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Natural Resource Stewardship and Science

Vegetation Mapping at Timucuan Ecological and Historic Preserve

Photointerpretation Key and Final Vegetation Map

Natural Resource Report NPS/SECN/NRR—2020/2075



ON THE COVER

Typical habitats of Timucuan Historical and Ecological Preserve—islands of upland mixed forests surrounded by tidal marsh dominated by mix of *Juncus* and *Spartina*

Photograph by Nancy K. O'Hare, December 2014

Vegetation Mapping at Timucuan Ecological and Historic Preserve

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Natural Resource Report NPS/SECN/NRR—2020/2075

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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 Timucuan Ecological and Historic Preserve (TIMU). This mapping effort was accomplished through collaboration with the NPS Southeast Coast Network (SECN), the North Carolina office of NatureServe (Durham, N.C.), and Amec-Foster-Wheeler Environmental & Infrastructure, Inc.

A final vegetation map for Timucuan Ecological and Historic Preserve was created to represent the vegetation occurring within the park during 2012. This product represents the final of four steps necessary to produce an accurate vegetation map based upon aerial photographs. This includes the determination of the community element global (CEGL) codes (2008) and acquisition of aerial imagery (2012), using the aerial imagery, with 162 ground truthing points (2014, 2015), to create a draft vegetation map, performing an accuracy assessment (2016), and then using all the available information to create a final vegetation map (2018).

The total mapping area encompassed the entire boundary of the preserve plus an additional 500-meter (1640-foot [ft]) buffered area. 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 NVCS was designed for relatively undisturbed vegetation communities and Timucuan EHP has an extensive human- influenced land-use history. Using 73 NatureServe vegetation plots within and adjacent to the park, color-infrared aerial photos, and data collected in the field, vegetation communities were delineated and assigned attributes. Using dominant vegetation classes and secondary vegetation classes, as well as modifiers to further describe the classifications, detailed vegetation maps were created for Timucuan EHP. Within the preserve, the more detailed NVCS was used. The implementation of the Florida State Wildlife Action Plan (SWAP) vegetation classification system was additionally used within the park as supplemental information (Kawula 2014). Where it was possible, attempts were made to create a cross-walk between this localized system and the national NVCS CEGL codes. Polygons and attributes created within the 500-meter (1,640-ft) buffer used the same classification system and modifiers as within the park.

The products generated from this project include a vegetation map, a photointerpretation key, summary statistics of each vegetation class and a detailed geodatabase with digital maps. The most prevalent vegetation class found in Timucuan EHP was Southern Atlantic Coast Salt Marsh (4191) covering 24.71% of the park. Rivers were the second most prevalent class at 22.77%, followed by Needlerush High Marsh (4168) at 20.93%. The map accuracy assessment (AA) showed 72% accuracy and a kappa rating of 69% using data from 313 AA plots.

Acknowledgments

We would like to thank the TIMU staff for helping us with this project. Shauna Allen and Ann Lewellen were especially helpful in providing access and NPS lodging.

Introduction

Timucuan Historical and Ecological Preserve 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 (UGA) 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, CGR agreed to analyze existing leaf-on color infrared (CIR) aerial photography to develop photointerpretation keys, accuracy assessment study plans, final digital maps of vegetation, geodatabases and associated metadata in accordance with NPS vegetation mapping standards, and field verification surveys in accordance with standard mapping practices. The Timucuan Historical and Ecological Preserve Vegetation Mapping project was coordinated by the University of Georgia (UGA) Center for Geospatial Research in the UGA Department of Geography between 2014 and 2018, with assistance from the Southeast Coast Network, the North Carolina (Durham) office of NatureServe (for the vegetation classification portion of the project), and Amec-Foster-Wheeler Environmental & Infrastructure, Inc. (for accuracy assessment).

While the NVCS 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 2012.

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 2015a).

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

Timucuan Ecological and Historic Preserve

Timucuan Ecological and Historic Preserve (TIMU; Figure 1) encompasses more than 18,000 hectares (44,479 acres [ac]) in northeastern Florida (Duval and Nassau Counties) and is one of the largest remaining salt marsh estuaries on the Southeast Coast (NPS 2016). Approximately 75 percent of the park consists of inland waterways and wetlands, forming an estuarine system of salt marsh, coastal hammock, and marine and brackish waters (Stowell 1996). The preservation of this large, unique estuary is important as it is located between the Nassau and St. Johns Rivers. These rivers discharge directly into the Atlantic Ocean, as most estuaries discharge into an embayment (Anderson 1992). This large estuary provides ample habitat for various vegetation types, mammals, reptiles, amphibians, avifauna, salt marsh invertebrates, and fish (NPS 2015b). The abundance of life that the estuary supports made it valuable to indigenous groups of the Southeast Coast.

The preserve is named after the indigenous Timucua people, who were living in the area at the time of first European contact (NPS 2015c). The park contains at least 200 archeological sites that provide evidence of approximately 6,000 years of human occupation (Stowell 1996). The Timucua chieftainships were the geographically largest population of American Indians in the territory that is now the state of Florida. They were a gateway community where ideas, customs, and commerce flowed between the cultures of the Southeast and Caribbean.

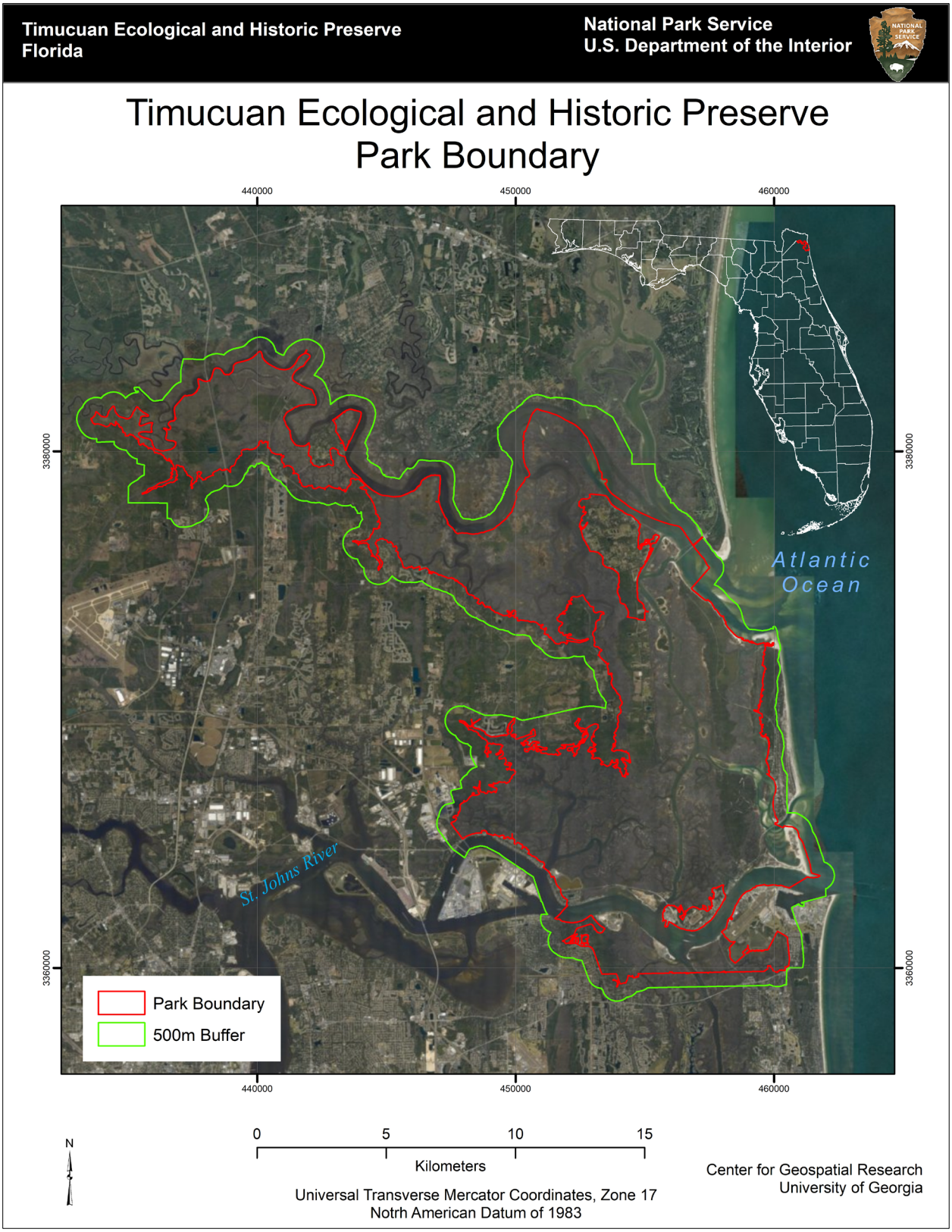


Figure 1. Timucuan Ecological and Historic Preserve with buffer area and its position relative to the state of Florida.

However, the Timucua Indians could not sustain themselves against the epidemic diseases brought to them and were extinct as a people by 1752 (NPS 2016). While the Timucua are the park's namesake, there is far more history contained within its boundaries.

Other areas of historical significance, contained within the boundaries of Timucuan EHP, are: Fort Caroline National Memorial, Kingsley Plantation, and American Beach. These sites document the area's history from French and Spanish settlement to slavery, plantation life, and the Jim Crow era of segregation. The park also contains state and city parks, such as Big Talbot Island State Park (managed by the Florida Park Service), Huguenot Memorial Park (managed by the City of Jacksonville) and various other public and private lands (NPS 2018c).

Former Florida Congressman Charles E. (Charlie) Bennett was instrumental in the designation of Timucuan EHP. After advocating for the creation of the ecological preserve throughout the mid-1980's; in 1987, Bennet introduced H.R. 1983 to the 100th Congress (Congress.gov, n.d., Summary). The bill, titled: "A bill authorizing the Secretary of the Interior to preserve certain wetlands and historic and prehistoric sites in the St. Johns River Valley, Florida, and for other purposes," was signed into law on February 16, 1988 by President Ronald Reagan (Stowell 1996). Since its designation, the park has been under the management of the NPS.

Vegetation Classification System

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

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

Prior to 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 as a combined reference and key for the following national monuments and preserve: Timucuan EHP, Fort Caroline National Monument, Castillo de San Marcos National Monument and Fort Matanzas National Monument, (see Table 1; NatureServe 2009). Their detailed report includes a dichotomous key for separating the CEGL codes described for Timucuan EHP. 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 factors1 (e.g. soil pH) which would not be evident in leaf-on CIR photographs. The NatureServe report also includes comprehensive descriptions of diagnostic species for each CEGL, and additional information on both the global and local expressions of the vegetation community type.

Table 1. Vegetation associations found within the park area of Timucuan Ecological and Historic Preserve and adjacent state parks during the initial assessment based on the National Vegetation Classification System.

Code	Description
2278*	Salt Flat (Woody Glasswort Type)
3525*	South Atlantic Coastal Shell Midden Woodland
3527	Cabbage Palmetto Hydric Hammock
3564*	Southern Coastal Plain Xeric Hammock
3643*	Slash Pine Flatwoods
3662	Pinus palustris - Pinus serotina / Quercus chapmanii - Quercus myrtifolia - Quercus geminata – Lyonia ferruginea Woodland
3781	Beachberry - Sea-grape / Sea-oats Shrubland
3804*	Bald-cypress – Swamp Blackgum Basin Swamp
3812	Florida Coastal Strand (Temperate Palmetto Type)
3821	Northeast Florida Coastal Scrub
3825*	Xeric Oak Scrubland
3839*	Atlantic Coast Interdune Swale
3920	Coastal Salt Shrub Thicket
3924	Seaside Oxeye Tidal Shrub Flat
3956	Saltwort - Woody Glasswort Dwarf-shrubland
4040*	Sea Oats – Beach Pennywort Herbaceous Vegetation
4051*	Southern Hairgrass - Saltmeadow Cordgrass - Dune Fingergrass Herbaceous Vegetation
4178*	Tidal Sawgrass Marsh
4186*	Needlerush High Marsh

*Vegetation classes found within the 73 NatureServe plots contained within TIMU and adjacent state parks.

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

Table 1 (continued). Vegetation associations found within the park area of Timucuan Ecological and Historic Preserve and adjacent state parks during the initial assessment based on the National Vegetation Classification System.

Code	Description
4191*	Southern Atlantic Coast Salt Marsh
4197	Mid-Atlantic High Salt Marsh
4234*	Seaside Greenbrier / Camphor Goldenaster - Trailing Wild Bean - (Sea-oats) Herbaceous Vegetation
4237	Florida Swamp Privet Spoil Island
4423*	Central Florida Willow Thicket
4490*	South Atlantic Coastal Plain Dry Longleaf Pine Sandhill
4511*	Sand Cordgrass Interdune Swale
4658*	Maritime Slash Pine Upland Flatwoods
4674*	Temperate Hydric Hammock
4701*	Bermuda Grass Semi-natural Pasture
4720*	East Gulf Coastal Plain Blackgum Dome Swamp
4788*	Sand Laurel Oak - Mixed Hardwood Upland Forest
4789*	South Atlantic Coast Tidal River Shrubland
4883	St. Augustine Grass Herbaceous Vegetation
7020*	Southeastern Florida Maritime Hammock
7032*	Maritime Live Oak Hammock
7040*	Palmetto – Live Oak Hydric Hammock
7044*	Loblolly-bay Forest
7049	Outer Coastal Plain Sweetbay Swamp Forest
7171	Mid-Late Successional Slash Pine Managed Forest
7420*	Pond-cypress Depression Forest
7663*	Saltmarsh Dropseed - Saltgrass Herbaceous Vegetation
7694	Saltgrass - (Saltmarsh Dropseed) Herbaceous Vegetation
7714*	Longleaf / Slash Pine Scrubby Flatwoods
7750	Peninsular Florida Scrubby Flatwoods
7792*	Outer Coastal Plain Maidencane Pond
7813	Cedar – Live Oak – Cabbage Palmetto Marsh Hammock

*Vegetation classes found within the 73 NatureServe plots contained within TIMU and adjacent state parks.

