-4. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 4.

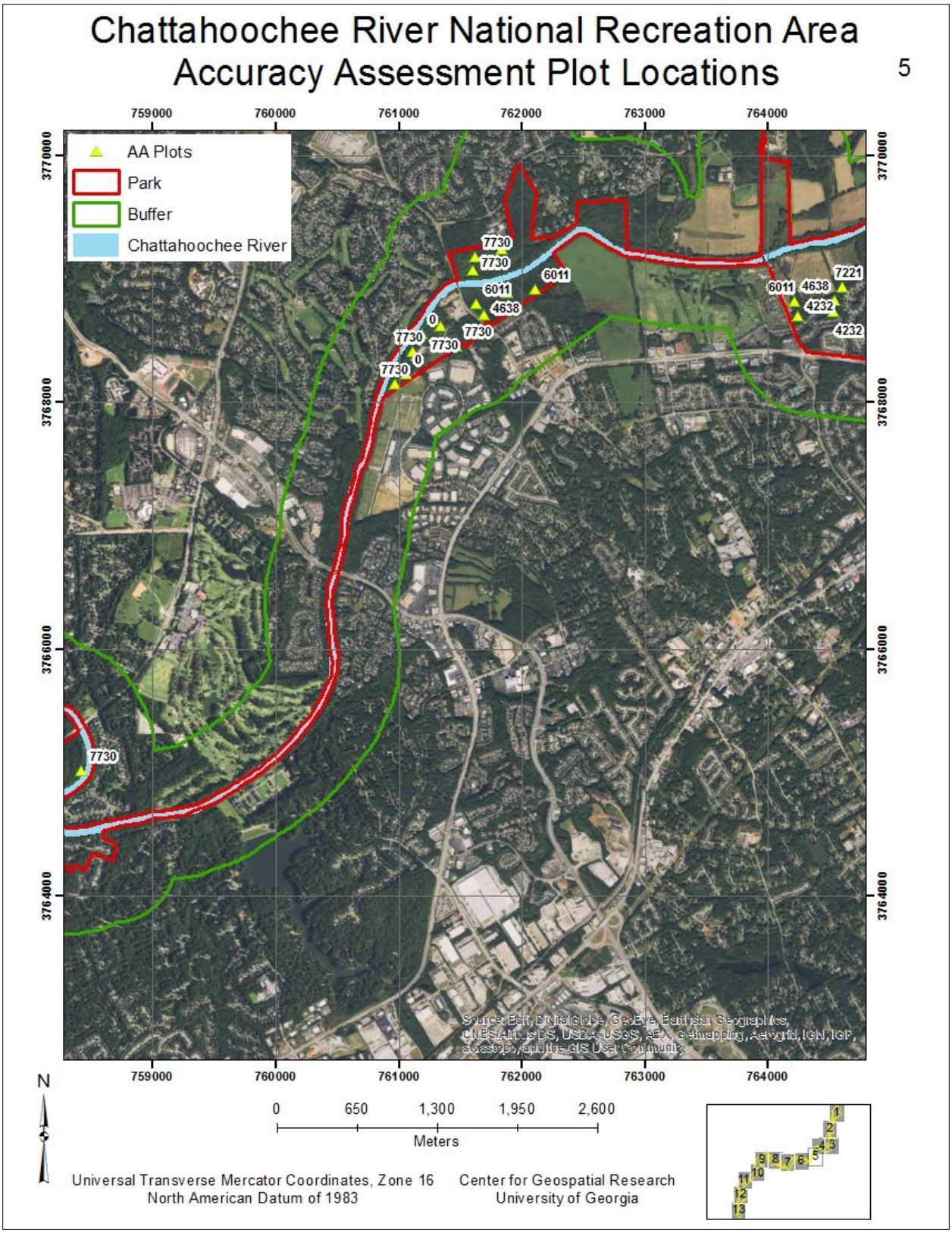


Figure G-5. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 5.

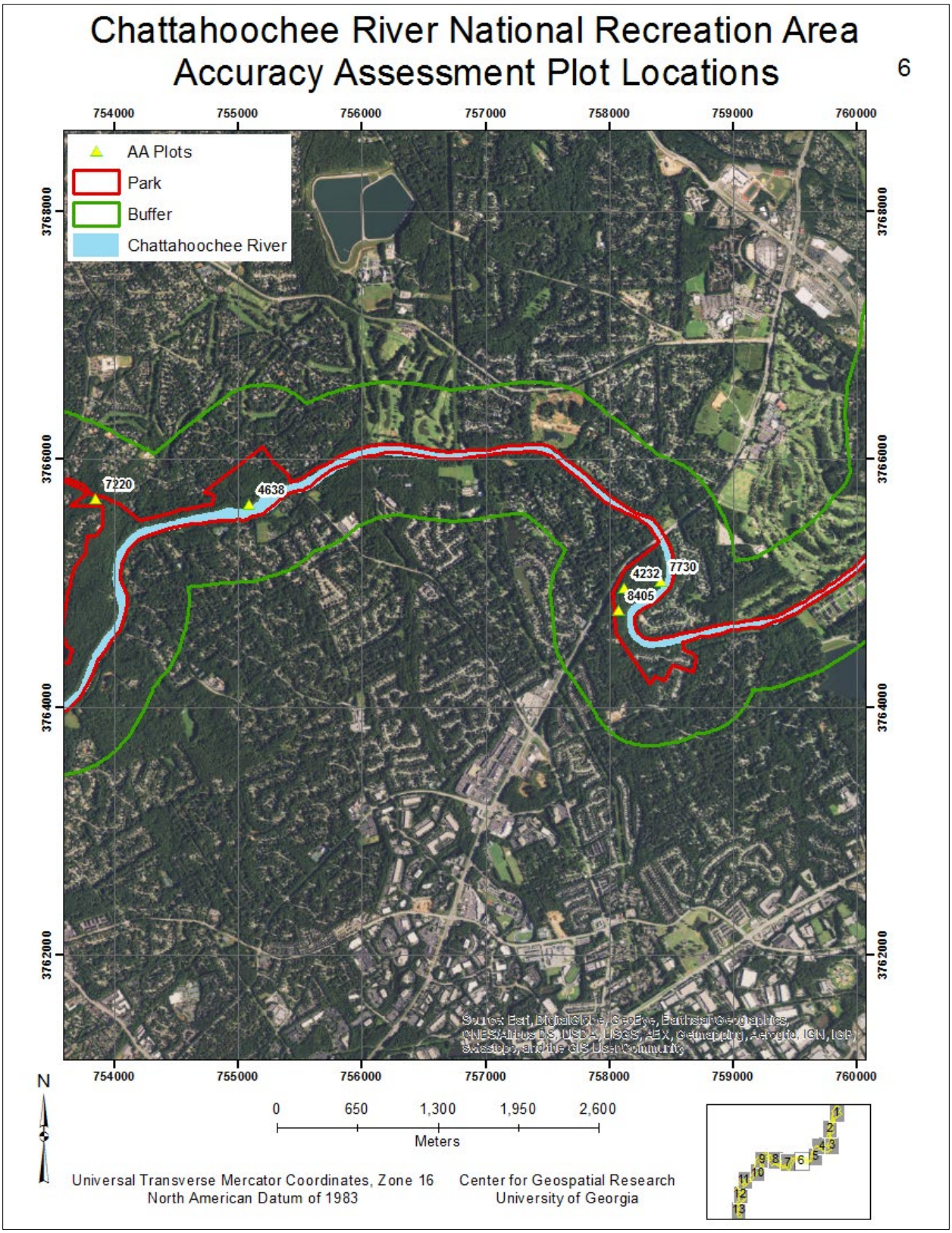


Figure G-6. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 6.

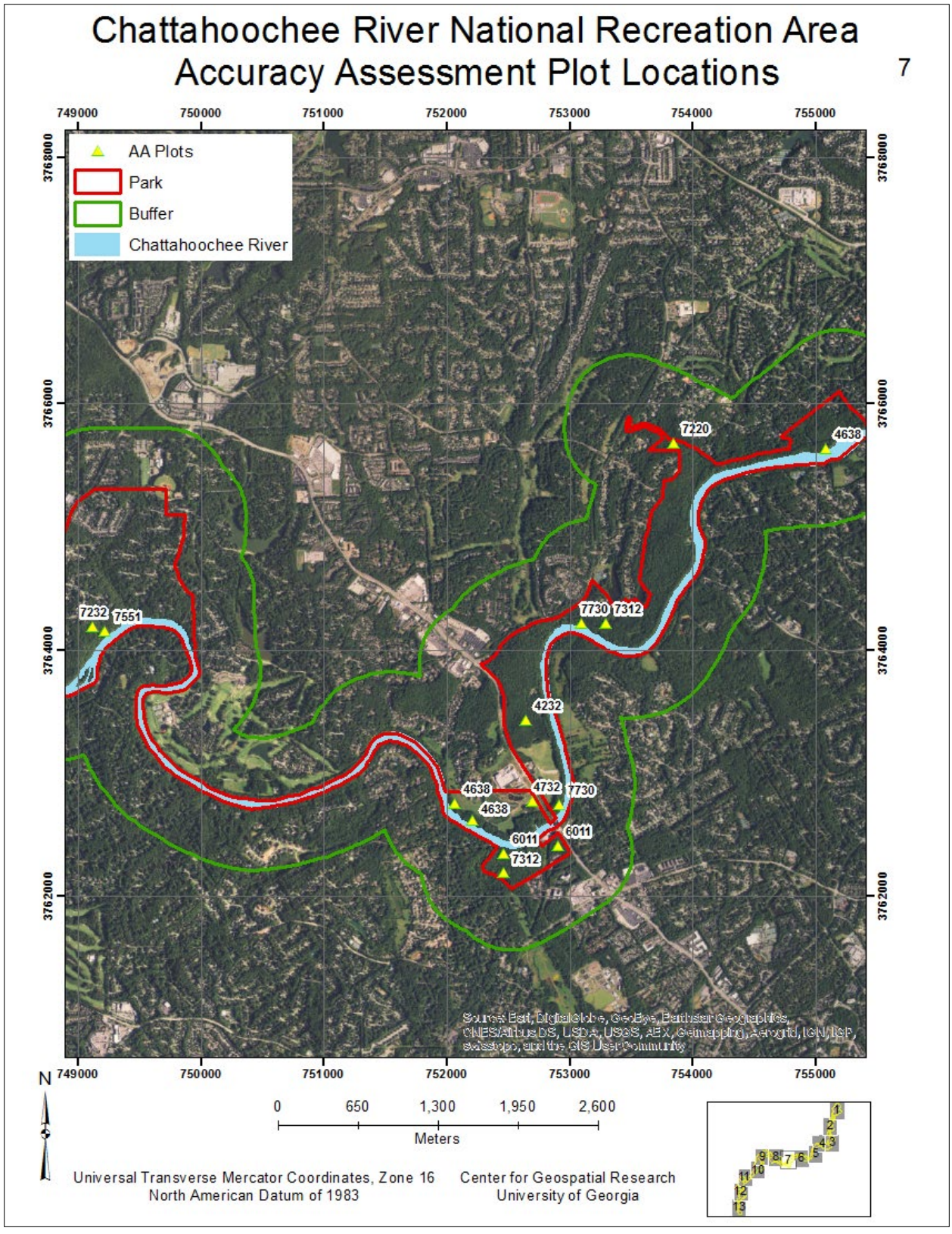


Figure G-7. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 7.

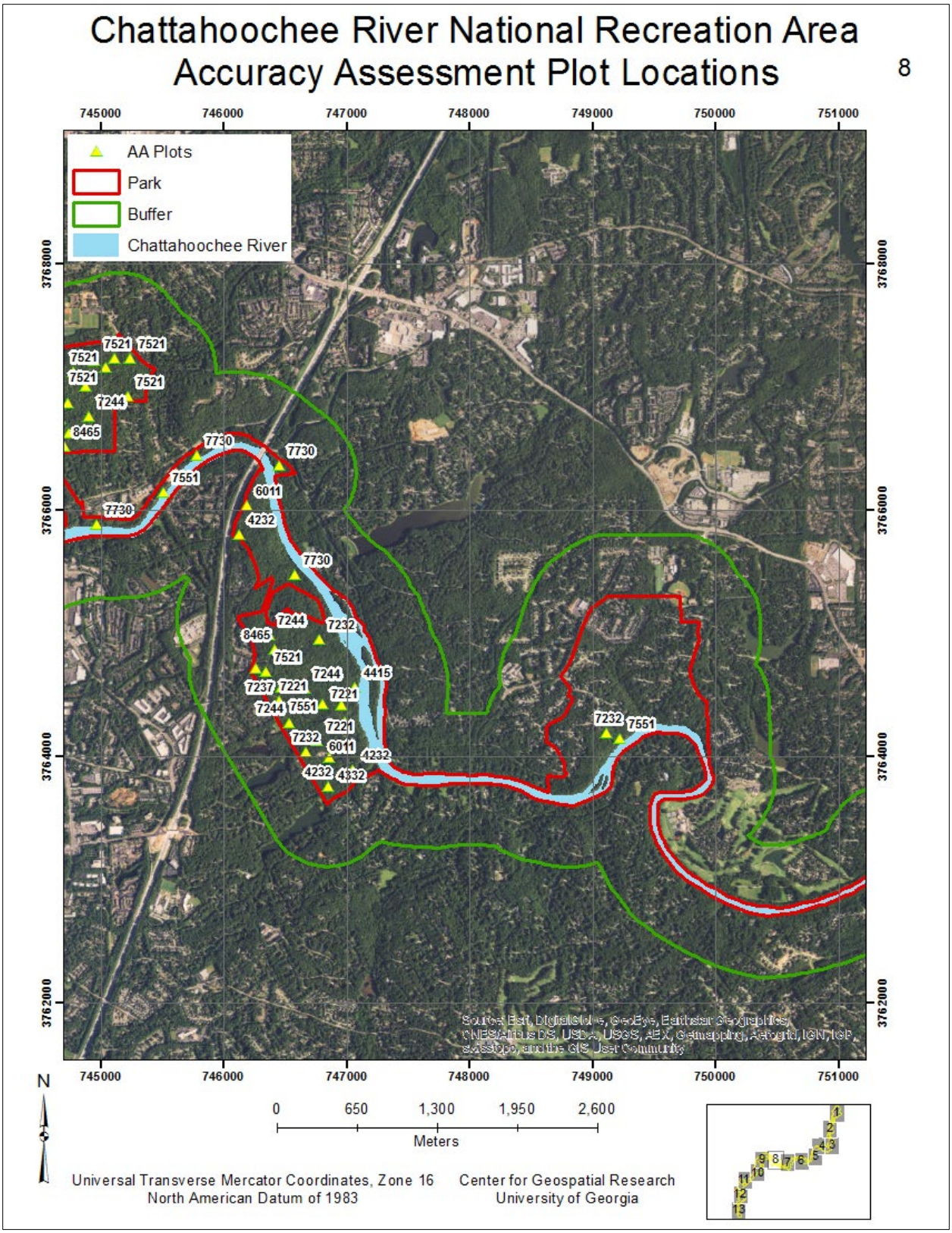


Figure G-8. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 8.

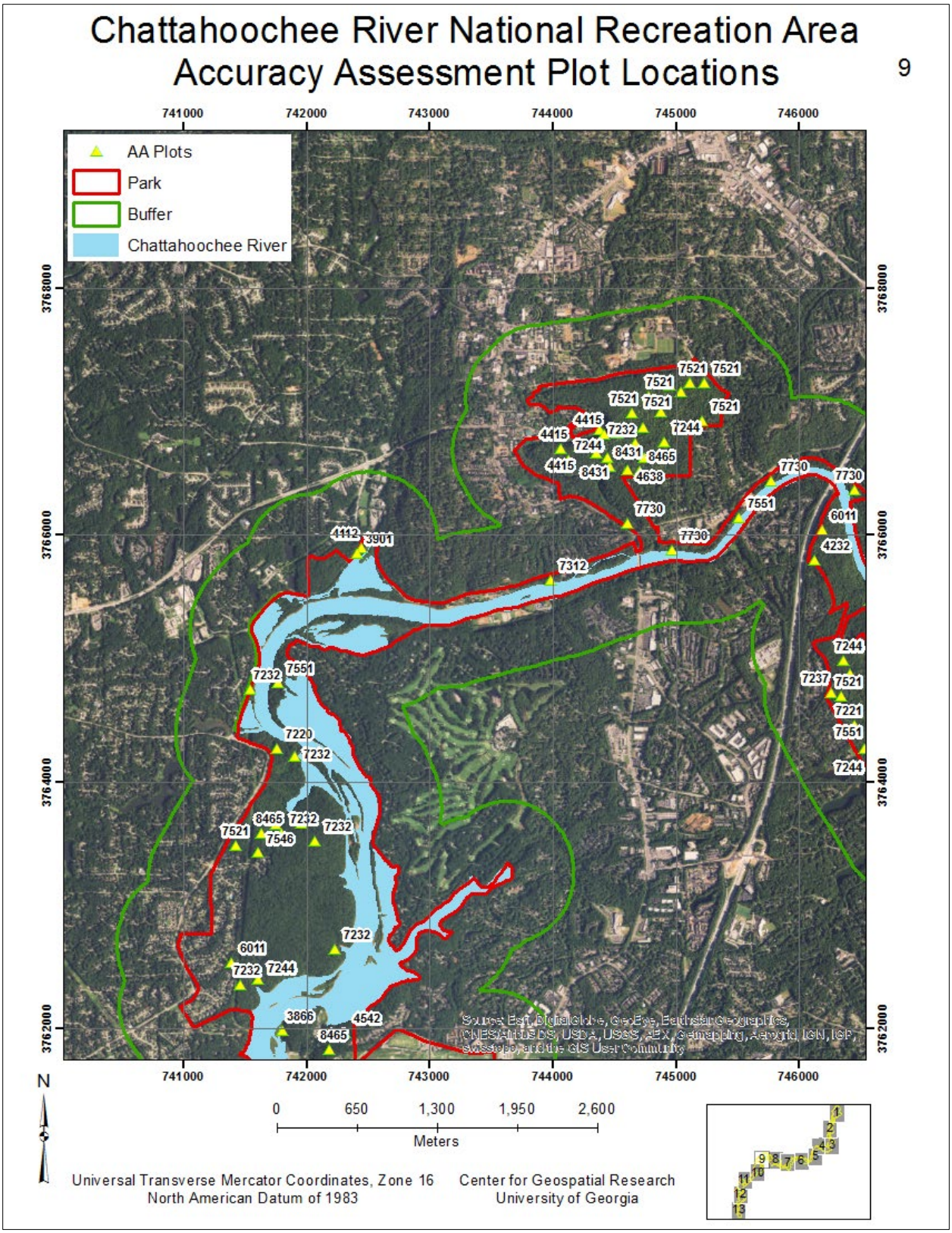


Figure G-9. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 9.

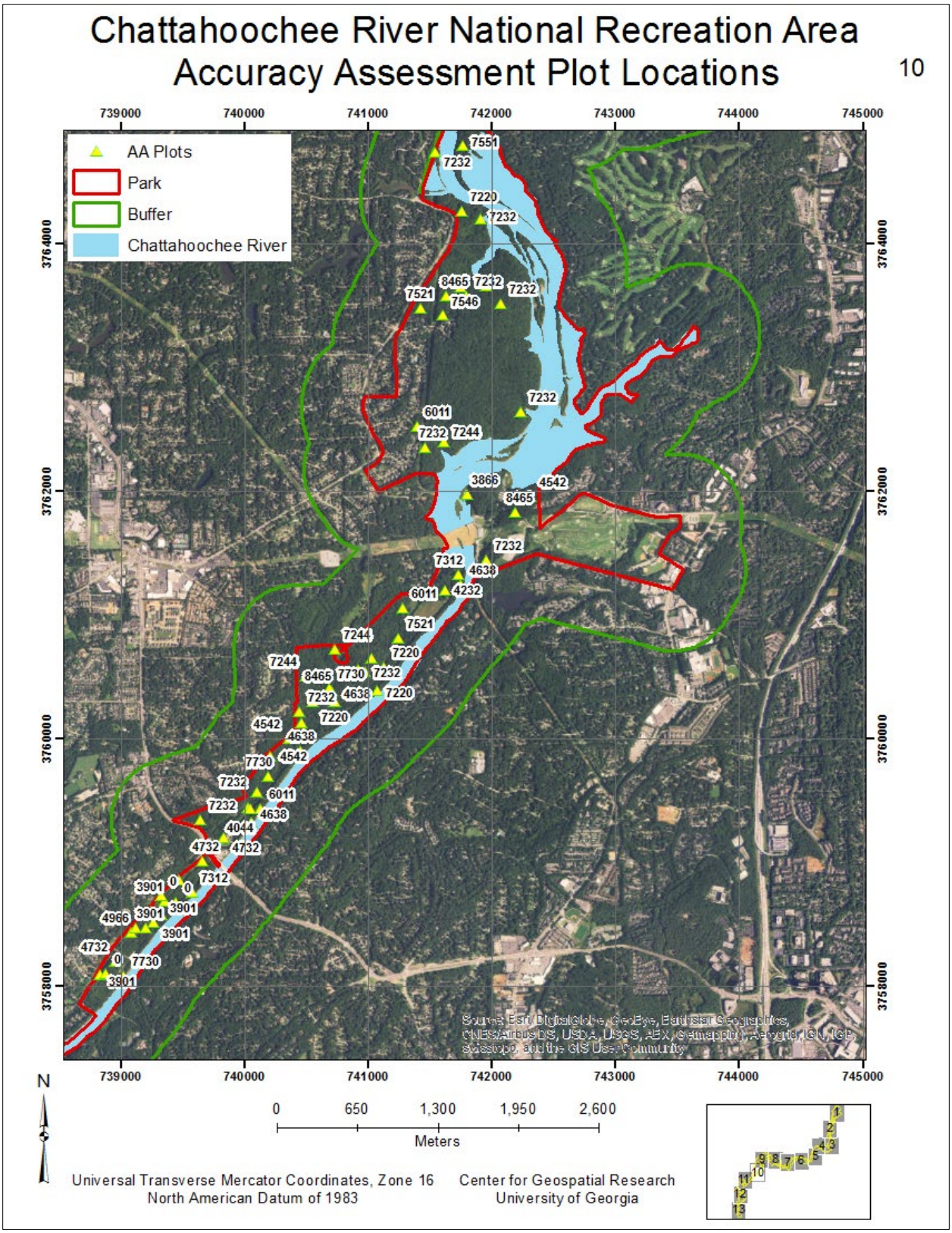


Figure G-10. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 10.

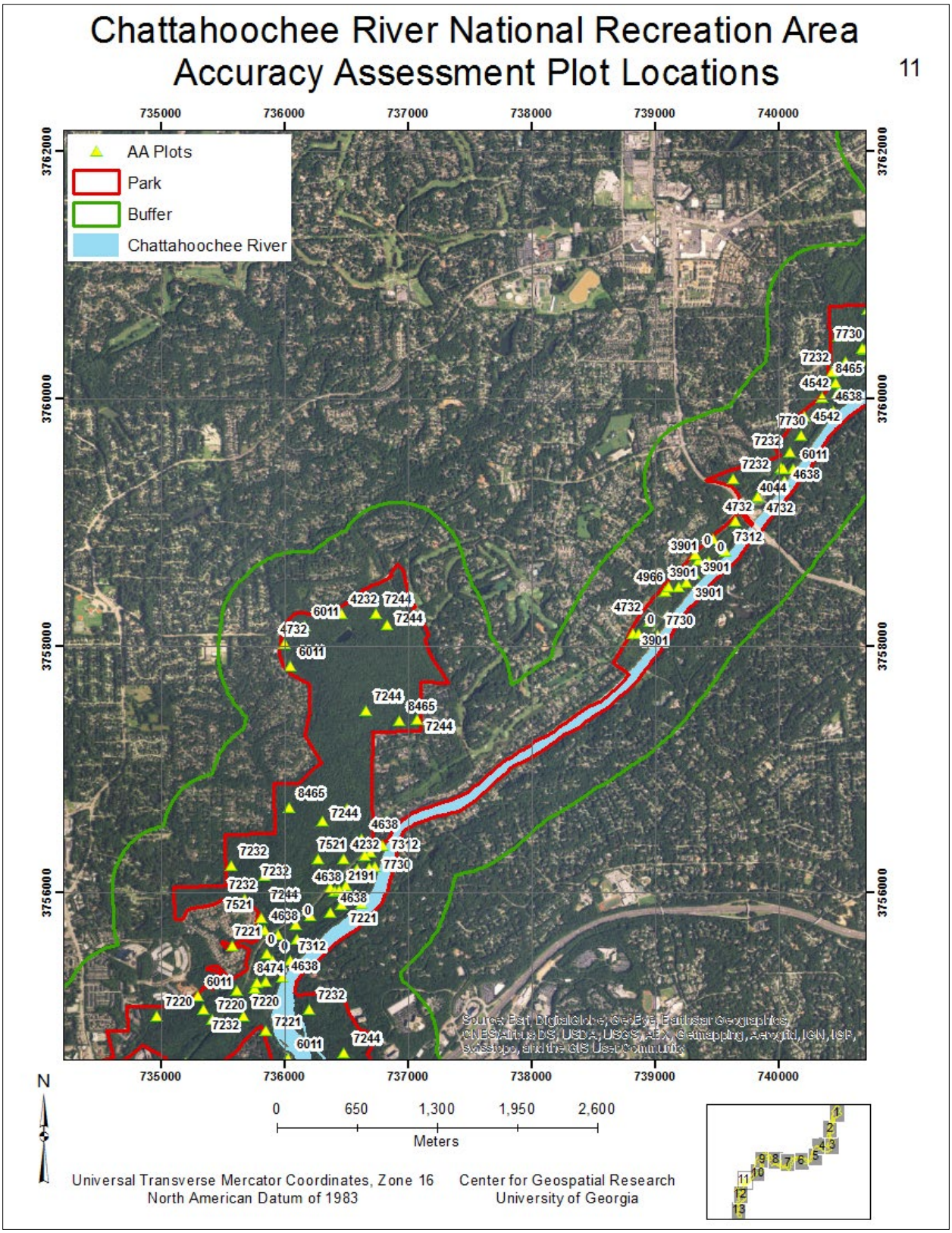


Figure G-11. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 11.

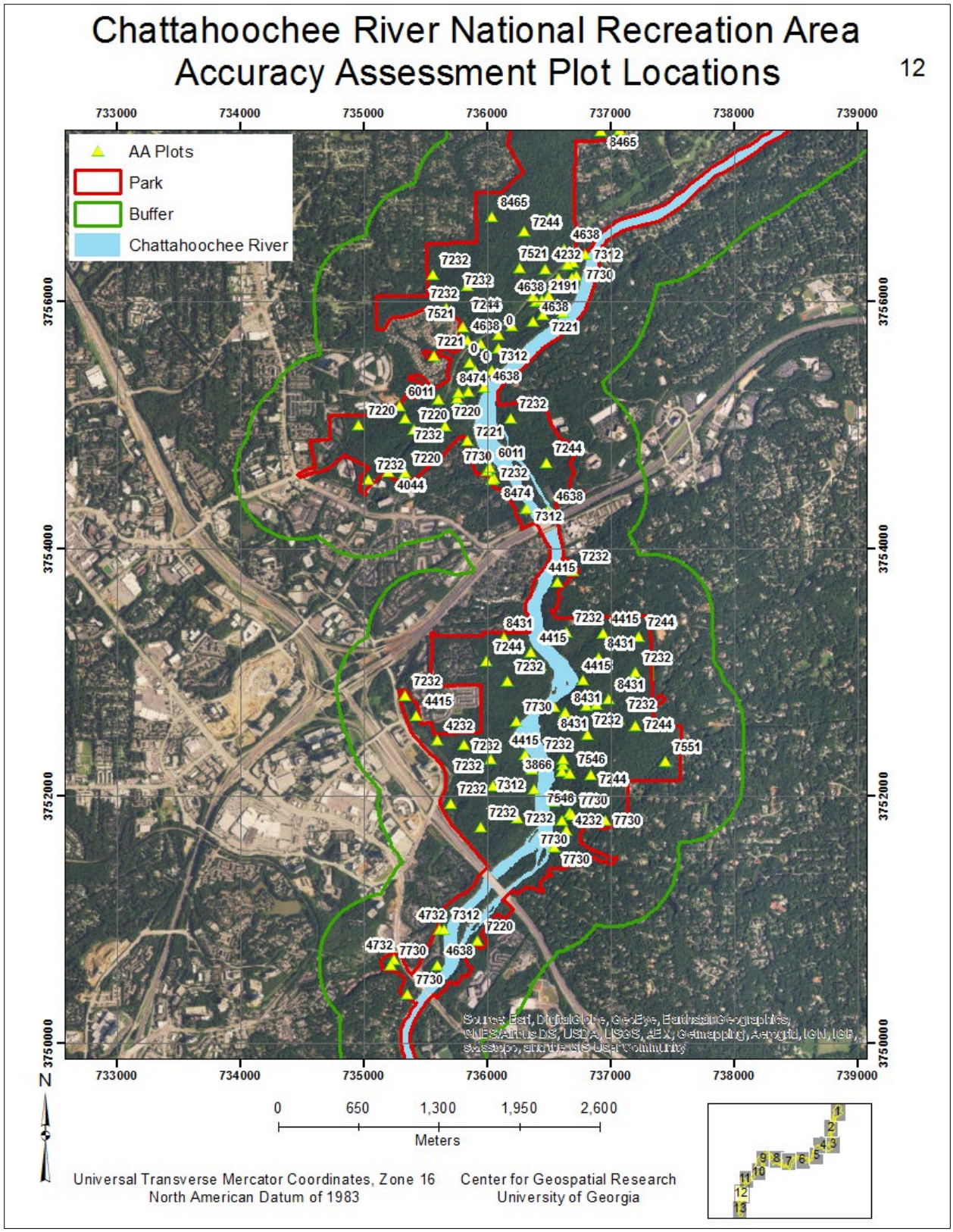


Figure G-12. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 12.

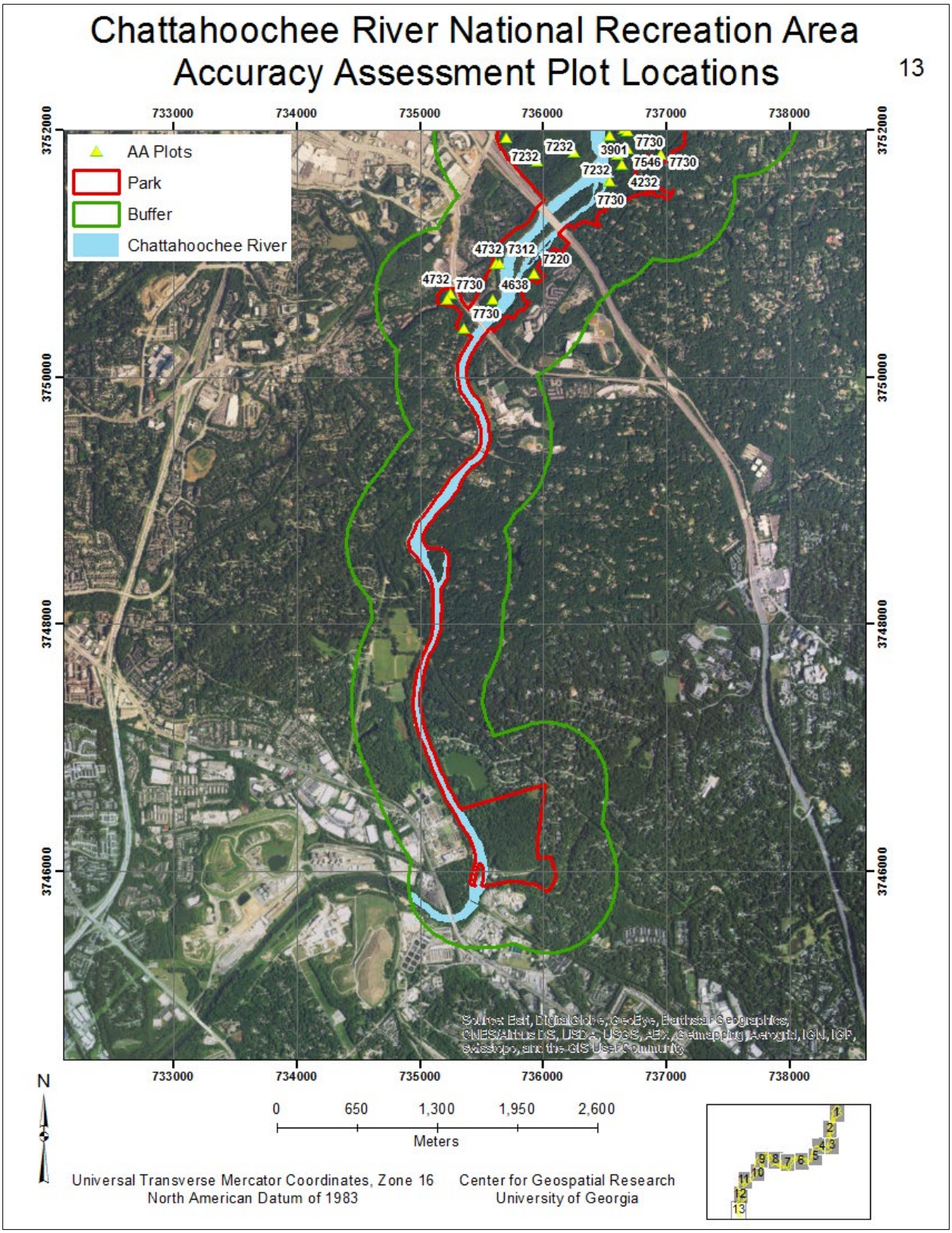


Figure G-13. Accuracy Assessment data collection locations from Chattahoochee National Recreation Area overlaid on visual imagery for Section 13.

Appendix H. Accuracy Assessment

Table H-1. Data points were acquired by Dave O'Loughlin, Jonathan Carr, Kirsten Hunt, Ben Cogdell, and Flynt Barksdale September through November of 2014.