Table 1 (continued). Vegetation associations found within the park area of Timucuan Ecological and Historic Preserve and adjacent state parks during the initial assessment based on the National Vegetation Classification System.

Code	Description
7848*	Sweetgum – Red Maple – (Swamp Blackgum)/ Virginia Chainfern Forest
7996*	Pond Pine – Bay Swamp

*Vegetation classes found within the 73 NatureServe plots contained within TIMU and adjacent state parks.

In general, the NVCS 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 NVCS. For this reason, University of Georgia Center for Geospatial Research augmented the NVCS classes identified by NatureServe as occurring in Timucuan EHP and adjacent Little Talbot Island State Park and Pumpkin Hill State Park 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 each park. The buffer area contained extensive areas of human influence and was mapped utilizing both the NVCS and Florida State Wildlife Action Plan (SWAP) classification systems (Kuwala 2014). The SWAP contains categories for human influences and water categories. Modifiers were also utilized within the buffer to increase the level of detail associated with the selected codes.

In summary, the park was mapped to the association (CEGL) level of the NVCS, while the buffer area preferentially used Florida SWAP codes and NVCS CEGL class codes due to SWAP being designed directly for Florida vegetation. Modifiers to these classification systems were used, as appropriate, to ensure a meaningful classification system for this park.

Vegetation Mapping Workflow

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

1. Define CEGL codes within the study area based upon plot-level ground data (completed by NatureServe)
2. Contact park staff to discuss their needs and concerns as applicable to the final vegetation map, obtain any existing background information on management activities to include in a GIS database (see below), and arrange access
3. Collect base data and construct a GIS foundation geodatabase
    a. Collect and inventory the aerial photographs
    b. If needed, scan and orthorectify the aerial photographs
    c. Obtain available GIS layers on exotic plant removal or prescribed burns that may affect vegetation communities
4. Create an initial photointerpretation key
    a. Overlay NatureServe Vegetation Survey points on photos
    b. Examine photos to understand signatures of vegetation communities as identified by ELCodes or CEGL number
5. Perform initial delineation of vegetation communities on CIR aerial photographs, supplemented by other leaf-off imagery using photointerpretation from both stereo-pairs and 2D imagery by heads-up GIS methods
    a. Identify spectral signatures dissimilar to the example spectral signatures around the NatureServe ground plots so that vegetation can be evaluated in field visits
6. Field visits
    a. Schedule field trips to the site to visit specific areas where questions exist
    b. Verify vegetation communities present
    c. Reconcile photo signature with NatureServe CEGL code
    d. Refine classification as necessary with reference to field work and ongoing communication with park staff regarding results
    e. If needed, assign additional CEGL numbers or combine certain CEGL numbers if specific classes exist within the park that were not discovered by the NatureServe Vegetation Survey or were indiscernible through aerial interpretation
7. Refine and extend photointerpretation key and delineation of polygons
    a. As needed, print photos and vegetation polygons for review and refinement
8. Prepare draft deliverable products
    a. Prepare draft GIS files
    b. Clean up line work and attribute tables

c. Compute statistics for vegetation polygons
d. Prepare metadata for vegetation polygon files
e. Finalize photointerpretation keys

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

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

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 Florida Geographic Data Library, the U.S. Geological Survey National Map, and the National Oceanic and Atmospheric Administration Digital Coast websites. Trail network and exotic plant removal data sets were also obtained. These layers are not publicly available and were obtained through NPS contacts. The data sets used to populate the foundation GIS database were from different sources, compiled for different reasons, and may not be in the same map projection. The task agreement specified that the spatial data be projected to the Universal Transverse Mercator (UTM) Coordinate System, North American Datum of 1983 (NAD83). Where necessary, data sets were projected to UTM Zone 17. Finally, a geodatabase in ArcGIS 10.2 format was created as a container to store and organize the data. Details of this database are presented in Figure 2 and Table 2.

Color infrared (CIR) aerial photographs of the park at 1:12,000 scale was acquired by Aero-Metric, Inc. on May 11–12, 2012. These photos were scanned and converted to digital orthophotographs at 0.3-meter (1-ft) resolution before they were delivered to NPS. 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 202 photos in 15 flight lines were required to cover Timucuan Ecological and Historic Preserve (Appendix A).

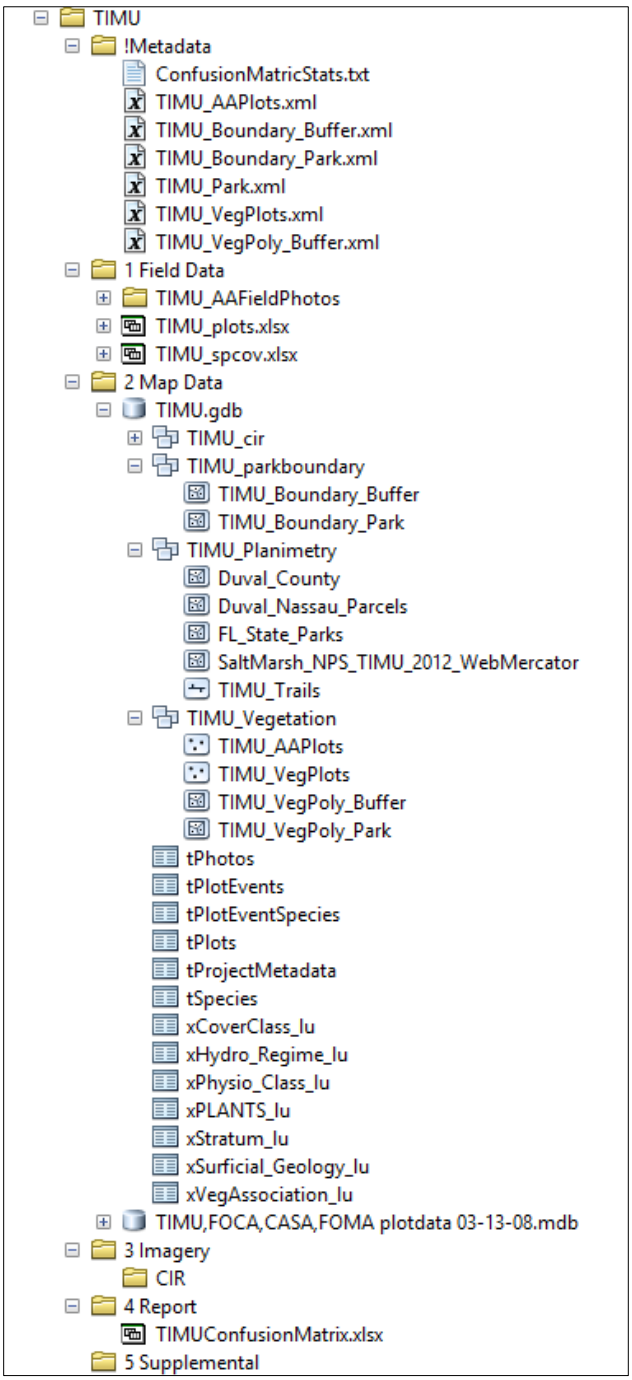


Figure 2. Foundation Geodatabase created for Timucuan Ecological and Historic Preserve.

Table 2. Data sets, descriptions, source, date, and scale imported into the Geodatabase.

Data set	Description	Source	Date	Scale/Resolution
County Boundary	Outline of St. Johns	US Census Bureau via FGDL	2011	n/a
Park Boundary	Outline of TIMU	NPS via FGDL	2012	n/a
Parcels	Florida Parcel Data by County	FDOR via FGDL	2014	n/a
Vegetation Plots	Sample Vegetation Locations	NatureServe	2006-07	n/a
NAIP Imagery	National Agriculture Imagery Program	USDA via FGDL	2010	1 meter
DEM	30-m resolution USGS Digital Elevation Model	University of Florida GeoPlan Center via FGDL	2012	15 meters
High Resolution True Color Imagery	True Color Imagery	FDOT	2014	6 inches
Color Infrared Imagery	Color Infrared Imagery	Aero-Metrics via NPS	2012	1 foot

The mapping area was split into two sections: park and buffer. The park was defined as the area within the prescribed park boundaries while the buffer pertained to the region within 500 meters (1,640 ft) outside of the park boundary.

Initial Photointerpretation Key and Vegetation Delineation

Classifying the different vegetation communities within the park was aided by a photointerpretation key (Appendix C). The initial photointerpretation key was based upon the NCVS vegetation classes at the association level. These associates were determined by NatureServe through independent plot level vegetation surveys in accordance with standard NVCS field methods (Jennings et al. 2009, Figure 3). Plot sizes in Timucuan EHP ranged in size between 100 and 1,000 square meters (1,076 and 10,764 square feet [sq 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, as well as descriptions and field notes (Appendix B). The vegetation associations for the park were determined by NatureServe from 73 plots. On two field visits, the UGA Center for Geospatial Research visited 162 points to interpret the CIR signatures of these vegetation associations to delineate vegetation. A third field visit occurred, but all data from that visit were unable to be retrieved due to a corruption of the original file. The accuracy assessment of UGA Center for Geospatial Research's vegetation map included 512 accuracy assessment points, 313 of which were used for analysis of the park.

The NatureServe vegetation plot points were overlaid on the CIR aerial photographs and the photo signature was examined. A few CEGL codes were not observed at Timucuan EHP, as the key combined four parks (Timucuan EHP, Fort Caroline National Monument, Castillo de San Marcos National Monument and Fort Matanzas National Monument) into one key, with the acknowledgement that not all vegetation classes would be represented in each park (NatureServe 2008). The NVCS 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. The key noted color, tree crown shapes and sizes, texture, context, and any other characteristics that could help to differentiate one community from the others on the spectral signature of the leaf-on CIR aerial photography. The orthophotographs were examined on-screen in heads-up mode using the ArcGIS software. Where needed, the hardcopy photographs were viewed in stereo/3D using a light table and a mirror stereoscope. This method is excellent for using relative heights of the trees and terrain to assist in determining the vegetation community and to delineate the boundaries of the individual features.

This key was later expanded to include more detailed descriptions of each class. The 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).

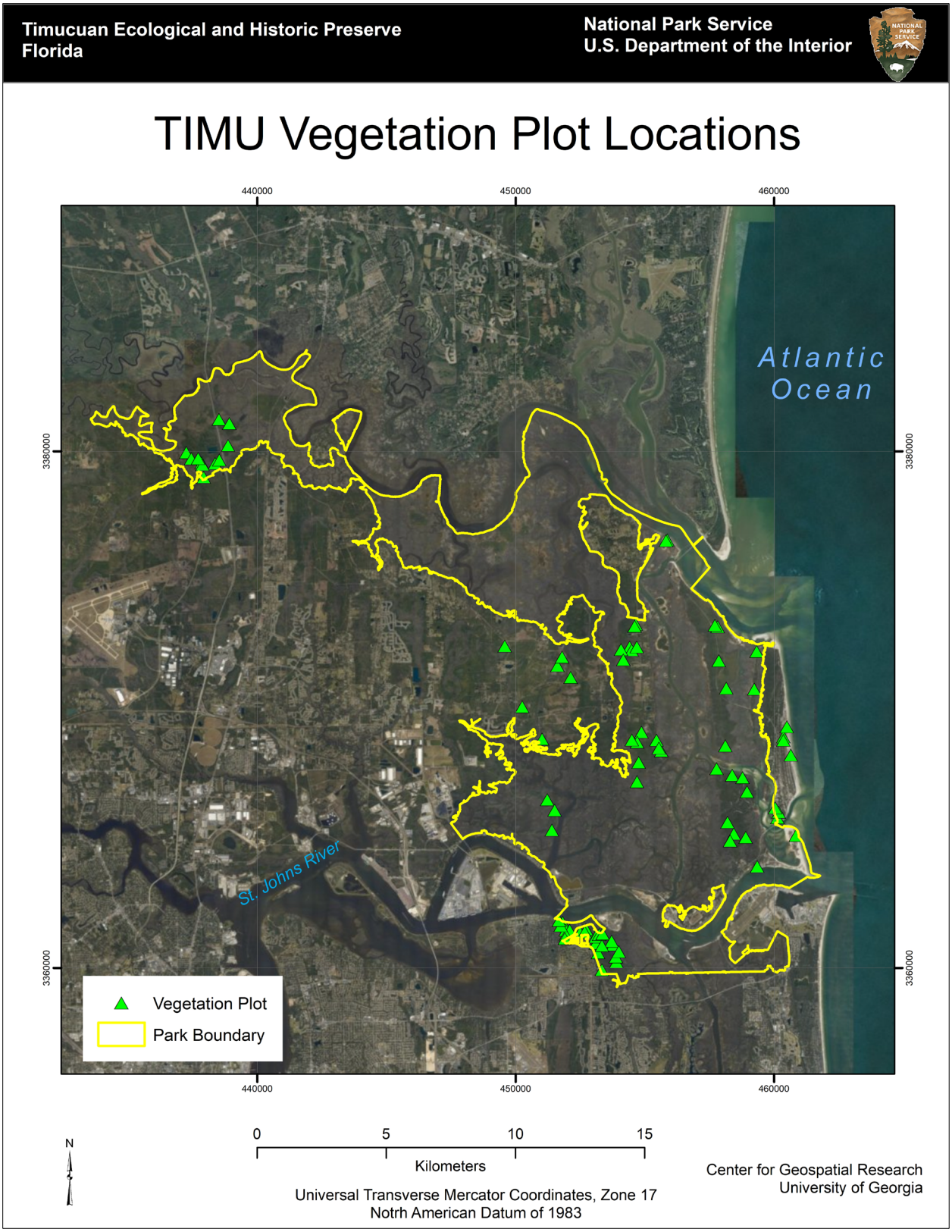


Figure 3. NatureServe vegetation plots for Timucuan Ecological and Historic Preserve.