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_025_001	CHAT_AA_025_001	10/4/2014	Dave O'Loughlin, Jonathan Carr	0.80	3901	3866	hydric soil. Soil texture is sandy clay loam, 2".	5/14/2015	David Oloughlin	21
CHAT_AA_025_002	CHAT_AA_025_002	10/5/2014	Dave O'Loughlin, Jonathan Carr	0.50	3901	0	Small stream south of point center. Beaver dam activity. Herbaceous layer most consistent with 4966. Soil texture is clay loam, 8".	5/14/2015	David Oloughlin	20
CHAT_AA_050_003	CHAT_AA_050_003	10/3/2014	Dave O'Loughlin, Jonathan Carr	1.00	2191	0	Long term inundation. Center of plot is mostly forested. Representativeness is good. Soil texture is clay loam, 22".	5/14/2015	David Oloughlin	21
CHAT_AA_050_004	CHAT_AA_050_004	10/4/2014	Dave O'Loughlin, Jonathan Carr	0.80	3901	0	Salix are trees here and easily most dominant. Representativness is good. Soil texture is clay loam, 4".	5/14/2015	David Oloughlin	21
CHAT_AA_050_005	CHAT_AA_050_005	10/3/2014	Dave O'Loughlin, Jonathan Carr	2.70	2191	0	Q. nigra on small row of hummocks. Representativeness is good. Soil texture is clay loam, 3".	5/14/2015	David Oloughlin	23
CHAT_AA_050_006	CHAT_AA_050_006	10/3/2014	Dave O'Loughlin, Jonathan Carr	1.10	2191	0	Hydric soil. Soil texture is clay loam, 2". Representativeness is good.	5/14/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_007	CHAT_AA_050_007	10/8/2014	Dave O'Loughlin, Jonathan Carr	1.30	7232	0	Southwest facing slope. Representativeness is good. Soil texture is loam, 3".	5/14/2015	David Oloughlin	21
CHAT_AA_050_008	CHAT_AA_050_008	10/8/2014	Dave O'Loughlin, Jonathan Carr	2.40	7730	0	Gently sloping east to small stream. Representativeness is good. Soil texture is loam, 8".	5/14/2015	David Oloughlin	22
CHAT_AA_050_009	CHAT_AA_050_009	10/10/2014	Dave O'Loughlin, Jonathan Carr	1.10	4542	0	Representativeness is good. Community may be slighlty more diverse that description in the community key. Soil texture is loam, 1".	5/14/2015	David Oloughlin	21
CHAT_AA_050_010	CHAT_AA_050_010	10/10/2014	Dave O'Loughlin, Jonathan Carr	1.70	7232	0	Center point above midslope on steep east facing slope. Representativeness is good. Soil texture is loam, 6".	5/14/2015	David Oloughlin	22
CHAT_AA_050_011	CHAT_AA_050_011	10/10/2014	Dave O'Loughlin, Jonathan Carr	3.20	4542	0	Southeast facing slope. Representativeness is fair. All community components are present but not necessarily dominant. Soil texture is loam, 2".	5/14/2015	David Oloughlin	23
CHAT_AA_050_012	CHAT_AA_050_012	10/30/2014	Jonathan Carr, Kirsten Hunt	0.80	0	0	NO FIT. Residential community to east. Center point on steep slope planted for erosion control. Best descried as planted loblolly. No soil sample taken; soil compacted.	5/14/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_013	CHAT_AA_050_013	10/30/2014	Jonathan Carr, Kirsten Hunt	0.90	0	0	NO FIT. Residential community to east of AA center. Center point on steep slope to west planted for erosion control. Best descried as planted loblolly. No soil sample taken.	5/14/2015	David Oloughlin	21
CHAT_AA_050_014	CHAT_AA_050_014	10/30/2014	Jonathan Carr, Kirsten Hunt	1.70	0	0	NO FIT. AA center south of Residential community. Center point on steep slope to southwest planted for erosion control. Best descried as planted loblolly/shortleaf pine shrudland. No soil sample taken.	5/14/2015	David Oloughlin	22
CHAT_AA_050_015	CHAT_AA_050_015	10/30/2014	Jonathan Carr, Kirsten Hunt	2.00	0	0	NO FIT. Residential community to north of AA center. AA plot on steep slope to west planted for erosion control. There is a stormwater bioretention area within the plot. Best descried as planted loblolly. No soil sample taken.	5/14/2015	David Oloughlin	22
CHAT_AA_050_016	CHAT_AA_050_016	9/30/2014	Dave O'Loughlin, Jonathan Carr	0.90	7232	0	Moderate slope s-se. Sparse to absent herbaceous layer. Representativeness is poor: No A. leucoderme but high abundance of C. florida. No Q. alba in canopy and no Q. rubra. Dominant oak is Q. coccinea. Soil texture is loam, 3".	5/14/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_017	CHAT_AA_050_017	9/30/2014	Dave O'Loughlin, Jonathan Carr	1.70	7244	0	Representativeness is good. Soil texture is loam, 2".	5/18/2015	David Oloughlin	22
CHAT_AA_050_018	CHAT_AA_050_018	10/25/2014	Dave O'Loughlin	0.20	7237	0	North facing slope down to road. Small pines near road. Representativeness is fair. Cornus and Pruus with Vaccinium. Soil texture is loam, 8".	5/18/2015	David Oloughlin	20
CHAT_AA_050_019	CHAT_AA_050_019	9/30/2014	Dave O'Loughlin, Jonathan Carr	2.00	8431	0	Representativeness is poor, missing several species in the community description. Soil texture is loam, depth is 3".	5/18/2015	David Oloughlin	22
CHAT_AA_050_020	CHAT_AA_050_020	10/29/2014	Dave O'Loughlin, Ben Cogdell	1.00	7220	0	Mid to top of ridge. Several large blowdowns creating openings. Hiking trail within sampling location. Representativeness is fair. Soil texture is sandy loam, 5".	5/18/2015	David Oloughlin	21
CHAT_AA_050_021.1	CHAT_AA_050_021.1	10/29/2014	Jonathan Carr, Kirsten Hunt	2.70	7521	0	Multiple jackpot pine blowdowns. Representativeness is good. Soil texture is loam, 1".	5/18/2015	David Oloughlin	23
CHAT_AA_050_021.2	CHAT_AA_050_021.2	10/29/2014	Jonathan Carr, Kirsten Hunt	0.80	8431	0	Center point just below ridge top on steep rocky slope to west-northwest rocks appear to be felsic(pink). Representativeness is good. Soil texture is loam, 1".	5/18/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_022	CHAT_AA_050_022	10/31/2014	Jonathan Carr, Kirsten Hunt	1.10	7244	0	Dirt road running east-west through the plot. Multiple Quercus spp. And pinus taeda blowdown. Site heavily invaded by microstegium. Canopy is relatively open. Sprinkler and pipng through plot. Site may be hydrologically manipulated. Representativeness is	5/18/2015	David Oloughlin	21
CHAT_AA_050_023.1	CHAT_AA_050_023.1	10/29/2014	Jonathan Carr, Kirsten Hunt	1.20	8431	0	Center point on midslope of south-southwest facing slope. Stream channel at toe of slope. Representativeness is fair, Quercus alba is a secondary dominant to co-dominant canopy species. Soil texture is loam, 1". Soil is shallow and rocky.	5/18/2015	David Oloughlin	21
CHAT_AA_050_023.2	CHAT_AA_050_023.2	10/29/2014	Jonathan Carr, Kirsten Hunt	3.70	4415	0	Center point on midsplope of steep north facing slope. Bed rock cliff exposure overlooking stream at toe of slope. Representativeness is good. Soil texture is loam, 1". Soil is shallow and rocky.	5/18/2015	David Oloughlin	24
CHAT_AA_050_024	CHAT_AA_050_024	10/23/2014	Dave O'Loughlin, Flynt Barksdale	0.60	4638	0	No slope. Very little canopy, < 30%. < 40 feet tall. Representativeness is good.	5/18/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_025	CHAT_AA_050_025	10/22/2014	Dave O'Loughlin, Flynt Barksdale	1.30	7546	7521	More loblolly dominant than 7521 but 7521 is secondary. Representativeness is good; however, there is a dense shrub layer and heavy invasive species component.	5/18/2015	David Oloughlin	21
CHAT_AA_050_026	CHAT_AA_050_026	10/29/2014	Jonathan Carr, Kirsten Hunt	3.20	4416	0	Center point near bottom of west-northwest facing slope. Epemeral to perennial channel runs through plot. Representativeness is poor, lacks shrubs assosciated with mafic substrates as desribed in the key but Ostraya virginiana is a dominant in the shrub	5/18/2015	David Oloughlin	23
CHAT_AA_050_027	CHAT_AA_050_027	10/29/2014	Jonathan Carr, Kirsten Hunt	0.70	4416	0	Center point is halfway up a steep north facing slope. Representativeness is poor, none of the species with mafic affinities in the community description are present in the community; however, Acer leucoderme is present in the subcanopy/ shrub layers. So	5/18/2015	David Oloughlin	21
CHAT_AA_050_028	CHAT_AA_050_028	10/29/2014	Jonathan Carr, Kirsten Hunt	3.70	7730	0	Center point in crenulation between 2 slopes (7730). Headwater stream flowing through plot Slope facing east dominated by Quercus prinus (8431). Slope facing west dominated by Q. alba and Carya alba (7730). Soil texture is clay loam, 4".	5/18/2015	David Oloughlin	24

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_029	CHAT_AA_050_029	10/2/2014	Dave O'Loughlin, Jonathan Carr	0.60	8431	0	Ridge top. Trail bisects plot. Representativeness is good. Soil texture is loam, 1".	5/18/2015	David Oloughlin	21
CHAT_AA_050_030	CHAT_AA_050_030	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.40	8431	0	Ridge top. Trail bisects plot. Sparse to absent herbaceous layer. Representativeness is good. Soil texture is loam, 6".	5/18/2015	David Oloughlin	21
CHAT_AA_050_031	CHAT_AA_050_031	10/31/2014	Jonathan Carr, Kirsten Hunt	1.10	7220	0	Center point in saddle between 2 slopes. Extensive loblolly and hardwood blowdown; however canopy is still relatively closed. Sprinkler system and piping through plot. Site may be hydrologically manipulated and invaded by microstegium. Representativenes	5/18/2015	David Oloughlin	21
CHAT_AA_050_032	CHAT_AA_050_032	10/31/2014	Jonathan Carr, Kirsten Hunt	0.60	7244	0	Center point in saddle between 2 slopes. Extensive oak blowdown; however canopy is still relatively closed. Sprinkler system and piping through plot. Site may be hydrologically manipulated. Representativeness is poor, Quercus falcata is not a canopy domi	5/18/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_033	CHAT_AA_050_033	10/31/2014	Jonathan Carr, Kirsten Hunt	1.30	7244	0	Significant oak and loblolly blowdown. Canopy relatively open. Site is heavily invaded by microstegeum. Sprinkler and piping through plot, may be hydrologically manipulated. Representativeness is fair, Quercus falcata is not an overwhelming dominant. Soi	5/18/2015	David Oloughlin	21
CHAT_AA_050_034	CHAT_AA_050_034	10/31/2014	Jonathan Carr, Kirsten Hunt	2.00	7521	0	Center point on old road bed running through plot. Some jackpot pine blowdown. Loblolly still a significant component. Invaded by microstegium, possible hydrologicially manipulated. Representativeness is good. Soil texture is loam, 2".	5/18/2015	David Oloughlin	22
CHAT_AA_050_035	CHAT_AA_050_035	10/2/2014	Dave O'Loughlin, Jonathan Carr	2.50	7244	0	Representativeness is good. Soil texture is loam, 2".	5/18/2015	David Oloughlin	22
CHAT_AA_050_036	CHAT_AA_050_036	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.00	8431	0	Center point on ridge top. Plot bisected by trail. Representativeness is good. Soil texture is loam, 3".	5/18/2015	David Oloughlin	21
CHAT_AA_050_037	CHAT_AA_050_037	10/22/2014	Dave O'Loughlin, Flynt Barksdale	5.60	7521	4638	Lots of pine stumps. Sparse canopy. Secondary more water oak than other examples. Soil texture is loam, 4".	5/18/2015	David Oloughlin	26

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_038	CHAT_AA_050_038	10/22/2014	Dave O'Loughlin, Flynt Barksdale	0.90	7521	0	Old farm terraces. Lots of downed pines Trail crosses plot south of center. Representativeness is good. Soil texture is loam 8"".	5/18/2015	David Oloughlin	21
CHAT_AA_050_039	CHAT_AA_050_039	10/22/2014	Dave O'Loughlin, Flynt Barksdale	1.10	7521	0	Lots of downed pines. Representativeness is good. Soil texture is loam, 2".	5/18/2015	David Oloughlin	21
CHAT_AA_050_040	CHAT_AA_050_040	10/23/2014	Dave O'Loughlin, Flynt Barksdale	1.40	7220	0	Moderate slope with relict terraces. Representativeness is good. Soil texture is loam, 6".	5/18/2015	David Oloughlin	21
CHAT_AA_050_041	CHAT_AA_050_041	10/23/2014	Dave O'Loughlin, Flynt Barksdale	1.20	7220	0	Clear relict terraces. Moderate to gentle slope. Representativeness is good. Soil texture is loam, 4".	5/18/2015	David Oloughlin	21
CHAT_AA_050_042	CHAT_AA_050_042	10/23/2014	Dave O'Loughlin, Flynt Barksdale	1.00	4638	0	Slight slope to the south. Representativeness is good. Soil texture is loam, 3".	5/18/2015	David Oloughlin	21
CHAT_AA_050_043	CHAT_AA_050_043	10/23/2014	Dave O'Loughlin, Flynt Barksdale	0.80	4638	0	Gentle slope and minimal canopy, < 20% core. Representativeness is fair. Lack of other Quercus spp. Soil texture is loam, 12".	5/18/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_044	CHAT_AA_050_044	10/22/2014	Dave O'Loughlin, Flynt Barksdale	0.90	7521	0	Moderate to no slope. Successional? Relict terracing? Representativeness is good. Soil texture is loam, 6".	5/18/2015	David Oloughlin	21
CHAT_AA_050_045	CHAT_AA_050_045	10/22/2014	Dave O'Loughlin, Flynt Barksdale	2.10	7521	0	Representativeness is good. Soil texture is loam, 3".	5/18/2015	David Oloughlin	22
CHAT_AA_050_046	CHAT_AA_050_046	10/5/2014	Dave O'Loughlin, Jonathan Carr	0.50	8474	4112	Inundated. Alder pond occupies higher points surrounding rush marsh. Representativeness is good. O horizon depth is 4"".	5/18/2015	David Oloughlin	20
CHAT_AA_050_047	CHAT_AA_050_047	10/7/2014	Dave O'Loughlin, Jonathan Carr	0.60	3901	4112	Gas easement runs through plot. Beaver dammed stream. Representativeness is good. Soil texture is silty clay, 4".	5/18/2015	David Oloughlin	21
CHAT_AA_050_048	CHAT_AA_050_048	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.50	4966	0	Inundated herbaceous wetland. Gas line easement runs north to south east of center. Road ROW buffer vegetation to west dominated by loblolly and tulp poplar. Deep channel running nort-south through plot. Representativeness is good. Soil texture is muck,	5/18/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_049	CHAT_AA_050_049	10/27/2014	Dave O'Loughlin, Jonathan Carr	0.60	4112	0	Plot largely open water due to beaver dam, offset plot center point due to depth of muck. Representativeness is good.	5/18/2015	David Oloughlin	21
CHAT_AA_050_050	CHAT_AA_050_050	11/2/2014	Jonathan Carr, Kirsten Hunt	0.50	2191	0	Plot on palustrine scrub/shrub wetland. No surface hydrology. Representativeness is good. Soil texture is clay loam, 2".	5/18/2015	David Oloughlin	20
CHAT_AA_050_051	CHAT_AA_050_051	11/2/2014	Jonathan Carr, Kirsten Hunt	0.10	2191	0	Plot a palustrine scrub/shrub wetland. Surface hydrology absent; however high water marks on tress and buttressed trunks. Representativeness is good. Soil texture is clay loam, 2".	5/18/2015	David Oloughlin	20
CHAT_AA_050_052	CHAT_AA_050_052	9/30/2014	Dave O'Loughlin, Jonathan Carr	1.50	4415	0	Steep slope to river. Sparse to absent herbaceous. Representativeness is good. Soil texture is loam, 5".	5/18/2015	David Oloughlin	22
CHAT_AA_050_053	CHAT_AA_050_053	10/1/2014	Dave O'Loughlin, Jonathan Carr	1.80	4415	0	Steep slope to river. North facing slope. Representativeness is good. Soil textur is loam, 4".	5/18/2015	David Oloughlin	22
CHAT_AA_050_054	CHAT_AA_050_054	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.50	7244	0	Plot in crenulation between 2 slopes, midway upslope facing southeast. Representativeness is good. Soil texture is loam.	5/18/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_055	CHAT_AA_050_055	10/2/2014	Dave O'Loughlin, Jonathan Carr	0.80	4415	0	Close as we felt safe to the center of the plot. Could see entire plot though. Bluff opens up into a gorge. Soil texture is loam, 1".	5/18/2015	David Oloughlin	21
CHAT_AA_050_056	CHAT_AA_050_056	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.10	8431	0	Plot slightly downslope from ridgetop on north facing slope. Soil texture is loam, 1".	5/18/2015	David Oloughlin	21
CHAT_AA_050_057	CHAT_AA_050_057	10/22/2014	Dave O'Loughlin, Flynt Barksdale	1.20	4415	0	North slope towards creek. Plot at midslope. Trail just south of center point. Top of plot near ridge. GPS offset due to yellow jacket nest. Representativeness is good. Soil texture is loam, 8".	5/18/2015	David Oloughlin	21
CHAT_AA_050_058	CHAT_AA_050_058	10/22/2014	Dave O'Loughlin, Flynt Barksdale	1.20	4638	0	Gently sloping north. High spot Fewer stumps. Representativeness is good.	5/18/2015	David Oloughlin	21
CHAT_AA_050_059	CHAT_AA_050_059	10/22/2014	Dave O'Loughlin, Flynt Barksdale	3.40	8431	0	Ridgetop, tail looping around center point. Representativeness is good. Soil texture is loam, 6".	5/18/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_060	CHAT_AA_050_060	11/6/2014	Jonathan Carr, Kirsten Hunt	2.80	6011	0	Plot just below ridgetop on gentle west facing slope. Some jackpot pine blowdown in plot. Representativeness is poor, Pinus echinata is the primary canopy dominant followed by P. taeda. Quercus spp. are present in the subcanopy. Soil texture is loam, 2"	5/18/2015	David Oloughlin	23
CHAT_AA_050_061	CHAT_AA_050_061	11/6/2014	Jonathan Carr, Kirsten Hunt	0.70	7244	0	Plot on ridgetop Loblolly snags and blowdown present. Representativeness is fair, Quercus coccinea is the overwhelming dominant. Q. falcata is secondary canopy dominant. Soil texture is loam, 3".	5/18/2015	David Oloughlin	21
CHAT_AA_050_062	CHAT_AA_050_062	9/30/2014	Dave O'Loughlin, Jonathan Carr	1.00	4415	4232	Steep slope to river. Representativeness is good. Soil texture is loam, 4".	5/18/2015	David Oloughlin	21
CHAT_AA_050_063	CHAT_AA_050_063	10/22/2014	Dave O'Loughlin, Flynt Barksdale	2.20	4415	0	North facing steep slope. Trail through plot center. Representativeness is good. Soil texture is loam, 8".	5/18/2015	David Oloughlin	22
CHAT_AA_050_064	CHAT_AA_050_064	9/29/2014	Dave O'Loughlin, Jonathan Carr	3.20	8431	0	Ridgetop. Representativeness is good. Soil texture is loam, 4".	5/18/2015	David Oloughlin	23
CHAT_AA_050_065	CHAT_AA_050_065	9/30/2014	Dave O'Loughlin, Jonathan Carr	3.20	4415	0	Representativeness is good. Soil texture is loam, 6".	5/19/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_066	CHAT_AA_050_066	9/30/2014	Dave O'Loughlin, Jonathan Carr	0.30	8431	0	East facing slope. Representativeness is good. Quercus rubra instead of Q. falcata. Soil texture is loam, 4".	5/19/2015	David Oloughlin	20
CHAT_AA_050_067	CHAT_AA_050_067	10/23/2014	Dave O'Loughlin, Flynt Barksdale	0.70	8431	0	Moderately steep slope to deep valley/draw. Trail bisects plot. Representativeness is good, yet site is more mesic due to northern aspect. Soil texture is loam, 8".	5/19/2015	David Oloughlin	21
CHAT_AA_050_068	CHAT_AA_050_068	10/29/2014	Jonathan Carr, Kirsten Hunt	1.20	7232	0	Plot center just outside of crenulation on west facing slope. Stream runs through plot. Representativeness is good; however, Acer leucoderme is nearly absent from the shrub layer. Soil texture is loam, 2".	5/19/2015	David Oloughlin	21
CHAT_AA_050_069	CHAT_AA_050_069	10/29/2014	Jonathan Carr, Kirsten Hunt	0.60	7244	7251	Multiple jackpot pine blowdown, far along in decaying. Representativeness is good, but young forest. Quercus falcata has reached height of the Liriodendron tulipifera in the canopy but most of the Q. falcata are in the subcanopy. Q. falcata is the most d	5/19/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_070	CHAT_AA_050_070	10/29/2014	Jonathan Carr, Kirsten Hunt	2.20	7232	0	Plot center below midslope of steep east facing slope. Stream at base of slope. Representativeness is poor, Fagus grandiflolia is relativley prevelant in canopy, subcanopy and shrub layers. Quercus prinus is more prevelant that Q. alba. Soil texture is l	5/19/2015	David Oloughlin	22
CHAT_AA_050_071	CHAT_AA_050_071	10/29/2014	Dave O'Loughlin, Ben Cogdell	1.70	7232	0	East facing midslope. Representativeness is good. Soil texture is loam, 3".	5/19/2015	David Oloughlin	22
CHAT_AA_050_072	CHAT_AA_050_072	10/1/2014	Dave O'Loughlin, Jonathan Carr	0.90	8431	0	Ridge top. Plot bisected by trail. Representativeness is good; however, while Quercus prinus is a canopy component. Soil texture is loam, 3".	5/19/2015	David Oloughlin	21
CHAT_AA_050_073	CHAT_AA_050_073	11/6/2014	Jonathan Carr, Kirsten Hunt	0.90	7244	0	Ridge top. Representativeness is fair to poor; canopy/ subcanopy is overwhelmingly dominated by Q. alba, followed by Q. coccinea/ Q. stellata. Soil texture is sandy loam, 2".	5/19/2015	David Oloughlin	21
CHAT_AA_050_074	CHAT_AA_050_074	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.40	4112	3901	Herbaceous wetland bordered by Salix shrub/forest. Representativeness for both communities is good. Soil texture is silty clay, 4".	5/19/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_075	CHAT_AA_050_075	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.50	3901	4112	Herbaceous wetland bordered by Salix shrub/forest to north, east and west. Soil texture is clay loam, 4".	5/19/2015	David Oloughlin	20
CHAT_AA_050_076	CHAT_AA_050_076	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.70	4112	0	Herbaceous wetland surrounded by Salix shrub/forest to east and south. Road ROW buffer vegetation dominated by loblolly pine and tulip poplar. Representativeness is good. Soil texture is sandy clay, 8".	5/19/2015	David Oloughlin	21
CHAT_AA_050_077	CHAT_AA_050_077	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.60	3901	4966	Road ROW buffer vegetation dominated by loblolly wet of plot center	4/16/2015	David Oloughlin	21
CHAT_AA_050_078	CHAT_AA_050_078	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.50	4112	0	Herbaceous wetland surrounded by Salix shrub/forest to east dominated by loblolly pine and tulip poplar and box elder to the west. wetland approx. 100 - 130 ft wide. Representativeness is good. Soil texture is clay loam, 4".	5/19/2015	David Oloughlin	20
CHAT_AA_050_079	CHAT_AA_050_079	10/31/2014	Dave O'Loughlin, Ben Cogdell	1.20	0	0	NO FIT. planted tallow tree cutover. Loblolly volunteer. Tallow tree is dominant. Soil texture is clay loam, 10".	5/19/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_080	CHAT_AA_050_080	10/31/2014	Dave O'Loughlin, Ben Cogdell	2.20	7730	0	Within CHAT river floodplain. Cultivated boxelder. Representativeness is poor, planted green ash, boxelder and other hardwood. Soil texture is loam, 4".	5/19/2015	David Oloughlin	22
CHAT_AA_050_081	CHAT_AA_050_081	10/31/2014	Dave O'Loughlin, Ben Cogdell	0.80	7730	0	Cultivated boxelder and green ash thicket. Representativeness is poor, planted Acer negundo. Soil texture is loam, 6".	5/19/2015	David Oloughlin	21
CHAT_AA_050_082	CHAT_AA_050_082	10/31/2014	Dave O'Loughlin, Ben Cogdell	1.60	7730	0	Some planted boxelder. Representativeness is good. Soil texture is loam, 6".	5/19/2015	David Oloughlin	22
CHAT_AA_050_083	CHAT_AA_050_083	10/31/2014	Dave O'Loughlin, Ben Cogdell	0.70	4638	0	Old levee. Planted boxelder and tallow tree creeping into plot from the east. Representativeness is fair. Soil texture is loam, 7".	5/19/2015	David Oloughlin	21
CHAT_AA_050_084	CHAT_AA_050_084	10/31/2014	Dave O'Loughlin, Ben Cogdell	1.40	0	0	NO FIT. plot center on the western edge of what appears to be planted tallow tree. Old levee. Oaks creeping into plot from the west. Soil texture is loam, 3".	5/19/2015	David Oloughlin	21
CHAT_AA_050_085	CHAT_AA_050_085	10/31/2014	Dave O'Loughlin, Ben Cogdell	0.70	7730	0	Boxelder cultivation and planted pine to the south-separate community. Representativeness is poor, planted Acer negundo. Soil texture is loam, 6".	5/19/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_086	CHAT_AA_050_086	11/1/2014	Dave O'Loughlin, Ben Cogdell	1.50	3901	0	75 ft south of the center is successional water oak forest. Majority of plot is shrubland. Representativeness is fair, mostly Liquidambar styraciflua. Soil texture is clay, 2.5'.	5/19/2015	David Oloughlin	22
CHAT_AA_050_087	CHAT_AA_050_087	11/1/2014	Dave O'Loughlin, Ben Cogdell	1.50	3901	0	Representativeness is good. Soil texture is clay, 18".	5/19/2015	David Oloughlin	22
CHAT_AA_050_088	CHAT_AA_050_088	11/1/2014	Dave O'Loughlin, Ben Cogdell	1.30	3901	0	Representativeness is good. Soil texture is clay, 3".	5/19/2015	David Oloughlin	21
CHAT_AA_050_089	CHAT_AA_050_089	11/5/2014	Jonathan Carr, Kirsten Hunt	0.20	0	0	Cultural Wet Meadow (KEMO). Plot in herbaceous dominated opening. Shrubby trees scattered throughout. Representativeness is good, some early successional/ invasive trees(shrubs) are present in the plot. Soil texture is clay loam, 3".	5/19/2015	David Oloughlin	20
CHAT_AA_050_090	CHAT_AA_050_090	11/5/2014	Jonathan Carr, Kirsten Hunt	0.50	7432	0	Plot in Rubus dominated thicket with sparse trees. Representativeness is fair, not assosciated with powerline ROW. Early successional/ invasive trees are present. Soil texture is clay loam, 2".	5/19/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_091	CHAT_AA_050_091	11/5/2014	Jonathan Carr, Kirsten Hunt	0.30	4112	0	Graminoid dominated with few shrubby trees. Representativeness is good. Soil texture is clay loam, 2".	5/19/2015	David Oloughlin	20
CHAT_AA_050_092	CHAT_AA_050_092	10/5/2014	Dave O'Loughlin, Jonathan Carr	1.30	3901	0	Steep north facing slope to south of plot center. Stream running south to north bisects center point beaver impoundment within plot. Many downed trees due to beaver north of the center. Herbaceous wetland where breaks in the canopy occur. Representativen	5/19/2015	David Oloughlin	21
CHAT_AA_050_093	CHAT_AA_050_093	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.30	0	4966	NO FIT. Privet most dominant with the rest boxelder less than 20 ft. wet strip to the east of plot center. Histotically knotweed pondshore? Choked out by murdania. Soil texture is sandy loam, 2".	5/19/2015	David Oloughlin	21
CHAT_AA_050_094	CHAT_AA_050_094	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.40	0	0	NO FIT. planted boxelder. Even aged. Soil texture is clay loam, 20".	5/19/2015	David Oloughlin	21
CHAT_AA_050_095	CHAT_AA_050_095	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.70	8474	0	Inundated. Representativeness is fair; Salix nigra is a large component. Soil texture is muck, 4", and silty clay, 2".	5/19/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_096	CHAT_AA_050_096	10/7/2014	Dave O'Loughlin, Jonathan Carr	1.00	4732	0	Bordered by Salix nigra stream community to the south and boxelder to the north. Representativeness is poor. Soil texture is sandy loam, 4".	5/19/2015	David Oloughlin	21
CHAT_AA_050_097	CHAT_AA_050_097	10/7/2014	Dave O'Loughlin, Jonathan Carr	0.30	0	0	NO FIT. bordered by Salix nigra stream community to the west. boxelder looks planted. Soil texture is sandy loam, 5".	5/19/2015	David Oloughlin	20
CHAT_AA_050_098	CHAT_AA_050_098	10/8/2014	Dave O'Loughlin, Jonathan Carr	5.40	3901	4966	Salix nigra dominated shrubland with privet dominated understory to the southeast of center. Dense herbaceous layer present in canopy breaks. Vegetation change appears to be due to topo break and saturation. Planted boxelder to the est. Representativenes	5/19/2015	David Oloughlin	25
CHAT_AA_050_099	CHAT_AA_050_099	10/8/2014	Dave O'Loughlin, Jonathan Carr	1.10	3901	0	Representativeness is good. Soil texture is clay loam, 20".	5/19/2015	David Oloughlin	21
CHAT_AA_050_100	CHAT_AA_050_100	10/27/2014	Dave O'Loughlin, Jonathan Carr	1.00	3866	4415	Center point in riverine emergent wetland eastern 1/3 of plot is hillslope forested broadleaf vegetation. Secondary community best described as 4415. Representativeness is fair, Scirpus cyperinus covers between 10-15% of plot area. Typhy latifolia is pri	5/19/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_101	CHAT_AA_050_101	10/27/2014	Dave O'Loughlin, Jonathan Carr	0.80	3901	0	Plot partially covered by a beaver dam. Representativeness is good. Soil texture is muck, 3'.	5/19/2015	David Oloughlin	21
CHAT_AA_050_102.1	CHAT_AA_050_102.1	11/5/2014	Jonathan Carr, Kirsten Hunt	0.80	2191	3901	Original center point on ecotone between floodplain and shrub/scrub wetland. This plot on shrub/scrub. No hydrology. Shallow ditching in plot. Representativeness for both the primary and secondary communities is good. Soil texture is clay loam, 2".	5/19/2015	David Oloughlin	21
CHAT_AA_050_102.2	CHAT_AA_050_102.2	11/5/2014	Jonathan Carr, Kirsten Hunt	2.40	7730	0	original center point on ecotone between floodplain and shrub/scrub wetland. This plot on floodplain forest. Representativeness is poor, best described as red maple-sweetgum-green ash successional floodplain forest. Soil texture is loam, 1".	5/19/2015	David Oloughlin	22
CHAT_AA_050_103	CHAT_AA_050_103	10/1/2014	Dave O'Loughlin, Jonathan Carr	1.70	7730	0	Plot adjacent to river and shoal to west-northwest. Plot also adjacent to maintained lawn to east-southeast. Trail bisects plot. Understory dominated by privet. Representativeness is good. Soil texture is loam, 2".	5/19/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_104	CHAT_AA_050_104	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.70	4638	7321	Levee forest. Fairly diverse herbaceous layer. Appears that plot is no longer actively flooded. Representativeness is good. Soil texture is sandy loam, 12".	5/19/2015	David Oloughlin	22
CHAT_AA_050_105	CHAT_AA_050_105	10/3/2014	Dave O'Loughlin, Jonathan Carr	0.80	7312	0	Plot adjacent to parking lot. Plot is active or historic Levee forest. Representativeness is fair, Betula nigra does not compose 50% of the canopy. Quercus nigra is a canopy dominant. Soil texture is loam, 24".	5/19/2015	David Oloughlin	21
CHAT_AA_050_106	CHAT_AA_050_106	10/4/2014	Dave O'Loughlin, Jonathan Carr	2.90	7312	0	Disconnected backwater slough. Representativeness is good. Soil texture is loam, 2".	5/19/2015	David Oloughlin	23
CHAT_AA_050_107	CHAT_AA_050_107	10/3/2014	Dave O'Loughlin, Jonathan Carr	4.60	7312	7551	Maintained utility easement bisects plot. Levee forest adjacent to river. Secondary community northwest of center. Representativeness is good, Quercus nigra are largest canopy trees but Betula nigra are most abundant. Soil texture is clay loam, 3".	5/19/2015	David Oloughlin	25