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). 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 NVCS itself 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 acres [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.

Field Surveys and Ground Truth

Field work and ground truthing for Timucuan EHP took place on November 4, 2014 and December 12–14, 2014. A third field visit occurred March 23–27, 2015, but corruption of the original file rendered the data collected irretrievable. The locations of these field visits were intended to give specific attention to: (1) representative habitats; (2) rare and important communities; (3) areas that have been managed, disturbed, or invaded; and (4) plots previously surveyed by NatureServe. These visits were conducted to collect data on canopy species composition, diagnostic species for NVCS, and terrain, similar to NatureServe's "Quick Plot" surveys.

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

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. Also noted were the presence of exotics, evidence of past or present human influence (e.g., agriculture, grazing, logging, mowing, exotic vegetation removal, old home sites), damage by insects, wild hogs, blow down, or fire. Prior to leaving a sampling location, researchers determined the primary association type, i.e. CEGL code (Grossman et al. 1994; Anderson et al. 1998; Grossman et al. 1998). Some sites were located in a mixed area indicative of an ecotone or an area of successional recovery. In such cases, secondary associations were determined in addition to dominant associations. Tertiary modifiers were often

determined as well. For this reason, all polygons have the possibility of having a secondary association and a modifier in addition to the required dominate association. In cases where researchers were unable to determine a clear match to a NVCS CEGL in the field, more detailed notes were taken to assign an appropriate CEGL or CGR-created class (e.g., a managed, damaged, human influence, or successional class) after further review of CIR signatures.

The 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).

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.

Occurring on two field visits or investigations, 162 discrete point locations were collected at Timucuan EHP (Table 3 and Figure 4). The number of sites visited in a single day was often influenced by terrain, weather, and point of interest density. A third field visit occurred March 23–27, 2015, but corruption of the original file rendered the data collected irretrievable.

Table 3. Field visits and number of data points collected for Timucuan EHP.

Dates	Team Member(s)	Number of Data Points
November 4, 2014	N. K. O'Hare, D. L. Cotten, B. P. Adams	27
Dec. 12-14, 2014	N. K. O'Hare	135
March 23-27, 2015	N.K. O'Hare	N/A
Total	n/a	**162**

Photointerpretation and GIS Methods

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

As vegetation areas were delineated with vector lines, points were digitized within each delineated area. These points were assigned attribute information such as the dominate vegetation (a CEGL value if located within the park or a Florida State Wildlife Action Plan (SWAP) or CEGL 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 ANSI '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 were performed as necessary using information collected during the field surveys.

Final Vegetation Mapping and Summary Statistics

A total of 39 NVCS CEGL association level vegetation communities were found in Timucuan EHP. Within those 39, 14 were combined into three separate combination classes due to lack of differentiation in aerial imagery and spectral signature. Twenty-one Florida SWAP codes were used to describe areas of human influence or non-vegetation (Table 4).

Table 4. Land cover classes found within the park area of Timucuan EHP based on the National Vegetation Classification System.

Code	Class	Description
3527	Woodlands	Cabbage Palmetto Hydric Hammock
3781	Shrublands	Beachberry - Sea-grape / Sea-oats Shrubland
3804	Forests	Bald-cypress - Swamp Blackgum Basin Swamp
3821	Shrublands	Northeast Florida Coastal Scrub
3825	Shrublands	Xeric Oak Scrubland
3839	Shrublands	Atlantic Coast Interdune Swale
3920	Shrublands	Coastal Salt Shrub Thicket
4001	Herbaceous and Graminoid Vegetation	Southeast Florida Beach Dune
4040	Herbaceous and Graminoid Vegetation	Sea Oats – Beach Pennywort Herbaceous Vegetation
4051	Herbaceous and Graminoid Vegetation	Southern Hairgrass - Saltmeadow Cordgrass - Dune Fingergrass Herbaceous Vegetation
4186	Herbaceous and Graminoid Vegetation	Needlerush High Marsh
4191	Herbaceous and Graminoid Vegetation	Southern Atlantic Coast Salt Marsh
4237	Shrublands	Florida Swamp Privet Spoil Island
4490	Woodlands	South Atlantic Coastal Plain Dry Longleaf Pine Sandhill
4674	Forests	Temperate Hydric Hammock
4720	Forests	East Gulf Coastal Plain Blackgum Dome Swamp
7020	Forests	Southeastern Florida Maritime Hammock
7032	Forests	Maritime Live Oak Hammock
7040	Forests	Palmetto - Live Oak Hydric Hammock
7044	Forests	Loblolly-bay Forest

* This value is a combination of two or more NVCS codes.

† Not an NVCS Code.

Table 4 (continued). Land cover classes found within the park area of Timucuan EHP based on the National Vegetation Classification System.

Code	Class	Description
7714	Woodlands	Longleaf / Slash Pine Scrubby Flatwoods
7750	Woodlands	Peninsular Florida Scrubby Flatwoods
7813	Forests	Cedar – Live Oak – Cabbage Palmetto Marsh Hammock
7848	Forests	Sweetgum - Red Maple - (Swamp Blackgum) / Virginia Chainfern Forest
7996	Woodlands	Pond Pine – Bay Swamp
18100†	Nonvegetated Cover	Mowed/Weedy Herbaceous
18212†	Nonvegetated Cover	Low Intensity Urban
18221†	Nonvegetated Cover	Residential, Med
18223†	Nonvegetated Cover	Commercial
18224†	Nonvegetated Cover	Industrial
18343†	Nonvegetated Cover	Ornamentals
18411†	Nonvegetated Cover	Road Paved
18412†	Nonvegetated Cover	Road Unpaved
18420†	Nonvegetated Cover	Rails
18800†	Nonvegetated Cover	Bare Soil
21119*	Herbaceous and Graminoid Vegetation	Combined 3940 (Central Florida Sawgrass Marsh), 3960 (Elephantgrass Herbaceous Vegetation), 3988 (South Florida Cattail Marsh), 4114 (Crowngrass Interdune Swale), 4511 (Sand Cordgrass Interdune Swale), 4527 (Watershield Pond)
31130†	Nonvegetated Cover	Flatwoods/Prairie/Marsh Lake
32100†	Nonvegetated Cover	Artificial/Farm Pond
32300†	Nonvegetated Cover	Quarry Pond
32500†	Nonvegetated Cover	Stormwater Treatment Areas
41001†	Nonvegetated Cover	Rivers
42100†	Nonvegetated Cover	Canal
52210†	Nonvegetated Cover	Mud

* This value is a combination of two or more NVCS codes.

† Not an NVCS Code.

Table 4 (continued). Land cover classes found within the park area of Timucuan EHP based on the National Vegetation Classification System.

Code	Class	Description
52220†	Nonvegetated Cover	Sand
52410†	Nonvegetated Cover	Salt Pan
52411*	Herbaceous and Graminoid Vegetation	3924 (Seaside Oxeye Tidal Shrub Flat), 3956 (Saltwort - Woody Glasswort Dwarf-shrubland), 7663 (Saltmarsh Dropseed - Saltgrass Herbaceous Vegetation), 7694 (Saltgrass - (Saltmarsh Dropseed) Herbaceous Vegetation), 2278 (Salt Flat (Woody Glasswort Type)
60000†	Nonvegetated Cover	Marine
70111*	Forests	3643 (Slash Pine Flatwoods), 4658 (Maritime Slash Pine Upland Flatwoods), 7171 (Mid-Late Successional Slash Pine Managed Forest)
182135	Nonvegetated Cover †	Community Recreation

* This value is a combination of two or more NVCS codes.

† Not an NVCS Code.

In the buffer zone, there were thirty-one NVCS CEGL association level vegetation communities. Within those 31, 14 were combined into three separate combination CEGL classes due to lack of differentiation in aerial imagery and spectral signature. Twenty-five Florida SWAP codes were used to describe areas of human influence or non-vegetation (Table 5). The park and buffer were further classified through the use of modifiers (Table 6). These modifiers were generated by the UGA Center for Geospatial Research to provide additional information regarding percentage of vegetation coverage or the nearest river. See Figure 5 for the Final Vegetation map of Timucuan EHP.

Table 5. Land cover classes found within the buffer of Timucuan Ecological and Historic Preserve.

Code	Class	Description
3527	Woodlands	Cabbage Palmetto Hydric Hammock
3781	Shrublands	Beachberry - Sea-grape / Sea-oats Shrubland
3804	Forests	Bald-cypress - Swamp Blackgum Basin Swamp
3825	Shrublands	Xeric Oak Scrubland
3920	Shrublands	Coastal Salt Shrub Thicket
4051	Herbaceous and Graminoid Vegetation	Southern Hairgrass - Saltmeadow Cordgrass - Dune Fingergrass Herbaceous Vegetation

* This value is a combination of two or more NVCS codes.

† Not an NVCS Code.

Table 5 (continued). Land cover classes found within the buffer of Timucuan Ecological and Historic Preserve.

Code	Class	Description
4186	Herbaceous and Graminoid Vegetation	Needlerush High Marsh
4191	Herbaceous and Graminoid Vegetation	Southern Atlantic Coast Salt Marsh
4674	Forests	Temperate Hydric Hammock
7020	Forests	Southeastern Florida Maritime Hammock
7032	Forests	Maritime Live Oak Hammock
7040	Forests	Palmetto - Live Oak Hydric Hammock
7044	Forests	Loblolly-bay Forest
7750	Woodlands	Peninsular Florida Scrubby Flatwoods
7813	Forests	Cedar – Live Oak – Cabbage Palmetto Marsh Hammock
7848	Forests	Sweetgum - Red Maple - (Swamp Blackgum) / Virginia Chainfern Forest
7996	Woodlands	Pond Pine – Bay Swamp
11120†	Forests	Mixed Upland Forest (Hardwoods)
11240†	Forests	Pine-Mesic Oak
15000†	Shrublands	Shrubs & Brush
18000†	Vegetated Cover	Terrestrial Cultural
18100†	Vegetated Cover	Mowed/Weedy Herbaceous
18212†	Nonvegetated Cover	Low Intensity Urban
18221†	Nonvegetated Cover	Residential, Med
18223†	Nonvegetated Cover	Commercial
18224†	Nonvegetated Cover	Industrial
18311†	Vegetated Cover	Rural Open Forested
18411†	Nonvegetated Cover	Road Paved
18412†	Nonvegetated Cover	Road Unpaved
18800†	Nonvegetated Cover	Bare Soil

* This value is a combination of two or more NVCS codes.

† Not an NVCS Code.

Table 5 (continued). Land cover classes found within the buffer of Timucuan Ecological and Historic Preserve.

Code	Class	Description
21119*	Herbaceous and Graminoid Vegetation	Combined 3940 (Central Florida Sawgrass Marsh), 3960 (Elephantgrass Herbaceous Vegetation), 3988 (South Florida Cattail Marsh), 4114 (Crowngrass Interdune Swale), 4511 (Sand Cordgrass Interdune Swale), 4527 (Watershield Pond)
21120†	Vegetated Cover	Scrub-Shrub Wetland
31130†	Nonvegetated Cover	Flatwoods/Prairie/Marsh Lake
32100†	Nonvegetated Cover	Artificial/Farm Pond
32300†	Nonvegetated Cover	Quarry Pond
32500†	Nonvegetated Cover	Stormwater Treatment Areas
41001†	Nonvegetated Cover	Rivers
52210†	Nonvegetated Cover	Mud
52220†	Nonvegetated Cover	Sand
52410†	Nonvegetated Cover	Salt pan
52411*	Herbaceous and Graminoid Vegetation	Combined 3924 (Seaside Oxeye Tidal Shrub Flat), 3956 (Saltwort - Woody Glasswort Dwarf-shrubland), 7663 (Saltmarsh Dropseed - Saltgrass Herbaceous Vegetation), 7694 (Saltgrass - (Saltmarsh Dropseed) Herbaceous Vegetation), 2278 (Salt Flat (Woody Glasswort Type))
60000†	Nonvegetated Cover	Marine
70111*	Forests	3643 (Slash Pine Flatwoods), 4658 (Maritime Slash Pine Upland Flatwoods), 7171 (Mid-Late Successional Slash Pine Managed Forest)
182135	Nonvegetated Cover †	Community Recreation
183332†	Vegetated Cover	Coniferous Plantations

* This value is a combination of two or more NVCS codes.

† Not an NVCS Code.

Table 6. Modifiers used throughout the park area and buffer of Timucuan Ecological and Historic Preserve. 1 through 4 represent percent coverage of primary vegetation in natural areas and percent canopy coverage in residential areas.

Code	Description	Comments
1	<25%	–
2	25% to 75%	–
3	>75%	–
4	>90%	Only used to describe 4186 with narrow band of 4191 at ecotone with river.

The most prevalent class found in Timucuan EHP is Southern Atlantic Coast Salt Marsh (4191) covering 24.71% of the park. Rivers are the second most prevalent class at 22.77%, followed by Needlerush High Marsh (4168) at 20.93%. Eighteen classes each cover less than 0.14% of the park and combined, cover less than 1% of the park. These classes are 3920, 4001, 4040, 4051, 4490, 4674, 4720, 7750, 7996, 18223, 18224, 18343, 18412, 18420, 31130, 32100, 32500, 42100. These classes are listed in Table 7 but excluded from Figure 6 for visual clarity.

The buffer of the park uses a mixture of Florida SWAP codes, NVCS CEGL codes and combined NVCS CEGL class codes. Within the buffer region of the park, the most prevalent class is Rivers (41001) at 18.98%, followed by Needlerush High Marsh (4186) and Coniferous Plantations (183332), two separate classes that each cover slightly over 8% of the buffer's area. Ten classes each cover less than 0.2% of the buffer and combined cover less than 1% of the buffer's area. They are listed in Table 8 but excluded from Figure 7 for visual clarity. These classes are 7813, 7750, 18412, 21120, 7020, 18000, 3781, 7996, 52410, 31130.

Modifiers were utilized throughout the park and buffer regions to further enhance the classification system. The modifier system was based on a numerical scale describing the degrees of percent coverage of the primary vegetation for natural areas and the percent canopy coverage for residential areas (Table 9).

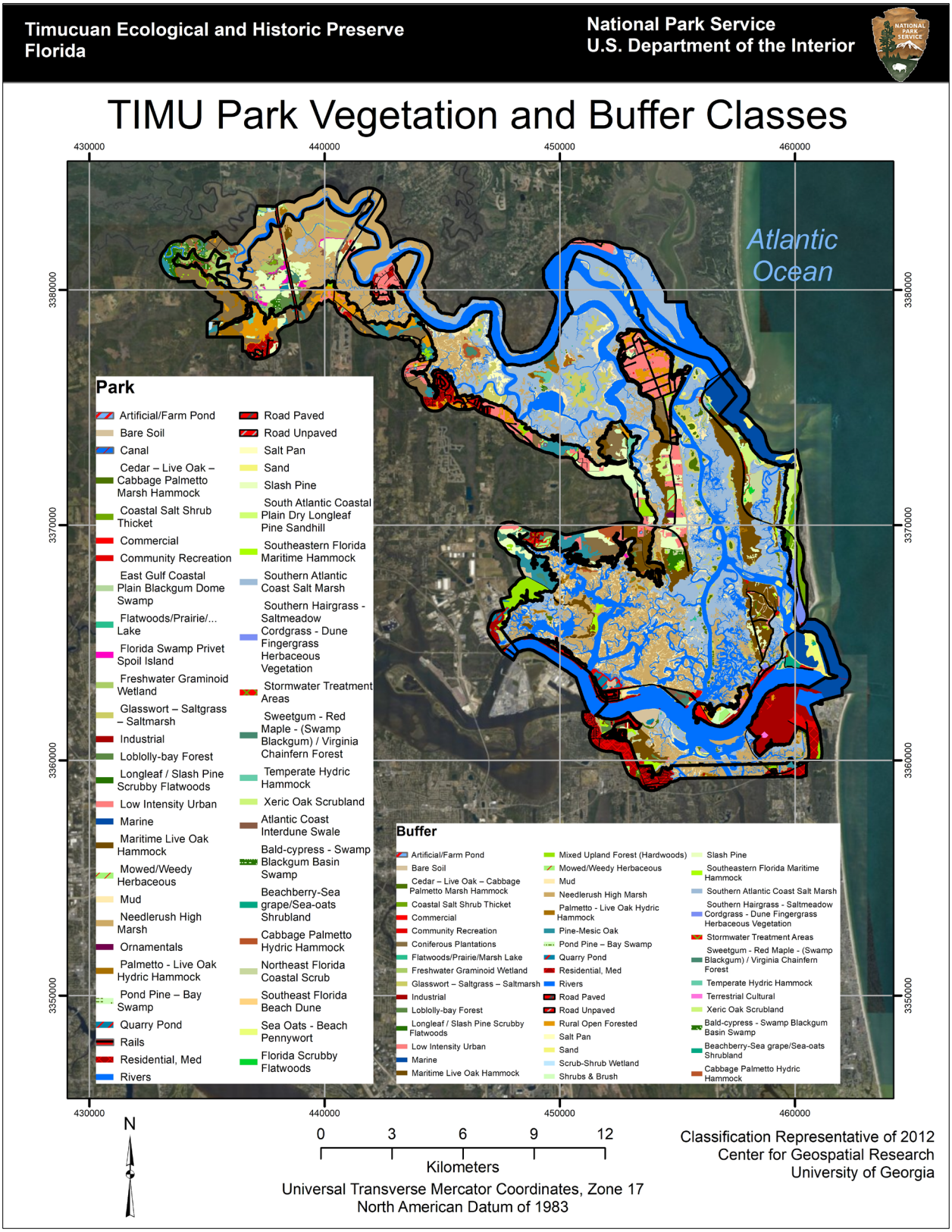


Figure 5. Vegetation map of Timucuan Ecological and Historic Preserve.

Table 7. Land cover classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Timucuan Ecological and Historic Preserve.

Class	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
4191	Southern Atlantic Coast Salt Marsh	846	5.22	4417.19	24.71%
41001	Rivers	96	42.41	4071.17	22.77%
4186	Needlerush High Marsh	746	5.02	3742.41	20.93%
7032	Maritime Live Oak Hammock	72	14.31	1030.66	5.77%
52210	Mud	708	1.30	920.87	5.15%
52411*	3924 (Seaside Oxeye Tidal Shrub Flat), 3956 (Saltwort - Woody Glasswort Dwarf-shrubland), 7663 (Saltmarsh Dropseed - Saltgrass Herbaceous Vegetation), 7694 (Saltgrass - (Saltmarsh Dropseed) Herbaceous Vegetation), 2278 (Salt Flat (Woody Glasswort Type)	266	2.70	718.46	4.02%
70111*	3643 (Slash Pine Flatwoods), 4658 (Maritime Slash Pine Upland Flatwoods), 7171 (Mid-Late Successional Slash Pine Managed Forest)	61	8.02	489.48	2.74%
60000	Marine	3	79.44	238.33	1.33%
52220	Sand	79	2.53	200.11	1.12%
21119*	Combined 3940 (Central Florida Sawgrass Marsh), 3960 (Elephantgrass Herbaceous Vegetation), 3988 (South Florida Cattail Marsh), 4114 (Crowngrass Interdune Swale), 4511 (Sand Cordgrass Interdune Swale), 4527 (Watershield Pond)	43	3.77	161.94	0.91%
18212	Low Intensity Urban	24	6.44	154.56	0.86%
7813	Cedar – Live Oak – Cabbage Palmetto Marsh Hammock	120	1.15	138.19	0.77%
18411	Road Paved	11	11.29	124.20	0.69%
3839	Atlantic Coast Interdune Swale	25	4.82	120.48	0.67%
3825	Xeric Oak Scrubland	9	13.00	116.98	0.65%
7040	Palmetto - Live Oak Hydric Hammock	33	3.19	105.43	0.59%
3821	Northeast Florida Coastal Scrub	11	9.52	104.67	0.59%

* This value is a combination of two or more NVCS codes.

Table 7 (continued). Land cover classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Timucuan Ecological and Historic Preserve.

Class	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
18221	Residential, Med	15	6.60	98.99	0.55%
7848	Sweetgum - Red Maple - (Swamp Blackgum) / Virginia Chainfern Forest	15	5.86	87.90	0.49%
18800	Bare Soil	9	9.56	86.08	0.48%
7044	Loblolly-bay Forest	9	8.18	73.63	0.41%
3527	Cabbage Palmetto Hydric Hammock	15	4.89	73.40	0.41%
52410	Salt Pan	17	4.22	71.69	0.40%
182135	Community Recreation	25	2.86	71.42	0.40%
7020	Southeastern Florida Maritime Hammock	11	6.10	67.08	0.38%
32300	Quarry Pond	6	8.23	49.40	0.28%
7714	Longleaf / Slash Pine Scrubby Flatwoods	5	8.74	43.72	0.24%
3804	Bald-cypress - Swamp Blackgum Basin Swamp	8	5.39	43.09	0.24%
4237	Florida Swamp Privet Spoil Island	7	5.38	37.65	0.21%
3781	Beachberry - Sea-grape / Sea-oats Shrubland	8	3.89	31.12	0.17%
18100	Mowed/Weedy Herbaceous	2	13.85	27.70	0.15%
4040	Sea Oats – Beach Pennywort Herbaceous Vegetation	6	4.01	24.07	0.13%
4674	Temperate Hydric Hammock	6	4.00	24.01	0.13%
31130	Flatwoods/Prairie/Marsh Lake	29	0.76	22.17	0.12%
18420	Rails	1	14.75	14.75	0.08%
18412	Road Unpaved	4	3.53	14.12	0.08%
18343	Ornamentals	2	4.71	9.43	0.05%
7750	Peninsular Florida Scrubby Flatwoods	3	2.92	8.77	0.05%
4051	Southern Hairgrass - Saltmeadow Cordgrass - Dune Fingergrass Herbaceous Vegetation	2	4.23	8.45	0.05%
4001	Southeast Florida Beach Dune	3	2.27	6.80	0.04%

* This value is a combination of two or more NVCS codes.

Table 7 (continued). Land cover classes, frequency of occurrence, mean area, total area, and percentage of total area within the park boundary of Timucuan Ecological and Historic Preserve.

Class	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
3920	Coastal Salt Shrub Thicket	5	1.35	6.75	0.04%
7996	Pond Pine – Bay Swamp	1	5.92	5.92	0.03%
18223	Commercial	3	1.93	5.78	0.03%
32100	Artificial/Farm Pond	11	0.26	2.83	0.02%
32500	Stormwater Treatment Areas	5	0.56	2.80	0.02%
4490	South Atlantic Coastal Plain Dry Longleaf Pine Sandhill	1	0.75	0.75	0.00%
42100	Canal	2	0.36	0.72	0.00%
4720	East Gulf Coastal Plain Blackgum Dome Swamp	1	0.44	0.44	0.00%
18224	Industrial	1	0.29	0.29	0.00%
Total	n/a	**3391**	n/a	**17876.85**	**100.0%**

* This value is a combination of two or more NVCS codes.

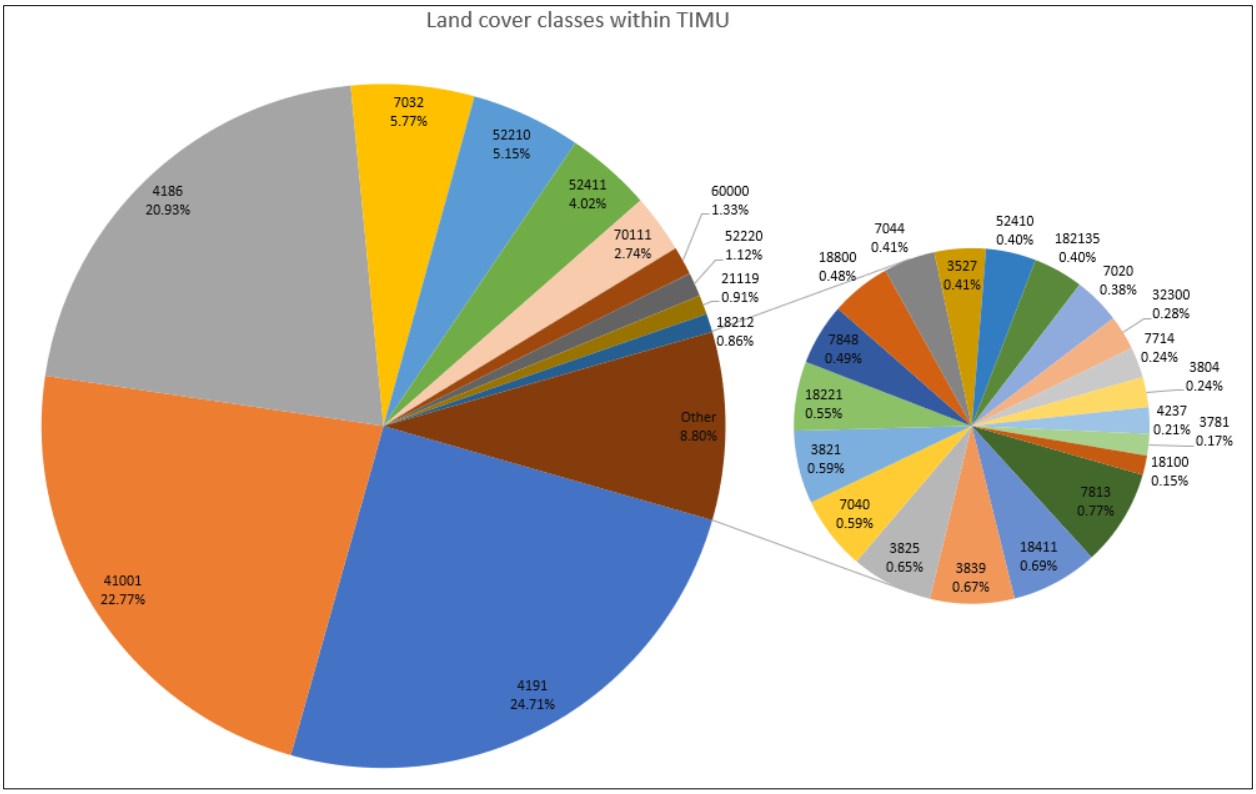


Figure 6. Preserve vegetation classes as a percentage of total area. The smallest 18 classes comprising <1% of the preserve are not depicted.