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_108	CHAT_AA_050_108	10/3/2014	Dave O'Loughlin, Jonathan Carr	0.60	7312	0	Maintained powerline easement to west of center. Neither the river nor the depositional levee was observed from the plot center. Representativeness is good. Soil texture is loam, 10".	5/19/2015	David Oloughlin	21
CHAT_AA_050_109	CHAT_AA_050_109	10/30/2014	Dave O'Loughlin, Ben Cogdell	0.80	4638	0	Plot center 60' north of Chattahoochee bank. Representativeness is good. Soil texture is loam, 3'.	5/19/2015	David Oloughlin	21
CHAT_AA_050_110	CHAT_AA_050_110	11/5/2014	Jonathan Carr, Kirsten Hunt	1.50	7312	0	Plot on levee forest. Just under 1/2 of plot on river. No signs o recent inundation or deposition. Site heavily invaded by privet. Multiple river birch blowdowns. Representativeness is good. Soil texture is clay loam, 3".	5/19/2015	David Oloughlin	22
CHAT_AA_050_111	CHAT_AA_050_111	11/5/2014	Jonathan Carr, Kirsten Hunt	1.90	7220	0	Center point on terrace. No signs of inundation or recent deposition. Half of plot dominated by privet. Representativeness is good; however, Juglans nigra and Celtis laevigata are significant components.. Soil texture is clay loam, 2".	5/19/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_112	CHAT_AA_050_112	11/6/2014	Jonathan Carr, Kirsten Hunt	1.40	7730	0	Center point on terrace. Sewer line ROW running north-south through plot east of the center. Representativeness is good. Soil texture is clay loam, 4".	5/19/2015	David Oloughlin	21
CHAT_AA_050_113	CHAT_AA_050_113	11/1/2014	Dave O'Loughlin, Ben Cogdell	1.20	4232	0	Representativeness is good. Soil texture is sand, 5".	5/19/2015	David Oloughlin	21
CHAT_AA_050_115	CHAT_AA_050_115	11/1/2014	Dave O'Loughlin, Ben Cogdell	0.90	4232	0	Representativeness is good. Soil texture is loam, 5".	5/19/2015	David Oloughlin	21
CHAT_AA_050_116	CHAT_AA_050_116	11/5/2014	Jonathan Carr, Kirsten Hunt	0.80	0	7178	NO FIT. Planted Virginia pine bordered to the east and west by white pine. Strip of planted Va. Pine ~100-120 ft. wide. &178 to east and west of center. Soil texture is clay loam, 3".	5/19/2015	David Oloughlin	21
CHAT_AA_050_117	CHAT_AA_050_117	11/5/2014	Jonathan Carr, Kirsten Hunt	3.00	0	0	NO FIT. Plot on flat. Residential development to the west of center. Soil texture is clay loam, 3".	5/19/2015	David Oloughlin	23
CHAT_AA_050_118.1	CHAT_AA_050_118.1	11/5/2014	Jonathan Carr, Kirsten Hunt	1.60	7178	0	Original center point on ecotone between mixed loblolly/tuliptree forest and old white pine forest. Pine blowdown is present. Representativeness is good. Soil texture is clay loam, 2".	5/19/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_118.2	CHAT_AA_050_118.2	11/5/2014	Jonathan Carr, Kirsten Hunt	1.60	7730	0	Original center point on ecotone between mixed loblolly/tuliptree forest and old white pine forest. New center point in successional tuliptree forest. Heavily invaded by microstegium. Representativeness is good; however, Lindera benzoin is absent and her	5/19/2015	David Oloughlin	22
CHAT_AA_050_119	CHAT_AA_050_119	11/5/2014	Jonathan Carr, Kirsten Hunt	0.50	6011	0	Plot on successional woodland forest. Pine blowdown evident. Site heavily invaded by microstegium. Southeast of tennis courts Heavily disturbed. Representativeness is poor; Pinus virginiana is overwhelming dominant. Very few Liriodendron tulipifera in	5/19/2015	David Oloughlin	20
CHAT_AA_050_120	CHAT_AA_050_120	11/5/2014	Jonathan Carr, Kirsten Hunt	6.40	6011	0	Paved road to the east of the center. Plot on planted pine in rows. Representativeness is fair, pines are planted in rows and understory species non cinsistent with key. Soil texture is loamy sand, 4".	5/19/2015	David Oloughlin	26
CHAT_AA_050_121.1	CHAT_AA_050_121.1	11/5/2014	Jonathan Carr, Kirsten Hunt	1.30	4638	0	Plot on terrace. Representativeness is good; however, Carya cordiformis is a significant canopy component. Soil texture is loamy sand, 4"	5/19/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_121.2	CHAT_AA_050_121.2	11/5/2014	Jonathan Carr, Kirsten Hunt	2.50	6011	0	Paved road runs north-south through plot. Representativeness is fair, understory components are not consistent with key. Soil texture is loamy sand, 4".	5/19/2015	David Oloughlin	22
CHAT_AA_050_122.1	CHAT_AA_050_122.1	11/5/2014	Jonathan Carr, Kirsten Hunt	2.20	6011	0	Original center on ecotone between broadleaf community and planted loblolly. New center in loblolly. Representativeness is good; however, pines are planded and in rows. Soil texture is loamy sand, 14".	5/19/2015	David Oloughlin	22
CHAT_AA_050_122.2	CHAT_AA_050_122.2	11/5/2014	Jonathan Carr, Kirsten Hunt	0.70	4638	0	Plot on terrace. Representativeness is good; however, Carya cordiformis is a significant community component. Soil texture is sandy loam, 3".	5/19/2015	David Oloughlin	21
CHAT_AA_050_123	CHAT_AA_050_123	11/5/2014	Jonathan Carr, Kirsten Hunt	3.50	6011	0	Plot on level terrain. In planted pine. Representativeness is good; however, pines are planted in rows. Soil texture is loamy sand, 14".	5/19/2015	David Oloughlin	24
CHAT_AA_050_124	CHAT_AA_050_124	11/1/2014	Dave O'Loughlin, Ben Cogdell	2.40	6011	0	Small wooded block situated between 2 active dog parks. Representativeness is good. Soil texture is loam, 5".	5/19/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_125	CHAT_AA_050_125	11/1/2014	Dave O'Loughlin, Ben Cogdell	1.60	4638	0	Representativeness is good. Soil texture is loam, 3".	5/19/2015	David Oloughlin	22
CHAT_AA_050_126	CHAT_AA_050_126	11/5/2014	Jonathan Carr, Kirsten Hunt	1.30	6011	0	Plot on flat topography. Some pine blowdown. Site heavily invaded by microstegium. Early to mid-successional forest. Representativeness is poor; Pinus virginiana overwhelming dominant. P. taeda sparse in canopy. Very few Liriodendron and Liquidambar. No	5/19/2015	David Oloughlin	21
CHAT_AA_050_127	CHAT_AA_050_127	11/5/2014	Jonathan Carr, Kirsten Hunt	3.90	7178	0	Plot center on old access road. Flat topo. Sparse to absent herb layer. Representativeness is good. Soil texture is sandy loam, 2".	5/19/2015	David Oloughlin	24
CHAT_AA_050_128	CHAT_AA_050_128	11/5/2014	Jonathan Carr, Kirsten Hunt	3.20	6011	0	Plot on flat terrain. Representativeness is good. Soil texture is clay loam, 4".	5/19/2015	David Oloughlin	23
CHAT_AA_050_129.1	CHAT_AA_050_129.1	9/29/2014	Dave O'Loughlin, Jonathan Carr	0.20	4732	0	Center point in sewer easement primarily composed of disturbed shrubs with secondary wet depression communities. Community is mowed. Nothing above 6 feet tall. ROW is 50 ft wide on either side of center point. Representativeness is poor. Soil texture is	5/19/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_129.2	CHAT_AA_050_129.2	9/29/2014	Dave O'Loughlin, Jonathan Carr	1.50	7730	0	Small incised stream runs through center of plot. Subcanopy shrub layer strongly dominated by privet. Herbs sparse to absent. Representativeness is fair, community is missing Platanus occidentalis and Celtis laevigata. Subcanopy and shrub dominated almos	5/19/2015	David Oloughlin	22
CHAT_AA_050_130.1	CHAT_AA_050_130.1	9/29/2014	Dave O'Loughlin, Jonathan Carr	2.40	4732	0	Plot in disturbed powerline ROW. Small stream running through center point. Representativeness is good. Soil texture is sandy loam, 3".	5/19/2015	David Oloughlin	22
CHAT_AA_050_130.2	CHAT_AA_050_130.2	9/29/2014	Dave O'Loughlin, Jonathan Carr	1.40	7312	0	Powerline easement to the west. Chattahoochee River to the east. Does not appear to have been flooded recently but does appear to be in floodplain levee forest. Representativeness is fair, less than 50% Betula nigra canopy cover. Carya ovalis is also pr	5/19/2015	David Oloughlin	21
CHAT_AA_050_131	CHAT_AA_050_131	10/5/2014	Dave O'Loughlin, Jonathan Carr	1.00	4044	0	Mowed. To east mixed hardwoods and to the west loblolly/tuliptree forest. Soil texture is clay loam, 6".	5/19/2015	David Oloughlin	21
CHAT_AA_050_132	CHAT_AA_050_132	10/3/2014	Dave O'Loughlin, Jonathan Carr	0.70	0	0	NO FIT. Privet thicket with a few trees. Soil texture is clay loam, 2".	5/19/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_133	CHAT_AA_050_133	10/3/2014	Dave O'Loughlin, Jonathan Carr	1.20	7221	0	Open. Forest surrounding. Representativeness is good. Soil texture is sandy loam, 2".	5/19/2015	David Oloughlin	21
CHAT_AA_050_134	CHAT_AA_050_134	10/6/2014	Dave O'Loughlin, Jonathan Carr	0.70	4732	0	Center in maintained easement. Trail runs north-south through center. Vegetation is mowed. Representativeness is good. Soil texture is clay loam, 3".	5/19/2015	David Oloughlin	21
CHAT_AA_050_135	CHAT_AA_050_135	10/3/2014	Dave O'Loughlin, Jonathan Carr	0.60	3866	6011	Maintained utility line. Representativeness is fair, Cyperus sp. is dominant rather than Scirpus cyperinus. Soil texture is loam, 5".	5/19/2015	David Oloughlin	21
CHAT_AA_050_136	CHAT_AA_050_136	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.80	3901	0	Gas easement runs roughly north-south through center. Dwarf shrubland and herb community persist in easement. Herb layer persist in canopy breaks. Representativeness is good. Soil texture is clay loam, 24".	5/19/2015	David Oloughlin	21
CHAT_AA_050_137	CHAT_AA_050_137	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.50	4732	0	Blackberry shrubland bordered by road to the west. Representativeness is good. Soil texture is sandy loam, 3".	5/19/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_138	CHAT_AA_050_138	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.60	4732	0	Linear depression with some wetland adjacent sewer line Mowed sewer line. Loblolly/tuliptree forest along eastern edge. Representativeness is fair. Soil texture is clay loam, 3".	5/19/2015	David Oloughlin	21
CHAT_AA_050_139	CHAT_AA_050_139	10/8/2014	Dave O'Loughlin, Jonathan Carr	0.60	4044	0	Mowed sewer line 70-80ft wide bordered by young sweetgum, tuliptree, loblolly saplings to the south. Streamside Salix community to the north. Representativeness is good. Soil texture is loam, 5".	5/19/2015	David Oloughlin	21
CHAT_AA_050_140	CHAT_AA_050_140	10/30/2014	Dave O'Loughlin, Ben Cogdell	0.60	4732	0	Shrubland/hedgerow in center of plot. Majority is maintained lawn not representative of any natural community. 40ft wide blackberry thicket. Representativeness is poor, majority of plot maintained perennial grass. Soil texture is loam, 4".	5/19/2015	David Oloughlin	21
CHAT_AA_050_141	CHAT_AA_050_141	11/1/2014	Dave O'Loughlin, Ben Cogdell	2.90	7221	0	Plot center behind fence on private property. Point offset 40 ft. Between fence and residential are in pooposite directions. Representativeness is fair. Soil texture is loam, 4".	5/19/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_143.1	CHAT_AA_050_143.1	11/6/2014	Jonathan Carr, Kirsten Hunt	0.80	6011	4044	Original center point on ecotone between early successional loblolly forest and broadleaf forest.Utility easement running northeast-southwest . Representativeness is good. Soil texture is loam, 1".	5/19/2015	David Oloughlin	21
CHAT_AA_050_143.2	CHAT_AA_050_143.2	11/6/2014	Jonathan Carr, Kirsten Hunt	0.90	7232	0	Original center point on ecotone between early successional loblolly forest and broadleaf forest. New center on gentle west-northwest facing slope. Representativeness is fair. Soil texture is loam, 1".	5/19/2015	David Oloughlin	21
CHAT_AA_050_144	CHAT_AA_050_144	10/29/2014	Dave O'Loughlin, Ben Cogdell	1.70	7521	0	Mutiple downed pines. Gently sloping midslope. Relatively sparse canopy. Representativeness is good. Soil texture is loam, 8".	5/19/2015	David Oloughlin	22
CHAT_AA_050_145	CHAT_AA_050_145	10/29/2014	Dave O'Loughlin, Ben Cogdell	0.50	7730	0	Western portion of plot has some developed canopy - majority comprised of privet, kudzu, and blackberry. Western edge (different community) forested poplar/ water oak. Representativeness is poor, privet/ distrubed choking out other species. Soil texture	5/19/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_146	CHAT_AA_050_146	10/29/2014	Dave O'Loughlin, Ben Cogdell	0.60	0	0	NO FIT. Kudzu/privet shrubland except on slope along outer edge of plot. Majority of plot within floodplain/terrace of Chattahoochee River. Western edge is on slope facing east. Soil texture is loam, 8".	5/19/2015	David Oloughlin	21
CHAT_AA_050_147	CHAT_AA_050_147	11/6/2014	Jonathan Carr, Kirsten Hunt	7.30	6011	0	Center point in maintained sewer easement. Early successional vegetation is reestablishing On either side of the easement similar community persists but at a later stage of succession. Representativeness is good. Soil texture is sandy loam, 2".	5/19/2015	David Oloughlin	27
CHAT_AA_050_149	CHAT_AA_050_149	9/29/2014	Dave O'Loughlin, Jonathan Carr	1.60	7730	0	Stream runs through plot. Understory shrub layer nearly completely dominated by privet. There is a maintained lawn approx. 100 ft from the center point. Herb layer sparse to absent. Representativeness is good. Soil texture is clay loam, 12"	5/19/2015	David Oloughlin	22
CHAT_AA_050_150	CHAT_AA_050_150	10/1/2014	Dave O'Loughlin, Jonathan Carr	0.90	7730	0	Plots subcanopy dominated by privet. Representativeness is fair, large abundance of Carya ovalis. Soil texture is clay loam, 24".	5/20/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_151	CHAT_AA_050_151	10/1/2014	Dave O'Loughlin, Jonathan Carr	3.80	7730	0	Representativeness is good. No Sycamore but floodplain and other species match. Soil texture is loam, 2".	5/20/2015	David Oloughlin	24
CHAT_AA_050_152	CHAT_AA_050_152	9/30/2014	Dave O'Loughlin, Jonathan Carr	2.90	7312	0	Gentle slope E-SE to river. Moderately steep slope to west. Herb layer is relatively sparse. Appears to lack a depositional levee. Representativeness is good. Soil texture is loam, 3".	5/20/2015	David Oloughlin	23
CHAT_AA_050_153	CHAT_AA_050_153	9/29/2014	Dave O'Loughlin, Jonathan Carr	1.80	7232	0	Representativeness is good. Soil texture is loam, 2".	5/20/2015	David Oloughlin	22
CHAT_AA_050_154	CHAT_AA_050_154	10/4/2014	Dave O'Loughlin, Jonathan Carr	2.70	8474	4112	8474 is primary with 4112 within. Representativeness is good. Soil texture is sandy clay loam, 4".	5/20/2015	David Oloughlin	23
CHAT_AA_050_155	CHAT_AA_050_155	10/3/2014	Dave O'Loughlin, Jonathan Carr	1.70	7312	0	Levee forest. Dense herb layer. Fairly open canopy at center. Representativeness is good; however, Betula nigra was not a canopy dominant but was the most prevalent species. Soil texture is clay loam, 6".	5/20/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_156	CHAT_AA_050_156	10/8/2014	Dave O'Loughlin, Jonathan Carr	2.00	7312	0	Representativeness is good. Green ash and river birch are co-dominants. Hard to tell if the river birch is 50% of the canopy. Soil texture is clay loam, 5".	5/20/2015	David Oloughlin	22
CHAT_AA_050_157	CHAT_AA_050_157	10/7/2014	Dave O'Loughlin, Jonathan Carr	1.70	7730	0	Representativeness is good. Soil texture is loam, 6".	5/20/2015	David Oloughlin	22
CHAT_AA_050_158	CHAT_AA_050_158	10/10/2014	Dave O'Loughlin, Jonathan Carr	6.30	7730	0	Floodplain forest. No evidence of recent flooding or long-term inundation. Slightly buttressed trunks on larger canopy trees. Herb layer is sparse with occaional dense patches of Onaclea sensibilis. Representativeness is good. Soil texture is clay loam,	5/20/2015	David Oloughlin	26
CHAT_AA_050_159	CHAT_AA_050_159	10/10/2014	Dave O'Loughlin, Jonathan Carr	1.50	7220	0	Historically active levee forest. River approx. 100-200 ft from center. River birch dominates actual levee but Carya alba is nearly the sole canopy tree behinfd the levee. Tuliptree, sweetgum an loblolly within the plot but west further from the levee. R	5/20/2015	David Oloughlin	22
CHAT_AA_050_160	CHAT_AA_050_160	10/29/2014	Dave O'Loughlin, Ben Cogdell	3.70	7730	0	Eastern portion of plot along confluence of trib and CHAT River. Representativeness is good. Soil texture is sandy loam, 4".	5/20/2015	David Oloughlin	24

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_161	CHAT_AA_050_161	10/31/2014	Jonathan Carr, Kirsten Hunt	1.10	7730	0	Plot on broad floodplain. Heavily invaded by privet. No sign of inundation. Representativeness is good. Soil texture is loamy sand, 30".	5/20/2015	David Oloughlin	21
CHAT_AA_050_162	CHAT_AA_050_162	10/30/2014	Jonathan Carr, Kirsten Hunt	1.60	7730	0	Plot on broad floodplain. Heavily invaded by privet and microstegium. Native herbs are absent. No sign of inundation. Representativeness is good; however, plot is missing other canopy species listed in community description and also has strong invasive c	5/20/2015	David Oloughlin	22
CHAT_AA_050_163	CHAT_AA_050_163	10/31/2014	Jonathan Carr, Kirsten Hunt	1.10	7730	0	Plot on broad floodplain. Large trees are buttressed. Heavily invaded by privet. No sign of inundation. Small stream to south. Microstegium radiating from stream otherwise Herbs sparse to absent. Representativeness is good. Soil texture is clay, 2".	5/20/2015	David Oloughlin	21
CHAT_AA_050_164	CHAT_AA_050_164	10/23/2014	Dave O'Loughlin, Flynt Barksdale	0.70	7730	0	Center point offset 19 ft due to dense privet and blackberry. Just off boardwalk and greenway/playground. Representativeness is good. Soil texture is silty clay loam, 12".	5/20/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_165	CHAT_AA_050_165	10/23/2014	Dave O'Loughlin, Flynt Barksdale	1.90	7312	0	Center is a wetland surrounded by forest. On a levee. Representativeness is good; however, green ash is a strong codominant. Privet likely chokes out other species. Soil texture is silt loam, 16".	5/20/2015	David Oloughlin	22
CHAT_AA_050_166	CHAT_AA_050_166	10/30/2014	Dave O'Loughlin, Ben Cogdell	10.30	7730	0	Representativeness is good. Soil texture is sandy loam, 3'.	5/20/2015	David Oloughlin	30
CHAT_AA_050_167	CHAT_AA_050_167	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.00	4415	0	Steep rocky slope. East aspect to floodplain shelf. Soil texture is loam, 5".	5/20/2015	David Oloughlin	21
CHAT_AA_050_168	CHAT_AA_050_168	10/23/2014	Dave O'Loughlin, Flynt Barksdale	2.30	7232	0	Steep south facing slope. Representativeness is good but lost of Q. nigra. Site could possibly be classified as 4638 but doesent seem successional. Soil texture is loam, 1".	5/20/2015	David Oloughlin	22
CHAT_AA_050_169	CHAT_AA_050_169	10/21/2014	Dave O'Loughlin, Flynt Barksdale	3.90	7232	0	Steep slope to backwater area. East facing. Representativeness is good. Soil texture is loam, 2".	5/20/2015	David Oloughlin	24
CHAT_AA_050_170	CHAT_AA_050_170	10/30/2014	Dave O'Loughlin, Ben Cogdell	0.90	7730	0	Representativeness is good. Soil texture is loam, 6".	5/20/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_171	CHAT_AA_050_171	10/30/2014	Dave O'Loughlin, Ben Cogdell	1.10	7730	0	Plot boundary between maintained driving range and river. Representativeness is fair, Hickories are codiminant. Soil texture is loam, 18".	5/20/2015	David Oloughlin	21
CHAT_AA_050_172	CHAT_AA_050_172	10/28/2014	Dave O'Loughlin, Jonathan Carr	1.30	4638	0	Representativeness is fair, Carya is a codominant. Soil texture is loamy sand, 22".	5/20/2015	David Oloughlin	21
CHAT_AA_050_178B_N	CHAT_AA_050_178B_N	11/4/2014	Jonathan Carr, Kirsten Hunt	1.30	7730	0	Center point on trail just east of bridge. Stream running north-south bisects AA plot. Representativeness is fair, herbaceous layer not very diverse. No Lindera benzoin. Soil texture is clay loam, 2".	5/20/2015	David Oloughlin	21
CHAT_AA_050_178B_S	CHAT_AA_050_178B_S	11/4/2014	Jonathan Carr, Kirsten Hunt	0.50	7220	0	Plot on floodplain. Incised stream channel to west of AA center. Site heavily invaded by Ligustrum sinense. No sign of recent inundation. Representativeness is good. Soil texture is clay loam, 4".	5/20/2015	David Oloughlin	20
CHAT_AA_050_179	CHAT_AA_050_179	9/29/2014	Dave O'Loughlin, Jonathan Carr	0.30	4638	0	Ecotone next to picnic area. Understory is much more dense outside of picnic area. High density of invasives into ecotone (microstegium, invasive mint?, nuisance wild cucumber?). Representativeness is fair, missing a variety of oaks. Soil texture is loa	5/20/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_180	CHAT_AA_050_180	10/10/2014	Dave O'Loughlin, Jonathan Carr	1.90	7220	0	Small stream running east to west within plot, south of center. Center on gentle south facing slope. Representativeness is good. Soil texture is loam, 1".	5/20/2015	David Oloughlin	22
CHAT_AA_050_181	CHAT_AA_050_181	10/3/2014	Dave O'Loughlin, Jonathan Carr	0.70	4638	0	Bisected by old slough/ditch. Representativeness is good. Soil texture is sandy loam, 14".	5/20/2015	David Oloughlin	21
CHAT_AA_050_182	CHAT_AA_050_182	10/28/2014	Dave O'Loughlin, Jonathan Carr	9.90	4638	0	Representativeness is good. Soil texture is loam, 1".	5/20/2015	David Oloughlin	30
CHAT_AA_050_183	CHAT_AA_050_183	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.50	6011	0	Old home site? Terrace drops off to NE. Lots of downed pine. Representativeness is good. Soil texture is loam.	5/20/2015	David Oloughlin	22
CHAT_AA_050_184	CHAT_AA_050_184	10/31/2014	Dave O'Loughlin, Ben Cogdell	2.30	8405	0	Plot on hillside of south facing slope (midslope) w/ stream bisecting opposite north facing slope. Representativeness is good. Soil texture is loam, 3".	5/20/2015	David Oloughlin	22
CHAT_AA_050_185	CHAT_AA_050_185	10/23/2014	Dave O'Loughlin, Flynt Barksdale	1.00	7730	0	Between road and creek. Lots of trash species. Drops down to floodplain shelf 10ft east of plot center. Representativeness is good. Soil texture is loam, 4".	5/20/2015	David Oloughlin	21
CHAT_AA_050_186	CHAT_AA_050_186	11/1/2014	Dave O'Loughlin, Ben Cogdell	0.60	7730	0	Representativeness is good, Quercus nigra is codominant. Soil texture is clay loam, 4".	5/20/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_187	CHAT_AA_050_187	10/31/2014	Dave O'Loughlin, Ben Cogdell	1.80	7221	0	Representativeness is good. Soil texture is clay loam, 6".	5/20/2015	David Oloughlin	22
CHAT_AA_050_188	CHAT_AA_050_188	10/31/2014	Dave O'Loughlin, Ben Cogdell	1.00	4638	0	Representativeness is fair.	5/20/2015	David Oloughlin	21
CHAT_AA_050_189	CHAT_AA_050_189	11/2/2014	Jonathan Carr, Kirsten Hunt	1.20	4638	0	Plot on floodplain terrace. Incised stream channel to east of center. Representativeness is good. Soil texture is loam, 2".	5/20/2015	David Oloughlin	21
CHAT_AA_050_191	CHAT_AA_050_191	11/6/2014	Jonathan Carr, Kirsten Hunt	1.90	4638	0	Plot on terrace. Representativeness is good. Soil texture is sandy loam, 2".	5/20/2015	David Oloughlin	22
CHAT_AA_050_192	CHAT_AA_050_192	11/6/2014	Jonathan Carr, Kirsten Hunt	2.60	4638	0	Plot on terrace. Representativeness is good. Soil texture is clay loam, 2".	5/20/2015	David Oloughlin	23
CHAT_AA_050_193	CHAT_AA_050_193	11/1/2014	Jonathan Carr, Kirsten Hunt	2.10	4638	0	Plot on high terrace, river to the east. Representativeness is good. Soil texture is loam, 4".	5/20/2015	David Oloughlin	22
CHAT_AA_050_194	CHAT_AA_050_194	10/29/2014	Dave O'Loughlin, Ben Cogdell	0.50	7244	0	Representativeness is good but Quercus nigra replaces Q. stellata and Q. vellutina. Soil texture is loam, 2".	5/20/2015	David Oloughlin	20