Table 8. NVCS and SWAP code and class, frequency of occurrence, mean area, total area, and percentage of total area within the buffer area of Timucuan Ecological and Historic Preserve.

CEGL	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
41001	Rivers	35	56.85	1989.61	18.98%
4186	Needlerush High Marsh	62	13.98	866.99	8.27%
183332	Coniferous Plantations	59	14.53	857.23	8.18%
18221	Residential, Med	95	8.69	825.42	7.87%
18212	Low Intensity Urban	138	5.57	769.3	7.34%
60000	Marine	4	143.82	575.29	5.49%
4191	Southern Atlantic Coast Salt Marsh	78	6.91	539.21	5.14%
18311	Rural Open Forested	48	11.02	528.74	5.04%
18224	Industrial	11	42.72	469.91	4.48%

Table 8 (continued). NVCS and SWAP code and class, frequency of occurrence, mean area, total area, and percentage of total area within the buffer area of Timucuan Ecological and Historic Preserve.

CEGL	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
11240	Pine-Mesic Oak	18	24.47	440.53	4.20%
70111*	3643 (Slash Pine Flatwoods), 4658 (Maritime Slash Pine Upland Flatwoods), 7171 (Mid-Late Successional Slash Pine Managed Forest)	24	31.25	302.15	2.88%
18411	Road Paved	40	7.29	291.49	2.78%
7032	Maritime Live Oak Hammock	9	19.68	265.64	2.53%
11120	Mixed Upland Forest (Hardwoods)	20	13.27	265.5	2.53%
7040	Palmetto - Live Oak Hydric Hammock	13	9.92	129	1.23%
3825	Xeric Oak Scrubland	2	62.86	125.71	1.20%
3920	Coastal Salt Shrub Thicket	4	30.61	122.43	1.17%
15000	Shrubs & Brush	13	7.74	100.58	0.96%
4051	Southern Hairgrass - Saltmeadow Cordgrass - Dune Fingergrass Herbaceous Vegetation	5	19.34	96.7	0.92%
3527	Cabbage Palmetto Hydric Hammock	9	10.02	90.2	0.86%
7848	Sweetgum - Red Maple - (Swamp Blackgum) / Virginia Chainfern Forest	13	6.88	89.49	0.85%
18100	Mowed/Weedy Herbaceous	19	4.04	76.75	0.73%
182135	Community Recreation	9	8.35	75.12	0.72%
3804	Bald-cypress - Swamp Blackgum Basin Swamp	7	9.49	66.45	0.63%
21119*	Combined 3940 (Central Florida Sawgrass Marsh), 3960 (Elephantgrass Herbaceous Vegetation), 3988 (South Florida Cattail Marsh), 4114 (Crowngrass Interdune Swale), 4511 (Sand Cordgrass Interdune Swale), 4527 (Watershield Pond)	25	2.33	58.27	0.56%
52220	Sand	12	4.68	56.12	0.54%
4674	Temperate Hydric Hammock	5	10.61	53.03	0.51%
52210	Mud	53	0.92	48.56	0.46%

Table 8 (continued). NVCS and SWAP code and class, frequency of occurrence, mean area, total area, and percentage of total area within the buffer area of Timucuan Ecological and Historic Preserve.

CEGL	Description	Frequency	Mean Area (ha)	Total Area (ha)	Percentage of Total Area
18223	Commercial	9	4.11	37.02	0.35%
52411*	Combined 3924 (Seaside Oxeye Tidal Shrub Flat), 3956 (Saltwort - Woody Glasswort Dwarf-shrubland), 7663 (Saltmarsh Dropseed - Saltgrass Herbaceous Vegetation), 7694 (Saltgrass - (Saltmarsh Dropseed) Herbaceous Vegetation), 2278 (Salt Flat (Woody Glasswort Type))	24	1.47	35.18	0.34%
7044	Loblolly-bay Forest	7	4.34	30.4	0.29%
18800	Bare Soil	7	4.18	29.28	0.28%
32500	Stormwater Treatment Areas	36	0.79	28.39	0.27%
32100	Artificial/Farm Pond	57	0.49	28.05	0.27%
32300	Quarry Pond	7	2.93	20.53	0.20%
7813	Cedar – Live Oak – Cabbage Palmetto Marsh Hammock	7	2.88	20.14	0.19%
7750	Peninsular Florida Scrubby Flatwoods	1	19.63	19.63	0.19%
18412	Road Unpaved	7	2.63	18.39	0.18%
21120	Scrub-Shrub Wetland	6	2.63	15.77	0.15%
7020	Southeastern Florida Maritime Hammock	2	4.87	9.73	0.09%
18000	Terrestrial Cultural	2	2.88	5.76	0.05%
3781	Beachberry - Sea-grape / Sea-oats Shrubland	1	5.24	5.24	0.05%
7996	Pond Pine – Bay Swamp	1	4.68	4.68	0.04%
52410	Salt pan	1	0.28	0.28	0.00%
31130	Flatwoods/Prairie/Marsh Lake	1	0.17	0.17	0.00%
Total	n/a	**1006**	**14.49**	**10484.06**	**100.0%**

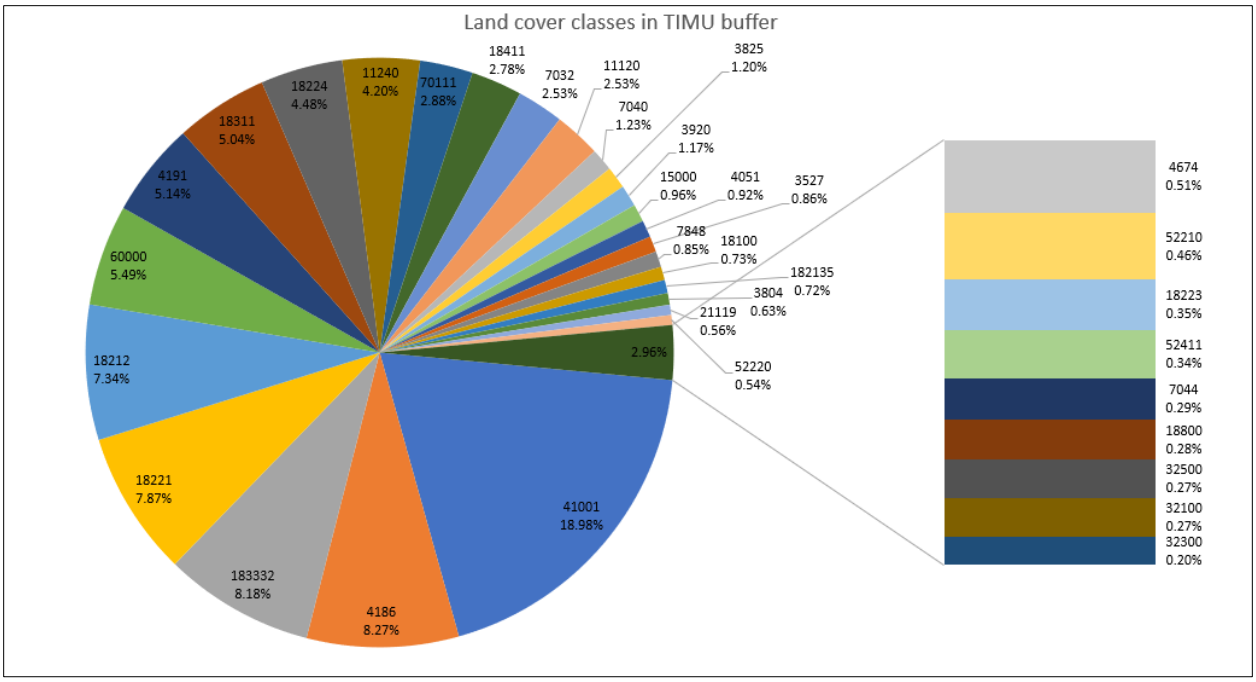


Figure 7. Buffer classes in Timucuan Ecological and Historic Preserve as a percentage of total area. The smallest 10 classes comprising <1% of the preserve's buffer are not depicted.

Table 9. Modifiers used throughout the park, including mean and total area. 1 through 4 represent percent coverage of primary vegetation in natural areas and percent canopy coverage in residential areas.

Code	Description	Comment	Mean Area (ha)	Total Area (ha)
1	<25%	–	2.07	264.98
2	25% to 75%	–	8.79	1486.18
3	>75%	–	6.33	3431.99
4	>90%	Only used to describe 4186 with narrow band of 4191 at ecotone with river.	2.38	128.60
Total	n/a	–	**19.57**	**5311.75**

Accuracy Assessment

Point Selection

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

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

Protocol dictates that the points be randomly distributed and stratified by class. For example, if 30 points are required for a particular class, those 30 points should be randomly distributed within all of the polygons of that particular class. The distribution of classes, the number of polygons, and the areas of each class was given in Table 7.

Point Acquisition

The Accuracy Assessment points were collected between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico. Figure 8 shows the locations of these points and Appendix D has the detailed information gathered at each of the 512 half a hectare (1.2 ac) accuracy assessment plot locations.

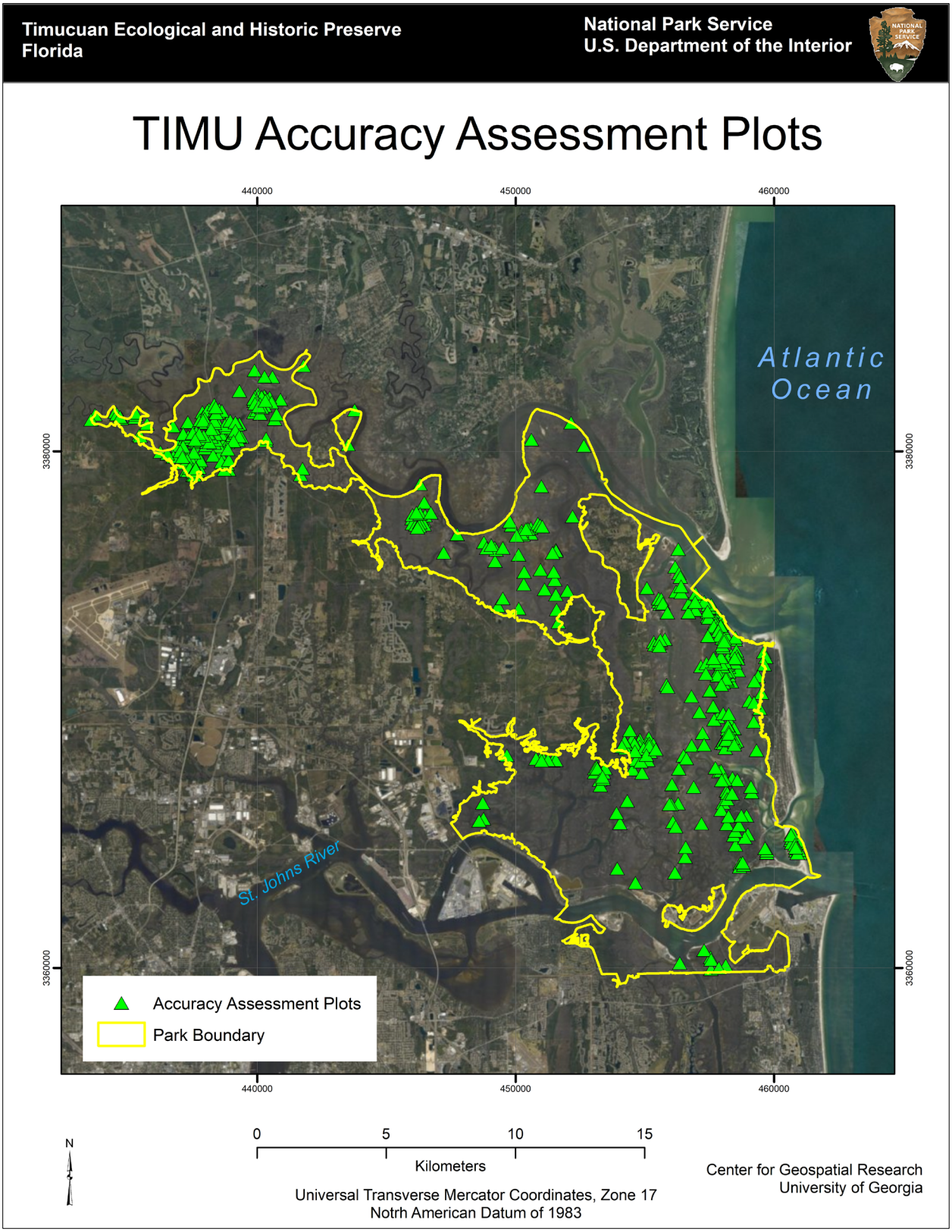


Figure 8. Accuracy Assessment data collection locations from Timucuan Ecological and Historic Preserve.

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 10, and the final accuracy assessment is presented in Table 11a–b.

Table 10. Breakdown of how the AA plots are related to the vegetation polygons and 2012 imagery.