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_195	CHAT_AA_050_195	10/29/2014	Dave O'Loughlin, Ben Cogdell	1.70	7244	0	Plot within blowdown. Trail intersects plot. Several pine blowdowns. Low slope. Representativeness is good but hickory not as dominant as key indicates but still present.	5/20/2015	David Oloughlin	22
CHAT_AA_050_196	CHAT_AA_050_196	10/8/2014	Dave O'Loughlin, Jonathan Carr	1.40	4638	0	Old levee. Representativeness is good. Soil texture is loamy sand.	5/20/2015	David Oloughlin	21
CHAT_AA_050_197	CHAT_AA_050_197	10/10/2014	Dave O'Loughlin, Jonathan Carr	2.60	4638	0	River to east of center point. Sewer easement to the west. Representativeness is good. Soil texture is loam, 24".	5/20/2015	David Oloughlin	23
CHAT_AA_050_198	CHAT_AA_050_198	10/3/2014	Dave O'Loughlin, Jonathan Carr	1.30	4638	0	Soil texture is clay loam, 3".	5/20/2015	David Oloughlin	21
CHAT_AA_050_199	CHAT_AA_050_199	10/5/2014	Dave O'Loughlin, Jonathan Carr	0.70	7232	0	Representativeness is good. Soil texture is loam.	5/20/2015	David Oloughlin	21
CHAT_AA_050_200	CHAT_AA_050_200	10/25/2014	Dave O'Loughlin	2.00	7332	0	North facing slope. Lots of downed pine. Representativeness is good. Soil texture is loam, 6".	5/20/2015	David Oloughlin	22
CHAT_AA_050_202	CHAT_AA_050_202	10/23/2014	Dave O'Loughlin, Flynt Barksdale	0.60	7730	0	Old levee. Representativeness is good. Soil texture is loam, 2".	5/20/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_208B	CHAT_AA_050_208B	11/7/2014	Jonathan Carr, Kirsten Hunt	1.50	4232	0	AA plot on gentle north-northwest facing slope. Representativeness is good. Soil texture is loam, 2".	5/20/2015	David Oloughlin	22
CHAT_AA_050_209	CHAT_AA_050_209	10/2/2014	Dave O'Loughlin, Jonathan Carr	0.50	7244	0	Plot slightly downslope to the north of ridgetop. Center point slightly north of trail and dirt road intersection. Representativeness is good. Soil texture is loam, 4".	5/20/2015	David Oloughlin	20
CHAT_AA_050_210	CHAT_AA_050_210	10/1/2014	Dave O'Loughlin, Jonathan Carr	0.40	7244	0	Northwest facing slope. Representativeness is good. Soil texture is loam.	5/20/2015	David Oloughlin	20
CHAT_AA_050_211	CHAT_AA_050_211	10/5/2014	Dave O'Loughlin, Jonathan Carr	1.70	7232	0	Plot center is just downslope of ridgetop on north facing slope. Representativeness is good; however, there is an abundance of Fagus grandifolia in the subcanopy shrub. Soil texture is loam, 2".	5/20/2015	David Oloughlin	22
CHAT_AA_050_212	CHAT_AA_050_212	10/7/2014	Dave O'Loughlin, Jonathan Carr	3.30	7244	0	Center point on ridgetop. Representativeness is good. Soil texture is loam, 6".	5/20/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_213	CHAT_AA_050_213	10/7/2014	Dave O'Loughlin, Jonathan Carr	0.80	7232	0	Center point slightly downslope from ridgetop on steep to gentle south facing slope. Representativeness is good; however, Ulmus rubra is more abundant in the shrub layer than Acer leucoderme. Fraxinus is also prevalent in the shrub layer. Soil texture is	5/20/2015	David Oloughlin	21
CHAT_AA_050_214	CHAT_AA_050_214	10/30/2014	Dave O'Loughlin, Ben Cogdell	2.00	7220	0	Road bisects plot east to west. 2 rodges slope down to small stream running along the road. Representativeness is good. Soil texture is clay loam, 3".	5/20/2015	David Oloughlin	22
CHAT_AA_050_215	CHAT_AA_050_215	10/31/2014	Dave O'Loughlin, Ben Cogdell	1.70	6011	0	Representativeness is good. Soil texture is loam, 4".	5/20/2015	David Oloughlin	22
CHAT_AA_050_216	CHAT_AA_050_216	11/6/2014	Jonathan Carr, Kirsten Hunt	2.90	4232	0	Center point just above toe slope of steep north facing slope. Representativeness is good. Soil texture is loam, 2".	5/20/2015	David Oloughlin	23
CHAT_AA_050_217	CHAT_AA_050_217	10/29/2014	Jonathan Carr, Kirsten Hunt	0.90	7521	0	Ridgetop with gentle slopes to east and west. Many decayed but evident jackpot pine blowdowns. Representativeness is good. Soil texture is loam, 2".	5/20/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_218	CHAT_AA_050_218	10/31/2014	Jonathan Carr, Kirsten Hunt	4.00	7244	0	Center of plot on gentle to steep north facing slope. Fair, Quercus coccinea and Q. alba are canopy codiminants as opposed to Q. falcata. Soil texture is loam, 4".	5/20/2015	David Oloughlin	24
CHAT_AA_050_219	CHAT_AA_050_219	10/31/2014	Jonathan Carr, Kirsten Hunt	1.90	7521	0	Golf course south of center point. Point in early to mid successional forest. At least 6 jackpot loblolly pine blowdowns. Representativeness is good, soil texture is loam, 2".	5/20/2015	David Oloughlin	22
CHAT_AA_050_220	CHAT_AA_050_220	10/25/2014	Dave O'Loughlin	3.60	8465	0	Top of north facing draw coming off a parking lot. Representativeness is good but Fagus grandifolia is not in the canopy. Still a decent amount of pine in the canopy. Soil texture is loam, 3".	5/20/2015	David Oloughlin	24
CHAT_AA_050_221	CHAT_AA_050_221	10/25/2014	Dave O'Loughlin	2.50	7232	0	Southeast facing slope down to draw which leads to a small stream west of the plot. Pines higher on slope grading to oaks, hickories, and Fagus as you drop. Representativeness is good but some pines left upslope. Soil texture is loam, 6".	5/20/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_222	CHAT_AA_050_222	10/31/2014	Dave O'Loughlin, Ben Cogdell	2.40	4232	0	Upper slope/ridgetop. relatively mature pines giving way to oaks. Representativeness is good. Soil texture is loamy sand, 4".	5/20/2015	David Oloughlin	22
CHAT_AA_050_237	CHAT_AA_050_237	10/4/2014	Dave O'Loughlin, Jonathan Carr	3.20	4415	0	Representativeness is good. Soil texture is loam, 3".	5/20/2015	David Oloughlin	23
CHAT_AA_050_238	CHAT_AA_050_238	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.30	7232	0	Representativeness is fair, canopy matches but missing Acer leucoderme and diverse herbs. Soil texture is loam, 1".	5/20/2015	David Oloughlin	21
CHAT_AA_050_239	CHAT_AA_050_239	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.80	7244	0	Representativeness is good. Soil texture is loam, 1".	5/20/2015	David Oloughlin	22
CHAT_AA_050_240	CHAT_AA_050_240	9/30/2014	Dave O'Loughlin, Jonathan Carr	0.70	7232	0	Blowdown and canopy gaps. Representativeness is fair, absence of Quercus rubra and Acer leucoderme. Higher density of Q. stellata on the dry side. Soil texture is loam, 3".	5/20/2015	David Oloughlin	21
CHAT_AA_050_241	CHAT_AA_050_241	10/1/2014	Dave O'Loughlin, Jonathan Carr	2.30	7232	0	Center located in topographic crenulation between 2 slopes to the east and west. Herbs sparse to absent. Representativeness is good, lacks Acer leucoderme; however, Asimina triloba and Manolia macrophyla indicate richwoods.	5/20/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_242	CHAT_AA_050_242	10/1/2014	Dave O'Loughlin, Jonathan Carr	0.70	7730	0	Representativeness is good. Soil texture is loam, 18".	5/20/2015	David Oloughlin	21
CHAT_AA_050_243	CHAT_AA_050_243	9/29/2014	Dave O'Loughlin, Jonathan Carr	1.90	7232	0	North facing slope. Representativeness is good. Soil texture is loam, 4".	5/20/2015	David Oloughlin	22
CHAT_AA_050_244	CHAT_AA_050_244	10/29/2014	Jonathan Carr, Kirsten Hunt	0.70	7244	0	Center point 3/4 up hillslope to ridgetop. Representativeness is good. Soil texture is loam, 1".	5/20/2015	David Oloughlin	21
CHAT_AA_050_245	CHAT_AA_050_245	11/1/2014	Jonathan Carr, Kirsten Hunt	0.90	7232	0	Center point on midslope of steep north facing slope over looking stream channel. Representativeness is fair to poor. Soil texture is loam, 1".	5/20/2015	David Oloughlin	21
CHAT_AA_050_246	CHAT_AA_050_246	10/22/2014	Dave O'Loughlin, Flynt Barksdale	2.60	7521	0	Residence borders southern edge of the plot. Plot successional but older. Tuliptree are older. Eleagnus and privet dominate. Representativeness is good. Soil texture is loam, 8".	5/20/2015	David Oloughlin	23
CHAT_AA_050_247	CHAT_AA_050_247	10/22/2014	Dave O'Loughlin, Flynt Barksdale	2.50	7521	0	Fewer downed pines. Lots of privet. Representativeness is good. Soil texture is clay loam, 8".	5/21/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_248	CHAT_AA_050_248	10/23/2014	Dave O'Loughlin, Flynt Barksdale	3.00	8465	0	Trail bisects plot. Gently sloping. Deep draw on south side. Representativeness is fair, Fagus grandifolia is not a canopy dominant. Site may be drier than mesic (7232). Soil texture is loam, 3".	5/21/2015	David Oloughlin	23
CHAT_AA_050_249	CHAT_AA_050_249	10/9/2014	Dave O'Loughlin, Jonathan Carr	3.90	4638	0	South facing slope. Representativeness is good but the components of mafic forest are present just not in overwhelming proportions. Soil texture is loam, 4".	5/21/2015	David Oloughlin	24
CHAT_AA_050_250	CHAT_AA_050_250	10/9/2014	Dave O'Loughlin, Jonathan Carr	1.30	7220	0	Center point just below ridgetop on a gentle to steep north facing slope. Large single hardwood blowdown near center. Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_251	CHAT_AA_050_251	10/21/2014	Dave O'Loughlin, Flynt Barksdale	1.00	7232	0	Low slope. Top of dry draw/valley. Representativeness is good. Diverse understory. Few Acer leucoderme. Soil texture is clay loam, 3".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_252	CHAT_AA_050_252	10/21/2014	Dave O'Loughlin, Flynt Barksdale	1.60	7220	0	Gentle slope to open water. Representativeness is fair. Absence of Liquidambar styraciflua and Pinus taeda. Very diverse in the subcanopy and shrub layer. Soil texture is loam, 6".	5/21/2015	David Oloughlin	22
CHAT_AA_050_253	CHAT_AA_050_253	11/6/2014	Jonathan Carr, Kirsten Hunt	1.20	8465	0	Center point on toe slope of northeast-north facing slope. Over looking stream. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	21
CHAT_AA_050_254	CHAT_AA_050_254	11/1/2014	Dave O'Loughlin, Ben Cogdell	3.00	7232	0	Representativeness is good, substitute Carya alba for Carya glabra. Soil texture is loam, 4".	5/21/2015	David Oloughlin	23
CHAT_AA_050_255	CHAT_AA_050_255	10/24/2014	Dave O'Loughlin, Flynt Barksdale	3.10	7244	0	Old home site? Ridgetop. Representativeness is fair, no Quercus falcata. Soil texture is loam, 3".	5/21/2015	David Oloughlin	23
CHAT_AA_050_256	CHAT_AA_050_256	11/8/2014	Jonathan Carr, Kirsten Hunt	1.30	7244	0	Center point just below ridgetop southeast of maintained road north-south through plot. Representativeness is fair; Quercus coccinea and Q. alba are codominants in the canopy. Q. falcata significant component but is less prevelant. Soil texture is loam,	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_268	CHAT_AA_050_268	10/2/2014	Dave O'Loughlin, Jonathan Carr	0.90	8431	0	Representativeness is good. Soil texture is loam, 4".	5/21/2015	David Oloughlin	21
CHAT_AA_050_269	CHAT_AA_050_269	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.90	7232	7244	Center point is 1/3 up a south-southwest facing slope. Representativeness is good. Soil texture is loam.	5/21/2015	David Oloughlin	22
CHAT_AA_050_270	CHAT_AA_050_270	10/2/2014	Dave O'Loughlin, Jonathan Carr	1.90	7232	8465	South facing slope. Acidic mix across stream on north facing slope. Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	22
CHAT_AA_050_271	CHAT_AA_050_271	9/30/2014	Dave O'Loughlin, Jonathan Carr	0.80	7232	0	Gentle slope to northwest to small first order stream. Site has experienced significant blowdown. Large snags are present. Representativeness is fair, no Acer leucoderme. Also, Oxydendron arboreum is prevelant throughout the subcanopy, Vaccinium spp. pre	5/21/2015	David Oloughlin	21
CHAT_AA_050_272	CHAT_AA_050_272	9/29/2014	Dave O'Loughlin, Jonathan Carr	0.60	7232	0	South facing slope. Representativeness is fair. Soil texture is loam, 12".	5/21/2015	David Oloughlin	21
CHAT_AA_050_273	CHAT_AA_050_273	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.30	7232	0	Steep slope to creek. Rocky terrain. Small flowing seepage area at edge of the plot. No herb layer due to high canopy cover. Minimal shrub layer. Representativeness is good. Soil texture is clay loam, 8".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_274	CHAT_AA_050_274	10/24/2014	Dave O'Loughlin, Flynt Barksdale	4.50	7232	0	Center on south facing slope. Small stream rums through the middle of the plot. West to east. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	24
CHAT_AA_050_275	CHAT_AA_050_275	11/6/2014	Jonathan Carr, Kirsten Hunt	4.90	7244	0	Plot just above toe slope of steep west facing slope. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	25
CHAT_AA_050_276	CHAT_AA_050_276	11/1/2014	Jonathan Carr, Kirsten Hunt	2.10	7244	0	Center point on relatively flat terrain. Residential development to northeast of center. Maintained lawn in northeastern portion of plot. Representativeness is good; however, Quercus alba is the predominant canopy species followed by Q. falcata. Soil tex	5/21/2015	David Oloughlin	22
CHAT_AA_050_277	CHAT_AA_050_277	11/1/2014	Jonathan Carr, Kirsten Hunt	1.00	7244	0	Center point on ridgetop. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	21
CHAT_AA_050_278	CHAT_AA_050_278	10/6/2014	Dave O'Loughlin, Jonathan Carr	0.70	7244	0	Representativeness is good. Soil texture is loam, 5".	5/21/2015	David Oloughlin	21
CHAT_AA_050_279	CHAT_AA_050_279	10/6/2014	Dave O'Loughlin, Jonathan Carr	4.40	7232	0	North facing slope. Representativeness is fair. Soil texture is loam, 1".	5/21/2015	David Oloughlin	24

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_280	CHAT_AA_050_280	10/7/2014	Dave O'Loughlin, Jonathan Carr	1.60	7244	0	Center point just below ridgetop of gentle to steep northwest facing slope. Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	22
CHAT_AA_050_281	CHAT_AA_050_281	10/21/2014	Dave O'Loughlin, Flynt Barksdale	1.50	7232	0	Gentle slope to bottom trail through center point. Representativeness is good. Soil texture is loam, 8".	5/21/2015	David Oloughlin	22
CHAT_AA_050_282	CHAT_AA_050_282	10/28/2014	Dave O'Loughlin, Jonathan Carr	2.20	7232	0	Center point 3/4 of way up slope on a steep northwest facing slope. Representativeness is good. Soil texture is loam, 8".	5/21/2015	David Oloughlin	22
CHAT_AA_050_283	CHAT_AA_050_283	10/10/2014	Dave O'Loughlin, Jonathan Carr	1.20	7244	0	Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_284	CHAT_AA_050_284	10/6/2014	Dave O'Loughlin, Jonathan Carr	1.60	7244	0	Center point midslope of gentle slope facing south. Representativeness is fair, Quercus alba is the most prevalent canopy species. Q. falcata is present but in lesser abundance. Soil texture is loam, 3".	5/21/2015	David Oloughlin	22
CHAT_AA_050_285	CHAT_AA_050_285	10/6/2014	Dave O'Loughlin, Jonathan Carr	2.50	7244	0	Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_286	CHAT_AA_050_286	10/8/2014	Dave O'Loughlin, Jonathan Carr	1.30	7232	0	Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	21
CHAT_AA_050_287	CHAT_AA_050_287	10/21/2014	Dave O'Loughlin, Flynt Barksdale	2.70	7521	0	Gentle side slope with several downed pines and canopy < 50%. Representativeness is good. Soil texture is clay, 2'.	5/21/2015	David Oloughlin	23
CHAT_AA_050_288	CHAT_AA_050_288	10/30/2014	Jonathan Carr, Kirsten Hunt	1.40	7232	0	Center point on midslope of gentle northwest facing slope. Representativeness is fair, canopy codominated by Carya alba and Quercus alba but Q. falcata is prevelant in the canopy at the edges of the boundary. Also, Acer leucoderme is not present and Oxyd	5/21/2015	David Oloughlin	21
CHAT_AA_050_289	CHAT_AA_050_289	10/31/2014	Jonathan Carr, Kirsten Hunt	5.30	7232	0	Center point 3/4 way up a steep to gentle north-northwest facing slope. Representativeness is good, no Acer leucoderme but plenty of other basic indicators are present. Soil texture is loam, 3".	5/21/2015	David Oloughlin	25
CHAT_AA_050_290	CHAT_AA_050_290	10/9/2014	Dave O'Loughlin, Jonathan Carr	2.00	7232	0	Ridgetop. Representativeness is good. Q. falcata and Q. coccinea are relativley abundant. Soil texture is loam, 4".	5/21/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_291	CHAT_AA_050_291	10/29/2014	Dave O'Loughlin, Ben Cogdell	3.90	4542	0	South facing slope. Small stream along southern edge of plot. Representativeness is good, but site lacks Celtis. Soil texture is loam, 5".	5/21/2015	David Oloughlin	24
CHAT_AA_050_292	CHAT_AA_050_292	10/31/2014	Jonathan Carr, Kirsten Hunt	0.80	7232	0	Plot over hillslope and swale. Representativeness is good. Soil texture is loam, 4". Representativeness is good. Soil texture is loam, 4".	5/21/2015	David Oloughlin	21
CHAT_AA_050_298B	CHAT_AA_050_298B	11/4/2014	Jonathan Carr, Kirsten Hunt	1.20	7521	0	Loblolly pine jackpot blowdown is present but has been decaying for a long time. Representativeness is good; however, Liquidambar styraciflua is a significant canopy component. Soil texture is sandy loam, 8".	5/21/2015	David Oloughlin	21
CHAT_AA_050_299B	CHAT_AA_050_299B	11/4/2014	Jonathan Carr, Kirsten Hunt	17.50	7232	0	Midslope of steep west facing slope. Representativeness is fair, Acer leucoderme is a lesser component, shrub and subcanopy speces indicative of acidic soils are present. Quercus falcata, Q. coccinea, and Pinus virginiana are present. Soil texture is loa	5/21/2015	David Oloughlin	38

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_300B	CHAT_AA_050_300B	11/7/2014	Jonathan Carr, Kirsten Hunt	1.90	7730	4418	Floodplain confined by two slopes. Incised perenial stream to north of plot center along toe slope and ephemeral channel to south of center along toe slope. No signs of recent inundation. Representativeness is good and fair for the primary and secondary	5/21/2015	David Oloughlin	22
CHAT_AA_050_301.1	CHAT_AA_050_301.1	10/1/2014	Dave O'Loughlin, Jonathan Carr	1.40	7220	0	Couple of tuliptree snags in the canopy Honeysuckle fairly dense in herb layer Path through center point Beaver impoundment PEM/PSS to south. 4418 (KEMO) may be a better fit. Representativeness is poor, lacks Pinus, Quercus spp. and Carya alba. Soil tex	5/21/2015	David Oloughlin	21
CHAT_AA_050_301.2	CHAT_AA_050_301.2	10/1/2014	Dave O'Loughlin, Jonathan Carr	0.60	3866	3901	Beaver impoundment, open water PEM/PSS. Multiple snags in canopy. Representativeness is good. Soil texture is muck, 24", and clay loam, 24-44"+.	5/21/2015	David Oloughlin	21
CHAT_AA_050_302	CHAT_AA_050_302	10/1/2014	Dave O'Loughlin, Jonathan Carr	1.40	7232	0	Small seep in center point Gentle slope to SW. Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_303	CHAT_AA_050_303	10/6/2014	Dave O'Loughlin, Jonathan Carr	2.50	7521	0	Center point above midslope on gentle to steep east facing slope. Residential development to west of center point. Significant pine blowdown. Stream to east of center, potentially outside of boundary. Representativeness is fair, canopy greater than 30: c	5/21/2015	David Oloughlin	22
CHAT_AA_050_304	CHAT_AA_050_304	10/8/2014	Dave O'Loughlin, Jonathan Carr	5.00	6011	0	Representativeness is good. Soil texture is loam, 4".	5/21/2015	David Oloughlin	25
CHAT_AA_050_305	CHAT_AA_050_305	11/1/2014	Dave O'Loughlin, Ben Cogdell	2.80	7730	7751	Representativeness is good. Soil texture is clay loam, 36".	5/21/2015	David Oloughlin	23
CHAT_AA_050_306	CHAT_AA_050_306	10/31/2014	Jonathan Carr, Kirsten Hunt	10.50	7730	0	Floodplain constricted by slope to east-sout east of center. Incised stream to east-southeast of center. Representativeness is good. Soil texture is clay loam, 2".	5/21/2015	David Oloughlin	30
CHAT_AA_050_307	CHAT_AA_050_307	10/31/2014	Jonathan Carr, Kirsten Hunt	4.90	7730	0	Plot on broad floodplain. No signs of recent inundation. Site heavily invaded by privet. Representativeness is good. Soil texture is clay loam, 2".	5/21/2015	David Oloughlin	25