Type	Code	Number	Status for Final Analysis
Perfect Match. Primary CEGL to Vegetation Code	L1	226	Retained
Perfect Match. Secondary CEGL to Vegetation Code	L2	6	Retained
CEGL code selection by CGR deemed inaccurate	C2	81	Retained
Poor fit – as described in accuracy assessment field notes	P1	12	Kicked out
Key discrepancies – disagreements with nearby NatureServe vegetation plot	N1	6	Kicked out
Spatial errors	S1	104	Kicked out
Does not match key description	M2	40	Kicked out
CEGL code not available to accuracy assessment team	M6	27	Kicked out
Plot exists outside of park boundary	O1	10	Kicked out
Total	–	512	**313 used for analysis**

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

Class	3525	3643	3804	3821	3825	3839	3920	3924	4040	4051	4186	4191	4197	4658	4674	4700	4720	4788	4789	7020	7032	7040	7044	7049	7171	7663	7694	7714	7813	7848	7996	52411	70111	Total
3525	4	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	0	0	0	0	0	0	4
3643	0	21	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	0	0	0	0	0	21
3804	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	0	0	0	0	0	0	0	0	2
3821	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	8
3825	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6
3839	0	0	0	0	0	6	0	0	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	7
3920	1	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	0	0	0	0	0	0	0	2
3924	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	0	0	0	0	0	0	0	0
4040	0	0	0	0	0	0	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
4051	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4186	0	0	0	0	0	0	0	0	0	0	21	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	25
4191	0	0	0	0	0	0	0	0	0	0	1	33	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	35
4197	0	0	0	0	0	0	0	0	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	2
4658	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
4674	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	0	0	0	0	0	0	0	0
4700	0	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	0	0	0	0	0	1
4720	0	0	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	0	0	0	0	1
4788	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	0	0	0	0	0	0	0	0
4789	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	0	0	0	0	0	0	0	0
7020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	1	0	0	0	0	0	0	0	0	0	0	0	0	22
7032	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	44	0	0	0	0	0	0	0	1	3	0	0	0	53
7040	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	0	0	13
7044	0	7	0	0	0	0	0	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	8
7049	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	0	0	2	0	0	0	0	3
7171	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	0	0	0	0	2	0	0	0	4
7663	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	0	0	0	0	0	0	0	0
7694	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	0	1	0	0	0	0	0	1

Table 11a (continued). 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	3525	3643	3804	3821	3825	3839	3920	3924	4040	4051	4186	4191	4197	4658	4674	4700	4720	4788	4789	7020	7032	7040	7044	7049	7171	7663	7694	7714	7813	7848	7996	52411	70111	Total
7714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	0	0	0	0	0	8
7813	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	10	0	0	0	0	12
7848	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	11	0	0	0	18
7996	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0	0	0	1	0	0	0	0	0	0	0	0	9
52411	0	0	0	0	0	0	0	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	2	0	4
70111	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	0	0	0	0	0	0	0	29	29
Total	5	42	2	1	2	6	0	1	10	0	23	38	2	2	1	1	1	1	2	28	70	1	0	0	3	1	1	5	17	16	0	2	29	313

Table 11b. Accuracy and error for the confusion matrix. Overall accuracy is 72. Kappa is 69.

Accuracy/error type	3525	3643	3804	3821	3825	3839	3920	3924	4040	4051	4186	4191	4197	4658	4674	4700	4720	4788	4789	7020	7032	7040	7044	7049	7171	7663	7694	7714	7813	7848	7996	52411	70111
Producer Accuracy	80[a]	50[b]	100[a]	0[b]	50[b]	100[a]	0[b]	0[b]	100[a]	0[b]	91[a]	87[a]	100[a]	0[b]	0[b]	100[a]	100[a]	0[b]	0[b]	75[a]	63[b]	0[b]	0[b]	0[b]	67[b]	0[b]	100[a]	80[a]	59[b]	69[b]	0[b]	100[a]	100[a]
Omission Error	20	50	0	100	50	0	0	100	0	0	9	13	0	100	100	0	0	100	100	25	37	100	0	0	33	100	0	20	41	31	0	0	0
User Accuracy	100[a]	100[a]	100[a]	0[b]	17[b]	86[a]	0[b]	0[b]	91[a]	0[b]	84[a]	94[a]	100[a]	0[b]	0[b]	100[a]	100[a]	0[b]	0[b]	95[a]	83[a]	0[b]	0[b]	0[b]	50[b]	0[b]	100[a]	50[b]	83[a]	61[b]	0[b]	50[b]	100[a]
Commission Error	0	0	0	100	83	14	100	0	9	100	16	6	0	100	0	0	0	0	0	5	17	100	100	100	50	0	0	50	17	39	100	50	0

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

[b] represents accuracy less than 70%

Quality Assurance of AA Plots

The AA plots were divided into nine categories to better understand issues regarding representativeness of accuracy assessment plot locations within Timucuan EHP (Table 10). Each plot was given a primary CEGL Code and an optional secondary CEGL Code created by the Ryan and Panico field team and a Vegetation code created by the UGA Center for Geospatial Research (CGR) team. (L1) if the match occurred between the primary CEGL Code and Vegetation Code, (L2) if the match occurred between the secondary CEGL Code and Vegetation Code. (C2) if was an incorrect match between the UGA Center for Geospatial Research and the AA plots, (P1) if the AA plot contained comments such as "does not key" in the field notes of the AA observation team, (N1) if the AA plot description greatly differed from an overlapping NatureServe plot, (S1) if the plot was located within an ecotone of adjacent polygons or fell in an area less than the minimum mapping unit, (O1) if the plot was referenced as outside of the park's boundary, (M6) if the CEGL code selected by the UGA Center for Geospatial Research was not in the key provided to the accuracy assessment team or (M2) if the AA plot description greatly differed from the imagery.

The AA plot 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 plot could easily land in a small gully, an inclusion that is too small to map, i.e. less than the minimum mapping unit (MMU) (0.5 hectares [1.2 ac]), or an ecotone where trees are invading a shrub land. To account for these situations, field observers were tasked with determining not only the vegetation within the AA sample area, but the surrounding area as well. An AA plot would be deemed a poor fit in cases where the assigned AA location was not easily classified into one of the designated vegetation classes by the AA observation team, as per their field notes. These instances included AA plots that fell inside of an ecotone or inclusion, or in an anomalous situation such as in a gully or sandy area (McManamay et al. 2012).

The AA plots that were found to overlap ecotones between polygons or were within an area smaller than MMU were labeled "spatial error" (S1). Plots that fall in these regions are difficult to classify and can be easily misinterpreted, therefore those 104 plots were removed accordingly.

The field notes of the AA team were also reviewed. AA plots with comments in the field notes such as "class not in key," "key ineffective," "not in key" or "difficult to key" were removed due to a lack of adequate NVCS CEGL code choices for the field team. Examples for this include AA plots 046500 stating "key ineffective," plot 049700 "key unclear" and plot 53300 "not in key." A total of 12 plots were removed for this reason.

The UGA Center for Geospatial Research had access to the NatureServe keys created for other National Parks in Florida and referred to those when it was deemed the TIMU key was lacking (M6). Examples for this include AA plots 034200 and 019000, with CEGL code 3527 (Cabbage Palmetto Hydric Hammock), and AA plots, including 052800 and 053300, with CEGL code 4237 (Florida Swamp Privet Spoil Island). Since these codes were not available to the AA team, comparing them in

an accuracy assessment confusion matrix would be irrelevant. This resulted in the removal of 27 plots.

Discrepancies between plot locations that disagreed with a nearby NatureServe vegetation plot were labeled “key discrepancies” (N1). Discrepancies such as these were expected since the park has many successional classes and wetland regions that may change in the six years between NatureServe surveys and flight date. A total of six plots were removed for this reason.

All available data were used to create a final vegetation classification for Timucuan EHP and the confusion matrix for the park is shown in Table 11a–b. Overall, 199 AA plots were removed (P1, S1, N1, M2, M6, O1) based on the plots lying in locations that were deemed unrepresentative of the polygon or imagery from 2012. This left 313 AA plots that were used to assess the map based on the 2012 imagery. The overall assessment showed a 72% accuracy and a kappa rating of 69% using the 313 AA plots (Table 11a–b).

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 Timucuan EHP 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 20 meters (65.6 ft; or many times even less) to a polygon boundary, or located in areas that have drastically changed since the imagery was acquired. These areas are very difficult to classify and typically represent a very gradual change between vegetation classes that could span 10’s of meters. By utilizing this technique even more errors can be reduced: 104 additional plots would have been included in the final assessment (S1).

The comments recorded by the accuracy assessment team “does not key” (P1) was another cause of error and removal of plots for final assessment. If the Accuracy Assessment did not find the NatureServe key adequate to address the vegetation classes of the park, then feedback should be given or a more in-depth explanation as to why—perhaps it was due to invasive species, the class lacked adequate representation in the key or some other reason. Twelve plots were removed due to this comment. This is also relevant to the UGA Center for Geospatial Research, though the goal is to create the most accurate vegetation map possible, 27 plots were removed due to the use of a code the Accuracy Assessment team did not have and thus could not be compared. The time span between NatureServe Survey dates (2006) to flying the aerial imagery (2012) is a significant amount of time regarding changes in vegetation.

Overall, using these simple additions, 143 more plots could have been included in the accuracy assessment of the park.

Conclusion

A final vegetation map for Timucuan EHP was created to represent the vegetation occurring within the park during 2012. This product represents the final of four steps necessary to produce an accurate vegetation map based upon aerial photographs. This includes the determination of the CEGL codes (2006) and acquisition of aerial imagery (2012), using aerial imagery, with ground truthing (2014), to create a draft vegetation map, performing an accuracy assessment (2015), and then using all the available information to create a final vegetation map (2018).

The most prevalent NVCS class found in the park is Southern Atlantic Coast Salt Marsh (4191) covering 24.71% of the park. Rivers (41001) are the second most prevalent class at 22.77%, followed by Needlerush High Marsh (4168) at 20.93%. Within the 500-meter (1,640-ft) buffer region of Timucuan EHP, the most prevalent class was Rivers, covering 18.98% of the park, followed by the NVCS class Needlerush High Marsh (4186) at 8.27% and Coniferous Plantations (183332) at 8.18%.

The overall accuracy assessment of the TIMU vegetation mapping project was 72% and the kappa rating was 69. Producing an accurate vegetation map based on color infrared imagery is a lengthy process and can take three to seven years to complete. During this time, disturbances may change some areas significantly. As a result, conclusions made from ground observations that were conducted during the middle or end of the overall process may be different from conclusions made from interpreting aerial photographs that were collected at the onset of the project.

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Appendix A. Flight Line Information

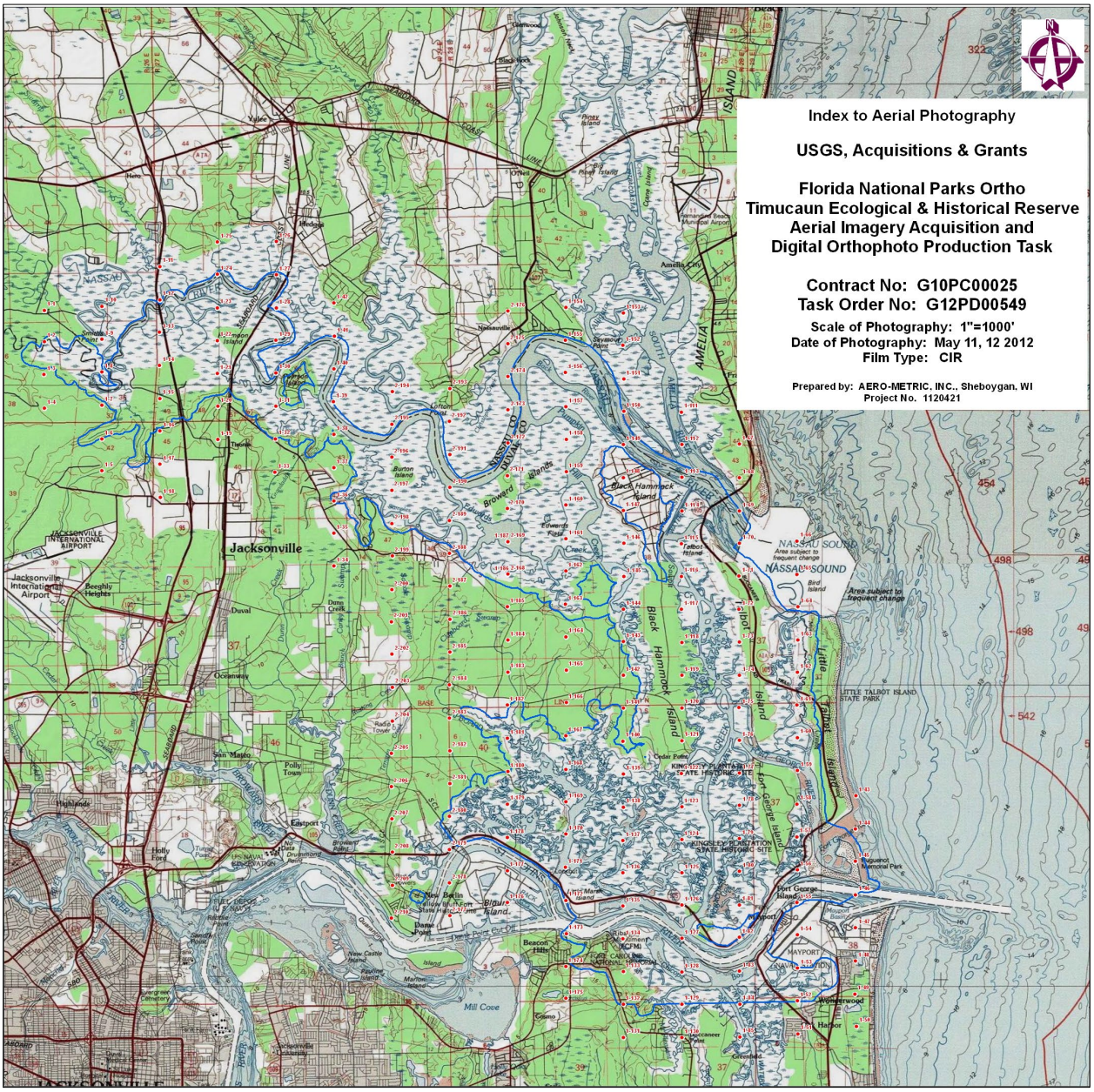


Figure A-1. TIMU flight lines and photo numbers, acquired by Aero-Metric at 1:12,000 scale on May 11–12, 2012.