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_308	CHAT_AA_050_308	10/31/2014	Jonathan Carr, Kirsten Hunt	1.10	8465	0	Broad valley between two slopes. Stream running east to west through plot. Small seeps present at hill slope. Representativeness is good. Soil texture is sandy loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_309	CHAT_AA_050_309	10/30/2014	Jonathan Carr, Kirsten Hunt	1.00	7546	0	Substantial Pinus taeda blowdown. Site is heavily invaded by Microstegium vimenium. Also, the eastern boundary of the AA plot is heavily invaded by Ligustrum sinense. Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_310	CHAT_AA_050_310	11/1/2014	Jonathan Carr, Kirsten Hunt	0.50	7244	0	Ridge top. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	20
CHAT_AA_050_311	CHAT_AA_050_311	11/1/2014	Jonathan Carr, Kirsten Hunt	1.70	7730	0	Center of plot midway between stream to east and topslope of steep hill to west. Representativeness is good. Soil texture is sandy clay loam, 6".	5/21/2015	David Oloughlin	22
CHAT_AA_050_312	CHAT_AA_050_312	10/30/2014	Jonathan Carr, Kirsten Hunt	2.70	4638	0	Gentle slope to south. Community comprises young, ealry-mid successional forest/ woodland. Canopy covers ~20-30%. Largest trees are Liriodendron, Quercus nigra and Liquidambar. Representativeness is good.	5/21/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_313	CHAT_AA_050_313	10/30/2014	Jonathan Carr, Kirsten Hunt	3.30	4638	0	Gentle slope to west. Community is young forest/ woodland, early-midsuccessional. Representativeness is fair, Quercus nigra is not an overwhelming canopy dominant. However, it is most prevalent species across a variety of strata. Soil texture is sandy lo	5/21/2015	David Oloughlin	23
CHAT_AA_050_314	CHAT_AA_050_314	10/30/2014	Jonathan Carr, Kirsten Hunt	5.50	7221	0	Topographic crenulation. Small stream running north to south bisects the plot. Fair, plot does contain one Fagus gandifolia in the the canopy and a few in the shrub. Also, Liquidambar styraciflua is a codominant with Liriodendron tulipifera. Soil texture	5/21/2015	David Oloughlin	26
CHAT_AA_050_315	CHAT_AA_050_315	10/30/2014	Jonathan Carr, Kirsten Hunt	1.50	4638	0	Midslope of gentle south-southwest facing slope. Stream running east-west at base of slope on edge of plot, southwest of the plot center. Old road bed at edge of plot, north of plot center. Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	22
CHAT_AA_050_316	CHAT_AA_050_316	10/30/2014	Jonathan Carr, Kirsten Hunt	1.40	7232	0	Plot 3/4 of way up a steep northwest facing slope. Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_317	CHAT_AA_050_317	10/3/2014	Dave O'Loughlin, Jonathan Carr	1.40	7730	0	Significant Betula nigra blowdown. Would have called 7321 had blowdown not occurred. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	21
CHAT_AA_050_318	CHAT_AA_050_318	11/1/2014	Dave O'Loughlin, Ben Cogdell	0.60	7730	0	Plot center falls within stream channel. Photos taken along stream bank. Representativeness is good. Soil texture is clay loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_319	CHAT_AA_050_319	10/6/2014	Dave O'Loughlin, Jonathan Carr	1.40	7232	8465	Plot on midslope of gentle east-southeast facing slope. Stream to the north of plot center. Resedential development to south of plot center. North facing beech dominated slope also within AA point but not the dominant cover type. Representativeness is fa	5/21/2015	David Oloughlin	21
CHAT_AA_050_320	CHAT_AA_050_320	10/1/2014	Dave O'Loughlin, Jonathan Carr	0.80	4232	0	Significant blowdown. Representativeness is poor. Soil texture is loam.	5/21/2015	David Oloughlin	21
CHAT_AA_050_321	CHAT_AA_050_321	10/5/2014	Dave O'Loughlin, Jonathan Carr	4.40	7220	0	Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	24
CHAT_AA_050_322	CHAT_AA_050_322	10/4/2014	Dave O'Loughlin, Jonathan Carr	0.80	4638	0	Representativeness is good. Soil texture is clay loam, 1'.	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_323	CHAT_AA_050_323	10/3/2014	Dave O'Loughlin, Jonathan Carr	4.00	7551	0	Majority of community encompases 7551. Portion of community is best represented by 2191 in the northwest portion of the plot. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	24
CHAT_AA_050_324	CHAT_AA_050_324	10/7/2014	Dave O'Loughlin, Jonathan Carr	0.50	4732	0	Rubus argutus thicket surrounded by Ligustrum sinense thicket with a canopy of young pines surrounding both thickets. Representativeness is fair, plot not in powerline cooridor, Ligustrum sinense also an important canopy component. Soil texture is loam,	5/21/2015	David Oloughlin	20
CHAT_AA_050_325	CHAT_AA_050_325	10/9/2014	Dave O'Loughlin, Jonathan Carr	0.80	4232	0	Representativeness is good. Soil texture is sandy loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_326	CHAT_AA_050_326	10/30/2014	Dave O'Loughlin, Ben Cogdell	1.80	4232	0	Planted pine with hardwood regeneration underneath. Not maintained. Representativeness is fair, pines in rows. Soil texture is loam, 3".	5/21/2015	David Oloughlin	22
CHAT_AA_050_327	CHAT_AA_050_327	10/21/2014	Dave O'Loughlin, Flynt Barksdale	3.40	7221	0	Small floodplain/ wetland area. Representativeness is fair, lack of Quercus spp, Pinus, and Fagus. Ligustrum sinense is prevelant. Soil texture is clay loam, 6".	5/21/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_328	CHAT_AA_050_328	10/24/2014	Dave O'Loughlin, Flynt Barksdale	3.00	6011	0	Plot contains maintained roadside. Representativeness is good. Soil texture is loam, 7".	5/21/2015	David Oloughlin	23
CHAT_AA_050_329	CHAT_AA_050_329	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.70	7551	0	Lots of blowdown. Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	22
CHAT_AA_050_330	CHAT_AA_050_330	10/25/2014	Dave O'Loughlin	3.30	7730	0	Old terrace, invaded by Ligustrum sinense. Representativeness is good. Soil texture is loamy sand, 10".	5/21/2015	David Oloughlin	23
CHAT_AA_050_331	CHAT_AA_050_331	11/2/2014	Jonathan Carr, Kirsten Hunt	0.90	6011	0	Relic floodplain/terrace. Landscape position may facilitate more hydrophytic vegetation rather than oxydendron arboreum. Representativeness is good; however, no oxydendron is present in the subcanopy. Soil texture is loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_332	CHAT_AA_050_332	11/1/2014	Jonathan Carr, Kirsten Hunt	3.00	6011	0	Midslope of gentle south facing slope. Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_333	CHAT_AA_050_333	11/1/2014	Jonathan Carr, Kirsten Hunt	0.80	6011	0	Terrace with large spoil mound southeast of plot center. No signs of recent inundation. However, due to topography, site may drain more slowly facilitating hydrophytic vegetation. Representativeness good but Betula nigra and Acer negundo are present in t	5/21/2015	David Oloughlin	21
CHAT_AA_050_334	CHAT_AA_050_334	10/29/2014	Jonathan Carr, Kirsten Hunt	1.30	4232	0	Ridgetop. Center of plot just outside of old road bed. Representativeness is fair. Pinus virginiana is a canopy codominant and possibly more prevelant than Pinus taeda. Soil texture is sandy loam, 2".	5/21/2015	David Oloughlin	21
CHAT_AA_050_350B	CHAT_AA_050_350B	11/7/2014	Jonathan Carr, Kirsten Hunt	2.30	4232	6011	Topographic crenulation. Some Jackpot pine blowdown but it is not extensive. Representativeness is good and poor for the primary and secondary communities, respectivley. Soil texture is loam, 2".	5/21/2015	David Oloughlin	22
CHAT_AA_050_351.1	CHAT_AA_050_351.1	10/4/2014	Dave O'Loughlin, Jonathan Carr	0.60	8474	0	Dense herbaceous layer under shrubs. Inundated wetland at base of slope to west. Representativeness is good. Soil texture is muck, 4'+.	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_351.2	CHAT_AA_050_351.2	10/4/2014	Dave O'Loughlin, Jonathan Carr	0.70	7232	0	Steep northeast facing slope. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	21
CHAT_AA_050_352	CHAT_AA_050_352	10/7/2014	Dave O'Loughlin, Jonathan Carr	0.80	4638	0	Plot between backslew and river. I-285 is south of plot center. Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	21
CHAT_AA_050_353.1	CHAT_AA_050_353.1	10/3/2014	Dave O'Loughlin, Jonathan Carr	2.10	4638	0	Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	22
CHAT_AA_050_353.2	CHAT_AA_050_353.2	10/3/2014	Dave O'Loughlin, Jonathan Carr	0.60	2191	0	Forested wetland to northwest transitioning to shrubland. Representativeness is good. Soil texture is loam, 4".	5/21/2015	David Oloughlin	21
CHAT_AA_050_354	CHAT_AA_050_354	10/6/2014	Dave O'Loughlin, Jonathan Carr	1.10	7521	0	Sparse canopy with lots of stumps. Representativeness is good. Soil texture is loam.	5/21/2015	David Oloughlin	21
CHAT_AA_050_355	CHAT_AA_050_355	10/8/2014	Dave O'Loughlin, Jonathan Carr	1.30	0	4638	No fit for primary classification. Best described as Acer negundo woodland. Soil texture is clay loam, 18".	5/21/2015	David Oloughlin	21
CHAT_AA_050_356	CHAT_AA_050_356	10/8/2014	Dave O'Loughlin, Jonathan Carr	2.40	0	0	No fit. Three different communities in eastern half of plot.	4/16/2015	David Oloughlin	22
CHAT_AA_050_357	CHAT_AA_050_357	10/21/2014	Dave O'Loughlin, Flynt Barksdale	1.60	7232	0	Midslope. Ease-northeast aspect. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_358	CHAT_AA_050_358	10/21/2014	Dave O'Loughlin, Flynt Barksdale	0.90	7244	0		4/16/2015	David Oloughlin	21
CHAT_AA_050_359	CHAT_AA_050_359	10/21/2014	Dave O'Loughlin, Flynt Barksdale	2.80	7546	0	Floodplain shelf at toe of slope. Representativeness is fair. Soil texture is clay loam, 12".	5/21/2015	David Oloughlin	23
CHAT_AA_050_380	CHAT_AA_050_380	9/30/2014	Dave O'Loughlin, Jonathan Carr	2.40	7730	0	Borders small creek and sewer line. Representativeness is fair, lots of red maple. Soil texture is loam, 2".	5/21/2015	David Oloughlin	22
CHAT_AA_050_381	CHAT_AA_050_381	10/6/2014	Dave O'Loughlin, Jonathan Carr	2.90	8465	4426	Gently sloping to small stream. Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	23
CHAT_AA_050_382	CHAT_AA_050_382	10/9/2014	Dave O'Loughlin, Jonathan Carr	3.10	4418	0	Old home site? Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	23
CHAT_AA_050_383	CHAT_AA_050_383	10/9/2014	Dave O'Loughlin, Jonathan Carr	2.90	4232	0	Midslope, gently sloping down to swale. Representativeness is good but sweetgum and tulip poplar are well represented. Soil texture is clay loam, 5".	5/21/2015	David Oloughlin	23
CHAT_AA_050_384	CHAT_AA_050_384	10/9/2014	Dave O'Loughlin, Jonathan Carr	2.80	7244	0	Midslope, east facing. Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_385	CHAT_AA_050_385	10/9/2014	Dave O'Loughlin, Jonathan Carr	3.00	7521	0	Numerous jackpots of downed pines. Representativeness is good; however, liquidambar styraciflua is prevelant in the subcanopy/shrub. Soil texture is loam, 3".	5/21/2015	David Oloughlin	23
CHAT_AA_050_386	CHAT_AA_050_386	10/28/2014	Dave O'Loughlin, Jonathan Carr	2.00	7232	0	South facing slope, draw/ravine at the center. Representativeness is fair, community feels just as acidic as it does basic. Soil texture is loam, 3".	5/21/2015	David Oloughlin	22
CHAT_AA_050_387	CHAT_AA_050_387	10/24/2014	Dave O'Loughlin, Flynt Barksdale	5.30	4542	0	Lower slope. Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	25
CHAT_AA_050_388	CHAT_AA_050_388	10/25/2014	Dave O'Loughlin	1.30	7521	0	Gently sloping to northeast. Sparse canopy. Plenty of shrubs. Lots of downed pines and recently downed sourwood. Representativeness is good. Soil texture is loam, 4".	5/21/2015	David Oloughlin	21
CHAT_AA_050_389	CHAT_AA_050_389	10/28/2014	Dave O'Loughlin, Jonathan Carr	0.90	7730	0	Floodplain. No evidence of recent inundation or ponding. Understory open for half of plot while Ligustrum sinense dominates other half. Herbaceous species absent to sparse. Representativeness is good. Soil texture is clay loam, 5".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_400.1	CHAT_AA_050_400.1	10/1/2014	Dave O'Loughlin, Jonathan Carr	2.30	7730	0	Representativeness is good. Soil texture is clay loam, 2".	5/21/2015	David Oloughlin	22
CHAT_AA_050_400.2	CHAT_AA_050_400.2	10/1/2014	Dave O'Loughlin, Jonathan Carr	2.20	3901	0	Wooland with rich herb layer. Representativeness is fair. Soil texture is clay loam, 2".	5/21/2015	David Oloughlin	22
CHAT_AA_050_401.1	CHAT_AA_050_401.1	10/1/2014	Dave O'Loughlin, Jonathan Carr	1.70	7546	0	Representativeness is fair, not much pine and lots of privet. Soil texture is loam, 1".	5/21/2015	David Oloughlin	22
CHAT_AA_050_401.2	CHAT_AA_050_401.2	10/1/2014	Dave O'Loughlin, Jonathan Carr	2.50	7730	0	Poor, canopy less than 25%. Wetland swale. Soil texture is clay loam, 2".	5/21/2015	David Oloughlin	22
CHAT_AA_050_402	CHAT_AA_050_402	10/2/2014	Dave O'Loughlin, Jonathan Carr	2.70	4415	0	Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	23
CHAT_AA_050_403	CHAT_AA_050_403	10/6/2014	Dave O'Loughlin, Jonathan Carr	1.50	4638	0	Gentle slope to small stream. Representativeness is fair. Soil texture is clay loam, 6".	5/21/2015	David Oloughlin	22
CHAT_AA_050_404	CHAT_AA_050_404	10/6/2014	Dave O'Loughlin, Jonathan Carr	1.60	4232	0	West facing slope to small stream. Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	22
CHAT_AA_050_405	CHAT_AA_050_405	10/7/2014	Dave O'Loughlin, Jonathan Carr	1.30	4232	0	Representativeness is fair, Quercus falcata is frequently in the canopy. Soil texture is clay loam, 4".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_406	CHAT_AA_050_406	10/9/2014	Dave O'Loughlin, Jonathan Carr	0.60	7220	0	Ecotone between successional forest and linear wetland depression (approximatley 60-70 ft. wide). Wet depression is secondary component contained on either side by successional sweetgum-tulip poplar forest. Representativeness is fair, prevelance of Ligus	5/21/2015	David Oloughlin	21
CHAT_AA_050_407	CHAT_AA_050_407	10/9/2014	Dave O'Loughlin, Jonathan Carr	1.80	7312	0	Sparse canopy layer. Even-aged young forest in subcanopy layer. Maintained sewer easement to northwest. Representativeness is fair, no levee. Point approximatley 300-400 feet from the river, Soil texture is sandy loam, 24".	5/21/2015	David Oloughlin	22
CHAT_AA_050_408	CHAT_AA_050_408	10/9/2014	Dave O'Loughlin, Jonathan Carr	0.30	4638	7312	Levee forest. Plot approximatley 100 ft. from the river. Representativeness is good. Soil texture is sandy loam, 5".	5/21/2015	David Oloughlin	20
CHAT_AA_050_409	CHAT_AA_050_409	10/21/2014	Dave O'Loughlin, Flynt Barksdale	0.80	8465	0	Representativeness is fair, not north facing. Soil texture is loam, 4"	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_429	CHAT_AA_050_429	11/6/2014	Jonathan Carr, Kirsten Hunt	0.60	7521	6011	Pine blowdown present throughout the plot. Representativeness is fair and poor for the primary and secondary assosciations, respectivley. Soil texture is loam, 2".	5/21/2015	David Oloughlin	21
CHAT_AA_050_430	CHAT_AA_050_430	10/1/2014	Dave O'Loughlin, Jonathan Carr	4.30	7546	0	Representativeness is good. Soil texture is clay loam.	5/21/2015	David Oloughlin	24
CHAT_AA_050_431	CHAT_AA_050_431	10/4/2014	Dave O'Loughlin, Jonathan Carr	5.70	7232	0	Mostly north facing slope. Representativeness is good. Missing Carya but strong basic veg. Soil texture is loam, 1".	5/21/2015	David Oloughlin	26
CHAT_AA_050_432	CHAT_AA_050_432	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.60	7221	0	Toe slope of east facing slope. Representativeness is good. Soil texture is sandy clay loam, 18".	5/21/2015	David Oloughlin	22
CHAT_AA_050_433	CHAT_AA_050_433	10/5/2014	Dave O'Loughlin, Jonathan Carr	3.00	7220	0	Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	23
CHAT_AA_050_434	CHAT_AA_050_434	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.70	6011	0	Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	22
CHAT_AA_050_435	CHAT_AA_050_435	10/6/2014	Dave O'Loughlin, Jonathan Carr	0.90	7244	0	Below ridge top on northwest facing slope. Representativeness is good. Soil texture is loam, 5".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_436	CHAT_AA_050_436	10/6/2014	Dave O'Loughlin, Jonathan Carr	0.90	8465	0	Northwest facing slope down to stream. Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	21
CHAT_AA_050_437	CHAT_AA_050_437	10/7/2014	Dave O'Loughlin, Jonathan Carr	1.40	6011	4732	Young pine stand. Adjacent to residential development to the south. Understory is relativley open except where Ligustrum sinense predominates. A secondary rubus thicket is also present. Representativeness is good and fair for the primary and secondary co	5/21/2015	David Oloughlin	21
CHAT_AA_050_438	CHAT_AA_050_438	10/9/2014	Dave O'Loughlin, Jonathan Carr	0.70	6011	0	Plot between ridgetop and midslope of a steep east-southeast facing slope. Representativeness is good; however, there are Quercus sp. and Carya sp. in shrub/ subcanopy layer but are less abundant than Liriodendron tulipifera and Liquidambar styraciflua.	5/21/2015	David Oloughlin	21
CHAT_AA_050_439	CHAT_AA_050_439	10/24/2014	Dave O'Loughlin, Flynt Barksdale	2.50	4232	0	Midslope, south facing. Representativeness is good. Soil texture is loam, 5".	5/21/2015	David Oloughlin	22
CHAT_AA_050_440	CHAT_AA_050_440	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.00	4332	0	Gentle mid-slope south facing. Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_441	CHAT_AA_050_441	10/30/2014	Dave O'Loughlin, Ben Cogdell	1.00	7312	0	Representativeness is poor. Soil texture is loam, 8".	5/21/2015	David Oloughlin	21
CHAT_AA_050_442	CHAT_AA_050_442	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.70	6011	0	Terraced drops off to west. Representativeness is good. Soil texture is clay loam, 5".	5/21/2015	David Oloughlin	22
CHAT_AA_050_443	CHAT_AA_050_443	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.70	7221	0	South facing, gently sloping down to small stream. Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	22
CHAT_AA_050_444	CHAT_AA_050_444	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.00	7221	0	South facing low slope. Representativeness is good, but Fagus is a component.	5/21/2015	David Oloughlin	21
CHAT_AA_050_445	CHAT_AA_050_445	10/24/2014	Dave O'Loughlin, Flynt Barksdale	9.30	7244	0	South facing slope with significant blowdown. Representativeness is good but no Liriodendron.	5/21/2015	David Oloughlin	29
CHAT_AA_050_446	CHAT_AA_050_446	10/23/2014	Dave O'Loughlin, Flynt Barksdale	2.00	7551	0	Representativeness is fair, distrubed and maintained. Soil texture is loam, 6".	5/21/2015	David Oloughlin	22
CHAT_AA_050_447	CHAT_AA_050_447	10/31/2014	Dave O'Loughlin, Ben Cogdell	2.00	6011	0	Planted pine stand. Representativeness is fair, plants are rows. Soil texture is clay loam, 10".	5/21/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_448	CHAT_AA_050_448	11/1/2014	Dave O'Loughlin, Ben Cogdell	2.40	6011	0	Floodplain/ levee assosciation 50 to 60 feet to the north of plot center. Representativeness is good. Soil texture is loam, 4".	5/21/2015	David Oloughlin	22
CHAT_AA_050_449	CHAT_AA_050_449	11/1/2014	Dave O'Loughlin, Ben Cogdell	5.70	7244	0	Representativeness is good. Soil texture is loam, 5".	5/21/2015	David Oloughlin	26
CHAT_AA_050_450	CHAT_AA_050_450	11/5/2014	Jonathan Carr, Kirsten Hunt	9.80	7220	0	Floodplain forest/ terrace. No recent signs of inundation. Site heavily invaded by Microstegium vimenium. Representativeness is fair, Carya cordiformis and Juglans nigra are significant canopy/ subcanopy components. Shrub layer relativley diverse; Linder	5/21/2015	David Oloughlin	30
CHAT_AA_050_450B	CHAT_AA_050_450B	11/4/2014	Jonathan Carr, Kirsten Hunt	1.70	8465	7232	Gentle north facing slope overlooking stream channel. Plot on ridgetop bounded by two stream channels. Confluence to east-southeast of center point. Representativeness is good and fair for the primary and seconday communities, respectivley. Soil texture	5/21/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_451	CHAT_AA_050_451	11/5/2014	Jonathan Carr, Kirsten Hunt	0.70	6011	0	Flat woods near residential community. Early mid-successional woodland-forest. Site is heavily invaded by Microstegium vimenium. Site is heavily disturbed. Representativeness is poor.	5/21/2015	David Oloughlin	21
CHAT_AA_050_451B	CHAT_AA_050_451B	11/4/2014	Jonathan Carr, Kirsten Hunt	2.10	7244	0	Jackpot pine blowdown. Pine stumps are prevelant but logs are far along in decaying. Plot is a young forest. Representativeness is fair, Quercus falcata is not an overwhelming dominant with equal amounts of Q. velutina and Q. alba. Also, younger forest.	5/21/2015	David Oloughlin	22
CHAT_AA_050_452N	CHAT_AA_050_452N	10/31/2014	Jonathan Carr, Kirsten Hunt	1.40	7521	0	Extensive jackpot pine blowdown. No remaining Pinus taeda in plot area. A few Liriodendron have reached the canopy but are still young. Heavily invaded by Microstegium vimenium. Representativeness is good; however, Liquidambar styraciflua is prevelant in	5/21/2015	David Oloughlin	21
CHAT_AA_050_452S	CHAT_AA_050_452S	9/30/2014	Dave O'Loughlin, Jonathan Carr	1.00	4232	4415	Steep slope down to river. Sparse to absent herbaceous layer. Heath bluff close to river channel. Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_453N	CHAT_AA_050_453N	11/7/2014	Jonathan Carr, Kirsten Hunt	0.80	0	0		4/16/2015	David Oloughlin	21
CHAT_AA_050_453S	CHAT_AA_050_453S	10/5/2014	Dave O'Loughlin, Jonathan Carr	0.90	7220	0	Representativeness is good. Soil texture is loam, 3".	5/21/2015	David Oloughlin	21
CHAT_AA_050_454N	CHAT_AA_050_454N	11/1/2014	Jonathan Carr, Kirsten Hunt	5.10	4232	0	Midslope of gentle east facing slope. Representativeness is good. Soil texture is loam, 1".	5/21/2015	David Oloughlin	25
CHAT_AA_050_454S	CHAT_AA_050_454S	10/5/2014	Dave O'Loughlin, Jonathan Carr	1.80	7220	0	Representativeness is good. Soil texture is loam, 2".	5/21/2015	David Oloughlin	22
CHAT_AA_050_455N	CHAT_AA_050_455N	10/29/2014	Dave O'Loughlin, Ben Cogdell	2.90	7232	0	Plot near toe slope of north facing slope. Plot center is adjacent to steam bottom which bisects plot. Representativeness is good. Soil texture is loam 2"".	5/21/2015	David Oloughlin	23
CHAT_AA_050_455S	CHAT_AA_050_455S	10/5/2014	Dave O'Loughlin, Jonathan Carr	2.50	7221	0	Lower slope of westfacing slope. Representativeness is fair. Soil texture is loam, 1".	5/21/2015	David Oloughlin	22
CHAT_AA_050_456	CHAT_AA_050_456	10/29/2014	Dave O'Loughlin, Ben Cogdell	2.90	7730	0	Representativeness is fair, Microstegium and privet, not celtis. Soil texture is clay loam, 6".	5/21/2015	David Oloughlin	23