Appendix B. NatureServe Vegetation Plot Locations and Notes

Table B-1. Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU01	453775	3360901	Tidal Marsh	Juncus roemerianus Herbaceous Vegetation	4186	Evergreen	Graminoid	Herbaceous vegetation
TIMU03	454416	3372425	Depression Marsh	Panicum hemitomon - Pluchea (camphorata, rosea) - Ludwigia spp. Herbaceous Vegetation	7792	Perennial herb	Graminoid	Herbaceous vegetation
TIMU08	454657	3373306	Depression Marsh	Panicum hemitomon - Pluchea (camphorata, rosea) - Ludwigia spp. Herbaceous Vegetation	7792	Perennial herb	Graminoid	Herbaceous vegetation
TIMU09	454612	3373231	Depression Marsh	Spartina bakeri - Muhlenbergia filipes - Andropogon glomeratus - Rhynchospora colorata Herbaceous Vegetation	4511	Perennial herb	Graminoid	Herbaceous vegetation
TIMU10	455648	3368405	Tidal Marsh	Spartina alterniflora Carolinian Zone Herbaceous Vegetation	4191	Evergreen	Graminoid	Herbaceous vegetation
TIMU29	438873	3380230	Basin Marsh	Cladium mariscus ssp. jamaicense Tidal Herbaceous Vegetation	4178	Cold-deciduous	Mixed broad-leaved	Woodland
TIMU31	438522	3381238	Basin Marsh	Morella cerifera - Toxicodendron radicans / Spartina bakeri Shrubland	4789	Evergreen	Broad-leaved	Shrubland
TIMU32	453107	3360963	Depression Marsh	Panicum hemitomon - Pluchea (camphorata, rosea) - Ludwigia spp. Herbaceous Vegetation	7792	Cold-deciduous	Graminoid	Herbaceous vegetation

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU46	437855	3379560	Basin Swamp	Taxodium distichum - Nyssa biflora - Acer rubrum - Magnolia virginiana Saturated Forest	3804	Cold-deciduous	Mixed broad-leaved	Forest
TIMU67	460371	3368943	Coastal Interdunal Swail	Morella cerifera / Spartina patens Shrubland	3839	Evergreen	Broad-leaved	Shrubland
TIMU22	438370	3379527	Basin Swamp	Taxodium distichum - Nyssa biflora - Acer rubrum - Magnolia virginiana Saturated Forest	3804	Cold-deciduous	Mixed broad-leaved	Forest
TIMU24	453195	3360595	Dome Swamp	Taxodium ascendens / (Nyssa biflora) / Leucothoe racemosa - Lyonia lucida - Morella cerifera Depression Forest	7420	Cold-deciduous	Mixed broad-leaved	Forest
TIMU28	453909	3360244	Baygall	Gordonia lasianthus - Magnolia virginiana - Persea palustris / Sphagnum spp. Forest	7044	Mixed evergreen - cold-deciduous	Broad-leaved	Forest
TIMU41	438535	3379669	Baygall	Gordonia lasianthus - Magnolia virginiana - Persea palustris / Sphagnum spp. Forest	7044	Evergreen	Broad-leaved	Forest
TIMU47	437932	3378997	Baygall	Gordonia lasianthus - Magnolia virginiana - Persea palustris / Sphagnum spp. Forest	7044	Evergreen	Broad-leaved	Forest
TIMU45	437880	3379485	Hydric Hammock	Sabal palmetto - Quercus virginiana Saturated Forest	7040	Mixed evergreen - cold-deciduous	Broad-leaved	Forest

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU55	453887	3360440	Hydric Hammock	Sabal palmetto - Quercus laurifolia - Quercus virginiana - Magnolia virginiana - Ulmus americana Forest	4674	Mixed evergreen - cold-deciduous	Broad-leaved	Forest
TIMU80	449586	3372466	Hydric Hammock	Sabal palmetto - Quercus laurifolia - Quercus virginiana - Magnolia virginiana - Ulmus americana Forest	4674	Mixed evergreen - cold-deciduous	Broad-leaved	Forest
TIMU17	453103	3361208	Xeric Hammock	Quercus geminata - (Quercus virginiana) / Serenoa repens - Lyonia fruticosa Forest	7020	Evergreen	Broad-leaved	Forest
TIMU75	452135	3371248	Dome Swamp	Taxodium ascendens / (Nyssa biflora) / Leucothoe racemosa - Lyonia lucida - Morella cerifera Depression Forest	7420	Cold-deciduous	Needle-leaved	Forest
TIMU18	453238	3361296	Scrub	Quercus myrtifolia - Quercus geminata - Quercus chapmanii Shrubland	3825	Evergreen	Broad-leaved	Shrubland
TIMU19	453373	3361327	Maritime Hammock	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU20	453722	3361040	Shell Mound	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU23	453351	3359934	Sandhill	Pinus palustris / Quercus laevis / Serenoa repens - Vaccinium stamineum / Aristida beyrichiana Woodland	4490	Evergreen	Needle-leaved	Woodland
TIMU30	438918	3381078	Mesic Flatwoods	Pinus elliottii var. elliottii / Serenoa repens - Ilex glabra Woodland	3643	Evergreen	Needle-leaved	Forest
TIMU33	453351	3360864	Scrub	Quercus myrtifolia - Quercus geminata - Quercus chapmanii Shrubland	3825	Evergreen	Broad-leaved	Shrubland
TIMU35	454708	3367217	Shell Mound	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU36	458389	3367469	Maritime Hammock	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU37	457785	3367715	Maritime Hammock	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU39	457827	3373212	Scrubby Flatwoods	Pinus (palustris, elliottii var. elliottii) / (Quercus geminata) / Serenoa repens / Aristida beyrichiana Woodland	7714	Evergreen	Broad-leaved	Shrubland

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU34	454768	3367965	Tidal Marsh	Spartina alterniflora Carolinian Zone Herbaceous Vegetation	4191	Evergreen	Graminoid	Herbaceous vegetation
TIMU38	458123	3368600	Depression Marsh	Spartina bakeri - Muhlenbergia filipes - Andropogon glomeratus - Rhynchospora colorata Herbaceous Vegetation	4511	Evergreen	Graminoid	Herbaceous vegetation
TIMU42	437256	3379956	Dome Swamp	Nyssa biflora / Ilex myrtifolia / Carex glaucescens - Eriocaulon compressum Forest	4720	Cold-deciduous	Broad-leaved	Forest
TIMU48	454876	3369136	Ruderal/canal (historic depression marsh)	Panicum hemitomon - Pluchea (camphorata, rosea) - Ludwigia spp. Herbaceous Vegetation	7792	Evergreen	Pteridophyte	Herbaceous vegetation
TIMU51	455874	3376569	Tidal Marsh	Sarcocornia perennis - (Batis maritima, Distichlis spicata) Dwarf-shrubland	2278	Mixed evergreen - cold-deciduous	Broad-leaved	Herbaceous vegetation
TIMU53	457872	3371897	Dome Swamp	Liquidambar styraciflua - Acer rubrum - (Nyssa biflora) / Woodwardia virginica Forest	7848	Cold-deciduous	Broad-leaved	Forest
TIMU62	460138	3365825	Tidal Marsh	Sporobolus virginicus - Distichlis spicata Herbaceous Vegetation	7663	Evergreen	Graminoid	Herbaceous vegetation
TIMU69	460370	3368818	Coastal Interdunal Swale	Salix caroliniana / Decodon verticillatus / Typha latifolia Forest	4423	Cold-deciduous	Broad-leaved	Shrubland
TIMU02	454494	3372307	Scrubby Flatwoods	Quercus myrtifolia - Quercus geminata - Quercus chapmanii Shrubland	3825	Evergreen	Broad-leaved	Shrubland

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU04	454695	3372431	Wet Flatwoods	Pinus elliottii var. elliottii / Serenoa repens - Ilex glabra Woodland	3643	Evergreen	Mixed broad-leaved	Forest
TIMU05	454709	3368743	Mesic Flatwoods	Pinus (palustris, elliottii var. elliottii) / (Quercus geminata) / Serenoa repens / Aristida beyrichiana Woodland	7714	Evergreen	Mixed broad-leaved	Woodland
TIMU06	454088	3372328	Xeric Hammock	Quercus geminata - (Quercus virginiana) / Serenoa repens - Lyonia fruticosa Forest	7020	Evergreen	Broad-leaved	Forest
TIMU07	454172	3371935	Baygall	Gordonia lasianthus - Magnolia virginiana - Persea palustris / Sphagnum spp. Forest	7044	Evergreen	Mixed broad-leaved	Forest
TIMU54	454003	3360639	Shell Mound	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU56	458964	3366826	Maritime Hammock	Quercus geminata / Vaccinium arboreum Forest	3564	Evergreen	Broad-leaved	Forest
TIMU57	458794	3367374	Ruderal	Cynodon dactylon Herbaceous Vegetation	4701	Perennial herb	Graminoid	Herbaceous vegetation
TIMU58	458211	3365645	Ruderal (pine plantation/maritime hammock)	Pinus elliottii var. elliottii - (Pinus palustris) / Ilex vomitoria - Serenoa repens - Morella cerifera Woodland	4658	Evergreen	Needle-leaved	Forest

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU59	460859	3365134	Beach Dune	Uniola paniculata - Hydrocotyle bonariensis Herbaceous Vegetation	4040	Perennial herb	Graminoid	Herbaceous vegetation
TIMU60	459358	3363932	Coastal Grassland	Smilax auriculata / Heterotheca subaxillaris - Strophostyles helvula - (Uniola paniculata) Herbaceous Vegetation	4234	Evergreen	Broad-leaved	Shrubland
TIMU61	458916	3365064	Shell Mound	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Mixed evergreen - cold-deciduous	Broad-leaved	Forest
TIMU63	460189	3366027	Beach Dune / Coastal Grassland	Smilax auriculata / Heterotheca subaxillaris - Strophostyles helvula - (Uniola paniculata) Herbaceous Vegetation	4234	Evergreen	Broad-leaved	Sparse vegetation
TIMU64	460056	3366206	Coastal Grassland (Coastal Interdunal Swale)	Muhlenbergia filipes - Spartina patens - Eustachys petraea Herbaceous Vegetation	4051	Perennial herb	Graminoid	Herbaceous vegetation
TIMU65	458455	3365197	Mesic Flatwoods	Pinus elliottii var. elliottii - (Pinus palustris) / Ilex vomitoria - Serenoa repens - Morella cerifera Woodland	4658	Evergreen	Needle-leaved	Forest
TIMU40	457718	3373265	Wet Flatwoods	Pinus serotina / Gordonia lasianthus - Persea palustris Saturated Woodland	7996	Evergreen	Needle-leaved	Forest
TIMU43	437447	3379716	Ruderal (Mesic Flatwoods)	unclassified		Shrubland		

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU44	437716	3379722	Mesic Flatwoods (pine plantation)	Pinus elliottii var. elliottii / Serenoa repens - Ilex glabra Woodland	3643	Evergreen	Needle-leaved	Woodland
TIMU49	454501	3368831	Xeric Hammock	Quercus geminata - (Quercus virginiana) / Serenoa repens - Lyonia fruticosa Forest	7020	Evergreen	Broad-leaved	Forest
TIMU50	455828	3376544	Ruderal (spoil island)	unclassified		Shrubland		
TIMU52	458156	3370836	Maritime Hamock	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU66	458306	3364926	Maritime Hammock	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU68	460656	3368241	Beach Dune	Uniola paniculata - Hydrocotyle bonariensis Herbaceous Vegetation	4040	Perennial herb	Graminoid	Herbaceous vegetation
TIMU70	460505	3369342	Beach Dune / Coastal Grassland	Smilax auriculata / Heterotheca subaxillaris - Strophostyles helvula - (Uniola paniculata) Herbaceous Vegetation	4234	Perennial herb	Mixed herbaceous	Herbaceous vegetation
TIMU71	459242	3370795	Maritime Hammock	Quercus geminata / Vaccinium arboreum Forest	3564	Evergreen	Broad-leaved	Forest

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU72	459339	3372259	Shell Mound	Juniperus virginiana var. silicicola - Zanthoxylum clava-herculis - Quercus virginiana - (Sabal palmetto) / Sageretia minutiflora - (Sideroxylon tenax) Woodland	3525	Evergreen	Mixed broad-leaved	Forest
TIMU73	455458	3368827	Mesic Flatwoods	Pinus elliottii var. elliottii - (Pinus palustris) / Ilex vomitoria - Serenoa repens - Morella cerifera Woodland	4658	Evergreen	Needle-leaved	Forest
TIMU74	455553	3368516	Shell Mound	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest
TIMU76	451626	3371703	Sandhill	Pinus (palustris, elliottii var. elliottii) / (Quercus geminata) / Serenoa repens / Aristida beyrichiana Woodland	7714	Mixed evergreen - cold-deciduous	Mixed broad-leaved	Woodland
TIMU77	451806	3372043	Scrubby Flatwoods	Pinus (palustris, elliottii var. elliottii) / (Quercus geminata) / Serenoa repens / Aristida beyrichiana Woodland	7714	Evergreen	Needle-leaved	Woodland
TIMU78	450262	3370113	Sandhill	Pinus palustris / Quercus laevis / Serenoa repens - Vaccinium stamineum / Aristida beyrichiana Woodland	4490	Mixed evergreen - cold-deciduous	Mixed broad-leaved	Woodland

Table B-1 (continued). Field data acquired by G. Shultz and J. Surdick in March and July 2006.