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_457.1	CHAT_AA_050_457.1	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.70	7730	0	Hydrology flowways, wracklines, strong sediment deposition on leaves and debris. Hydrology does not appear to be from the river but soley from surface runnoff. Representativeness is good. However, canopy composed almost entirely of Fraxinus pennsylvannic	5/21/2015	David Oloughlin	22
CHAT_AA_050_457.2	CHAT_AA_050_457.2	10/4/2014	Dave O'Loughlin, Jonathan Carr	1.10	6011	0	Sewerline running north-south through plot. Representativeness is good. Soil texture is sandy clay loam, 6".	5/21/2015	David Oloughlin	21
CHAT_AA_050_458	CHAT_AA_050_458	10/30/2014	Jonathan Carr, Kirsten Hunt	1.00	7244	0	Plot just below ridge top. Representativeness is good. Soil texture is loam, 6".	5/21/2015	David Oloughlin	21
CHAT_AA_050_459	CHAT_AA_050_459	11/1/2014	Dave O'Loughlin, Ben Cogdell	1.40	6011	0	Representativeness is good. Semi-natural pine stand. Soil texture is clay, 3'.	5/21/2015	David Oloughlin	21
CHAT_AA_050_460	CHAT_AA_050_460	10/30/2014	Dave O'Loughlin, Ben Cogdell	4.30	7312	0	Representativeness is fair. Betula nigra while dominant is not 50% of the canopy. May not be a good representation of a levee. Soil texture is loam, 6".	5/21/2015	David Oloughlin	24
CHAT_AA_050_461	CHAT_AA_050_461	10/30/2014	Dave O'Loughlin, Ben Cogdell	1.80	6011	0	Representativeness is good. Soil texture is clay loam, 3".	5/21/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_462	CHAT_AA_050_462	10/30/2014	Dave O'Loughlin, Ben Cogdell	5.80	6011	0	Approximatley half of plot is bottomland. Influenced by resedential and roadside runnoff. Portion closer to road is dominated by pines. Representativeness is fair. Soil texture is loam, 8".	5/21/2015	David Oloughlin	26
CHAT_AA_050_463	CHAT_AA_050_463	10/21/2014	Dave O'Loughlin, Flynt Barksdale	2.20	6011	0	Representativeness is fair. Soil texture is loam, 3".	5/22/2015	David Oloughlin	22
CHAT_AA_050_464	CHAT_AA_050_464	10/24/2014	Dave O'Loughlin, Flynt Barksdale	2.10	4232	0	Mid slope towards river. South facing slope. Representativeness is good. Does not have the variety of oak species. Soil texture is loam, 3".	5/22/2015	David Oloughlin	22
CHAT_AA_050_465	CHAT_AA_050_465	10/24/2014	Dave O'Loughlin, Flynt Barksdale	1.60	7221	0	Midslope southern aspect but within sheltered valley. Center point loacted on old road bed. Representativeness is good. Soil texture is loam, 4"/	5/22/2015	David Oloughlin	22
CHAT_AA_050_467B	CHAT_AA_050_467B	11/7/2014	Jonathan Carr, Kirsten Hunt	3.20	4232	0	Steep west facing slope. Sewer easement to west. Resedential development to east. Representativeness is good. Soil texture is loam, 2".	5/22/2015	David Oloughlin	23
CHAT_AA_050_468B	CHAT_AA_050_468B	11/4/2014	Jonathan Carr, Kirsten Hunt	1.10	7232	0	Ridge top. Representativeness is good. Soil texture is loam, 1".	5/22/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_469	CHAT_AA_050_469	10/27/2014	Dave O'Loughlin, Jonathan Carr	2.10	7551	0	Floodplain dominated by privet. Mature pines. Representativeness is good. Ligustrum limits species diversity. Soil texture is loam, 1".	5/22/2015	David Oloughlin	22
CHAT_AA_050_470	CHAT_AA_050_470	10/28/2014	Dave O'Loughlin, Jonathan Carr	5.10	4232	0	Hill top with little local topography, gently slopes down to the west. Representativeness is good, Liriodendron tulipifera is a lesser canopy co-dominant. Soil texture is loam, 6".	5/22/2015	David Oloughlin	25
CHAT_AA_050_471	CHAT_AA_050_471	10/28/2014	Dave O'Loughlin, Jonathan Carr	2.10	6011	0	Plot mostly pine dominated. Toward the road (west) younger pines. To the eastern edge of the olot start to pick up more oaks. Representativeness is good. Soil texture is loam, 5".	5/22/2015	David Oloughlin	22
CHAT_AA_050_472	CHAT_AA_050_472	10/23/2014	Dave O'Loughlin, Flynt Barksdale	3.20	7730	0	Adjacent to parking lot and greenway. Some non-dominant invasives. Representativeness is good. Soil texture is loam, 5".	5/22/2015	David Oloughlin	23
CHAT_AA_050_473	CHAT_AA_050_473	10/22/2014	Dave O'Loughlin, Flynt Barksdale	1.30	7244	0	Midslope of relativley steep grade. Southern aspect. Representativeness is good. Soil texture is loam, 4".	5/22/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_474	CHAT_AA_050_474	10/31/2014	Jonathan Carr, Kirsten Hunt	1.70	6011	0	Old road running east-west through plot. Representativeness is good; however, Pinus virginiana while second to Pinus taeda as the canopy dominant, is still a significant canopy component. Soil texture is clay loam, 1".	5/22/2015	David Oloughlin	22
CHAT_AA_050_475	CHAT_AA_050_475	9/30/2014	Dave O'Loughlin, Jonathan Carr	1.20	7551	7730	Plot bisected by large stream. Understory is dominated by Ligustrum sinense. Maintained easement to west-northwest of point. Representativeness is fair and poor for primary and secondary assossciations, respectivley. Soil texture is loam, 12".	5/22/2015	David Oloughlin	21
CHAT_AA_050_476	CHAT_AA_050_476	10/7/2014	Dave O'Loughlin, Jonathan Carr	2.20	6011	0	Low elevation ridgetop. Representativeness is good. Soil texture is loam, 6".	5/22/2015	David Oloughlin	22
CHAT_AA_050_477	CHAT_AA_050_477	10/28/2014	Dave O'Loughlin, Jonathan Carr	3.00	7551	0	Sewer line corridor runs through the plot center, north to south. Representativeness is good. Soil texture is sandy loam, 4".	5/22/2015	David Oloughlin	23
CHAT_AA_050_480	CHAT_AA_050_480	10/5/2014	Dave O'Loughlin, Jonathan Carr	0.60	6011	0	Midway up gentle east-northeast facing slope. Representativeness is good. Fagus grandifolia is abundant in both subcanopy and shrub layers. Soil texture is loam, 3".	5/22/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_481	CHAT_AA_050_481	10/6/2014	Dave O'Loughlin, Jonathan Carr	3.60	7232	8465	Center point on left bank of stream channel flowing north to south. Recent Quercus alba and Q. coccinea blowdown. Representativeness is good and fair for the primary and secondary assosciation, respectivley. Soil texture is sandy loam, 24".	5/22/2015	David Oloughlin	24
CHAT_AA_050_482	CHAT_AA_050_482	10/6/2014	Dave O'Loughlin, Jonathan Carr	5.70	7232	0	Midslope of gentle southwest facing slope. Representativeness is good, lacks Acer leucoderme but has abundance of Prunus serotina. Soil texture is loam, 4".	5/22/2015	David Oloughlin	26
CHAT_AA_050_483	CHAT_AA_050_483	10/10/2014	Dave O'Loughlin, Jonathan Carr	1.10	7220	0	Topographic crenulation. Representativeness is good. Soil texture is loam, 2".	5/22/2015	David Oloughlin	21
CHAT_AA_050_484	CHAT_AA_050_484	10/27/2014	Dave O'Loughlin, Jonathan Carr	1.30	8465	0	Topographic crenulation between two steep north and south facing slopes. Representativeness is fair, Fagus grandifolia is not a canopy dominant. Ephemeral draw in center of plot. Soil texture is loam, 1". Soil is very rocky.	5/22/2015	David Oloughlin	21
CHAT_AA_050_485	CHAT_AA_050_485	10/23/2014	Dave O'Loughlin, Flynt Barksdale	1.90	7244	7521	Reclit terrace. North of plot, large blowdown. South of plot, oak forest - less successional. Representativeness is good. Soil texture is loam, 4".	5/22/2015	David Oloughlin	22

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_486	CHAT_AA_050_486	10/22/2014	Dave O'Loughlin, Flynt Barksdale	0.80	4415	0	Steep north facing slope. Representativeness is good. Soil texture is loam, 4".	5/22/2015	David Oloughlin	21
CHAT_AA_050_487	CHAT_AA_050_487	10/22/2014	Dave O'Loughlin, Flynt Barksdale	0.90	7232	0	Sheltered cove. Northern aspect. Representativeness is fair, Q. prinus is most dominant not a successional species. Soil texture is loam, 3".	5/22/2015	David Oloughlin	21
CHAT_AA_050_488	CHAT_AA_050_488	10/30/2014	Jonathan Carr, Kirsten Hunt	0.50	7244	0	Ridgetop sloping west. Representativeness is fair, Quercus coccinea is codominant to slightly more dominant that Q. falcata. Soil texture is loam, 2".	5/22/2015	David Oloughlin	20
CHAT_AA_050_489	CHAT_AA_050_489	10/30/2014	Jonathan Carr, Kirsten Hunt	1.50	4638	0	Gentle slope. Maintained field to south of plot center. Some mature Quercus falcata, Liquidambar, Liriodendron, and Quercus nigra are present; however, most trees are young. Canopy layer ~30%. Site appears to be in stage of early-mid succession. Represen	5/22/2015	David Oloughlin	22
CHAT_AA_050_490	CHAT_AA_050_490	10/29/2014	Dave O'Loughlin, Ben Cogdell	1.00	8465	0	Plot on midslope of north slope of draw midslope to upper slope. Representativeness is good. Soil texture is loam, 6".	5/22/2015	David Oloughlin	21

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
CHAT_AA_050_491	CHAT_AA_050_491	9/29/2014	Dave O'Loughlin, Jonathan Carr	1.30	4415	0	West facing slope. Representativeness is good. Soil texture is loam, 4".	5/22/2015	David Oloughlin	21
CHAT_AA_050_492	CHAT_AA_050_492	10/7/2014	Dave O'Loughlin, Jonathan Carr	1.40	7244	0	Ridgetop. Small stream to the southwest. Representativeness is fair; Quercus coccinea is the dominant canopy tree. Q. falcata is present in canopy but is less abundant. Soil texture is loam, 1".	5/22/2015	David Oloughlin	21
CHAT_AA_050_493	CHAT_AA_050_493	10/10/2014	Dave O'Loughlin, Jonathan Carr	1.50	7232	0	Representativeness is good. Soil texture is loam, 1".	5/22/2015	David Oloughlin	22
CHAT_AA_050_494.1	CHAT_AA_050_494.1	10/9/2014	Dave O'Loughlin, Jonathan Carr	2.00	8465	0	Base of north facing slope on stream bank. Opposite side of gently sloping floodplain.	5/22/2015	David Oloughlin	22
CHAT_AA_050_494.2	CHAT_AA_050_494.2	10/9/2014	Dave O'Loughlin, Jonathan Carr	4.80	7730	0	Ecotone at stream. Mesic slope to south and bottomland floodplain to north. Representativeness is fair, Liquidambar styraciflua is prevelant in the canopy. Soil texture is clay loam, 10	5/22/2015	David Oloughlin	25

AA_Event	AA_Code	Event Date	Surveyors	GPS Error	Primary Code	Secondary Code	General_Comments	AA Update	AA_User	20m buffer
222CHAT_AA_050_495	CHAT_AA_050_495	10/27/2014	Dave O'Loughlin, Jonathan Carr	1.00	7232	0	Center point on midslope of steep west facing slope overlooking river. Diverse herbaceous layer. Unable to reach center point due to dangerous terrain. GPS point within 14' of AA center. Representativeness is good. Soil texture is loam, 8".	5/22/2015	David Oloughlin	21
CHAT_AA_050_496	CHAT_AA_050_496	10/27/2014	Dave O'Loughlin, Jonathan Carr	4.50	4542	0	Gentle southeast facing slope. Overhalf of AA plot contained on sheltered concave slope, open to west-northwest. Representativeness is good. Soil texture is loam, 3".	5/22/2015	David Oloughlin	24
CHAT_AA_050_497	CHAT_AA_050_497	10/21/2014	Dave O'Loughlin, Flynt Barksdale	0.80	7232	0	Midslope to bottom. Trail through north edge of plot. Representativeness is good. Soil texture is loam, 3".	5/22/2015	David Oloughlin	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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Natural Resource Stewardship and Science
1201 Oakridge Drive, Suite 150
Fort Collins, CO 80525