Plot Code	Field X	Field Y	Provisional	Classified	ELCODE	Leaf Phenology	Leaf Type	Physiological Class
TIMU79	451027	3368864	Upland Mixed Forest	Quercus hemisphaerica - Magnolia grandiflora - Carya (glabra, pallida) / Vaccinium arboreum / Chasmanthium sessiliflorum Forest	4788	Evergreen	Broad-leaved	Forest
TIMU81	451410	3365338	Shell Mound	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Mixed evergreen - cold-deciduous	Mixed broad-leaved	Forest
TIMU82	451228	3366520	Xeric Hammock	Quercus geminata / Vaccinium arboreum Forest	3564	Evergreen	Broad-leaved	Forest
TIMU83	451517	3366106	Shell Mound	Quercus virginiana - (Pinus elliottii var. elliottii, Sabal palmetto) / Persea borbonia - Callicarpa americana Forest	7032	Evergreen	Broad-leaved	Forest

Appendix C. 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, 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 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, and/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.

Cabbage Palmetto Hydric Hammock

Attributes, descriptions, and a map are shown in Table C-1 and Figure C-1.

Table C-1. Attributes and descriptions of Cabbage Palmetto Hydric Hammock.

Attribute	Description
CEGL Code	3527
Community Name	Cabbage Palmetto Hydric Hammock
Color	Pink overstory with gray-blue understory
Tone	Light to medium
Texture	Coarse
Pattern	Open 25% to 50% canopy
Height	Mixed; tallest stratum < 10 meters (32.8 ft)
Shape	Compact, round crowns of Sabal palmetto
Size	Linear waterward; convoluted landward
Location	Transitional between marsh vegetation (Juncus, Spartina or tidal marsh barren) and more closed-canopy upland woodlands or forests
Association	–
Comments	–

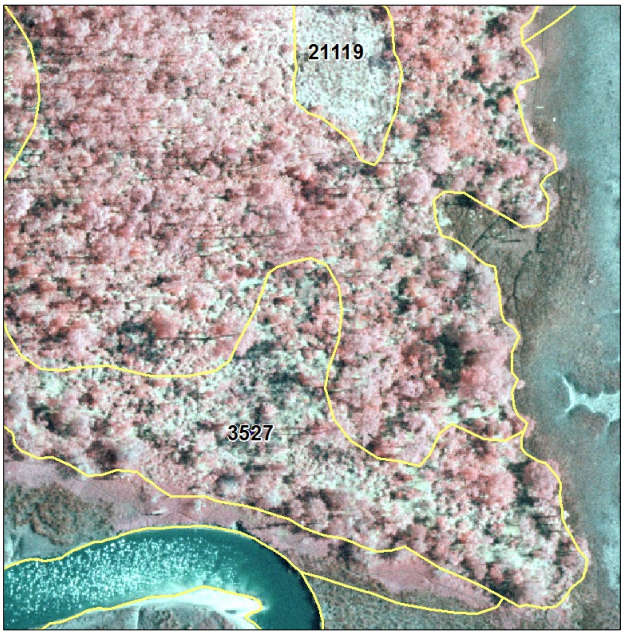


Figure C-1. Map showing Cabbage Palmetto Hydric Hammock (3527).

Summary

Global Vegetation

This vegetation type is dominated by a combination of *Sabal palmetto* (cabbage palmetto), *Quercus virginiana* (live oak), *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), and *Quercus nigra* (water oak). *Sabal palmetto* (cabbage palmetto) is prominent in the upper woody strata. The canopy contains *Sabal palmetto* (cabbage palmetto), *Pinus elliottii* (slash pine), *Pinus taeda* (loblolly pine), and *Quercus nigra* (water oak). The subcanopy contains *Sabal palmetto* (cabbage palmetto), *Acer rubrum var. trilobum* (red maple), *Juniperus virginiana* (eastern redcedar), *Liquidambar styraciflua* (sweetgum), and *Quercus nigra* (water oak). Shrubs include *Ilex cassine* (dahoon), *Morella cerifera* (wax myrtle), *Ilex glabra* (inkberry), *Persea palustris* (swamp bay), *Cornus foemina* (stiff dogwood), *Diospyros virginiana* (common persimmon), and *Vaccinium corymbosum* (highbush blueberry). Woody vines include *Berchemia scandens* (Alabama supplejack), *Smilax auriculata* (earleaf greenbrier), *Smilax bona-nox* (saw greenbrier), *Toxicodendron radicans* (eastern poison ivy), *Vitis rotundifolia* (muscadine), and *Smilax glauca* (cat greenbrier). Herbs include *Galactia elliottii* (Elliott's milkpea), *Cladium mariscus ssp. jamaicense* (Jamaica swamp sawgrass), *Osmunda cinnamomea* (cinnamon fern), *Woodwardia virginica* (Virginia chainfern), *Blechnum serrulatum* (toothed midsorus fern), and the epiphyte *Phlebodium aureum* (golden polypody).

Beachberry –Sea-grape/Sea-oats Shrubland

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

Table C-2. Attributes and descriptions of Beachberry–Sea-grape/Sea-oats Shrubland.

Attribute	Description
CEGL Code	3781
Community Name	Beachberry–Sea-grape/Sea-oats Shrubland
Color	Red with gray-green
Tone	Mix of dark to light
Texture	Uneven
Pattern	Scattered
Height	Mixed; canopy < 5 meters (16.4 ft)
Shape	Linear but with uneven edges
Size	Uncommon class; very small average size with very little variation
Location	Coastal, inland from sparser dune or sand
Association	–
Comments	–

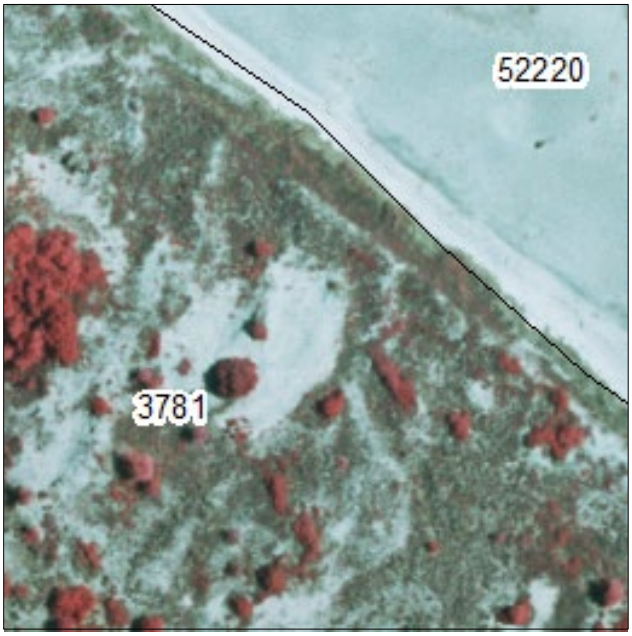


Figure C-2. Map showing Beachberry–Sea-grape/Sea-oats Shrubland (3781).

Summary

Global Vegetation

Stands are dominated by the shrubs *Scaevola plumieri* and *Coccoloba uvifera* (seagrape), with *Uniola paniculata* (seaoats) present in the herb layer. Other characteristic species include *Chamaesyce mesembrianthemifolia* (coastal beach sandmat), *Coccoloba uvifera* (seagrape), *Iva imbricata* (seacoast marshelder), *Panicum amarum* var. *amarulum* (bitter panicgrass), *Paspalum*, *distichum* (knotgrass), *Cenchrus longispinus* (mat sandbur), *Helianthus debilis* (cucumberleaf sunflower), *Remirea maritima* (beachstar), and *Alternanthera maritima* (seaside joyweed).

Bald-cypress—Swamp Blackgum Basin Swamp

Attributes, descriptions, a photo and a map are shown in Table C-3, and Figure C-3.

Table C-3. Attributes and descriptions of Bald-cypress—Swamp Blackgum Basin Swamp.

Attribute	Description
CEGL Code	3804
Community Name	Bald-cypress—Swamp Blackgum Basin Swamp
Color	Taller strata predominately pink but with some red tones; lower strata gray-blue
Tone	Medium
Texture	Moderately coarse
Pattern	Moderate
Height	Medium to tall
Shape	Linear to large patches depending upon location
Size	One of the most common classes; very large patches with large variations possible
Location	More common far enough inland to be freshwater
Association	Usually landward of freshwater graminoid wetland or freshwater shrubs
Comments	–

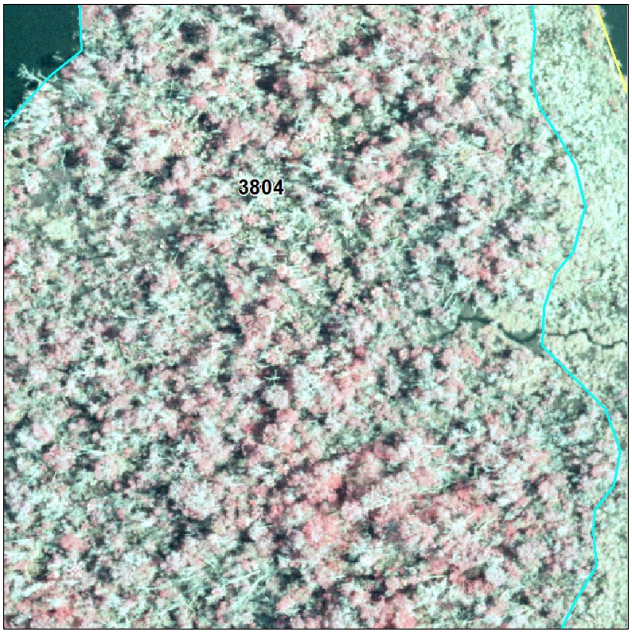


Figure C-3. Map showing Bald-cypress—Swamp Blackgum Basin Swamp (3804).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The very dense to closed (90–100% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, is dominated by *Taxodium distichum* (bald cypress), along with *Acer rubrum* (red maple), *Fraxinus pennsylvanica* (green ash), *Liquidambar styraciflua* (sweetgum), *Nyssa biflora* (swamp tupelo), and *Quercus laurifolia* (laurel oak). The sparse (30%) subcanopy (5–15 meters [16.4–49.2 ft]) is made up of canopy species along with *Ilex cassine* (dahoon) and *Persea palustris* (swamp bay). The tall-shrub layer (2–5 meters [6.6–16.4 ft]) is highly variable (5–100%); one stand is heavily dominated by *Morella cerifera* (wax myrtle). Additional shrubs in the very sparse (5–10%) short-shrub layer (1–2 meters [3.3–6.6 ft]) may include *Baccharis halimifolia* (eastern baccharis), *Lyonia lucida* (fetterbush lyonia), *Persea palustris* (swamp bay), *Sabal palmetto* (cabbage palmetto), and *Vaccinium corymbosum* (highbush blueberry). The very sparse (5–20%) herbaceous layer may include *Carex* (sedge) spp., *Chasmanthium sessiliflorum* (longleaf woodoats), *Hydrocotyle* (hydrocotyle) sp., *Iris hexagona* (Dixie iris), *Polygonum hydropiperoides* (swamp smartweed), and *Saururus cernuus* (lizard's tail), among others. Vines (5%) are diverse and include *Decumaria barbara* (woodvamp), *Smilax* (greenbrier) spp., *Toxicodendron radicans* (eastern poison ivy), and *Vitis rotundifolia* (muscadine).

Global Vegetation

This forest is dominated by *Taxodium distichum* (bald cypress), *Nyssa biflora* (swamp tupelo), *Acer rubrum* (red maple), and *Magnolia virginiana* (sweetbay). The subcanopy is composed of *Acer rubrum* (red maple), *Magnolia virginiana* (sweetbay), and *Persea palustris* (swamp bay). Shrubs are *Lyonia lucida* (fetterbush lyonia), *Morella cerifera* (wax myrtle), *Persea palustris* (swamp bay), and *Leucothoe racemosa* (swamp doghobble). *Toxicodendron radicans* (eastern poison ivy) is an important vine, and *Dulichium arundinaceum* (threeway sedge) is the only sparse herb documented. In a stand from the Ocala National Forest, the canopy contains *Nyssa biflora* (swamp tupelo), *Taxodium distichum* (bald cypress), *Acer rubrum* (red maple), and *Pinus elliottii* (slash pine). In addition, the subcanopy contains *Ulmus americana* (American elm), *Ilex cassine* (dahoon), *Persea palustris* (swamp bay), and *Sabal palmetto* (cabbage palmetto). Shrubs include *Diospyros virginiana* (common persimmon), *Fraxinus caroliniana* (Carolina ash), *Ilex cassine* (dahoon), *Itea virginica* (Virginia sweetspire), *Morella cerifera* (wax myrtle), *Nyssa biflora* (swamp tupelo), *Persea palustris* (swamp bay), *Quercus nigra* (water oak), *Toxicodendron radicans* (eastern poison ivy), and *Vaccinium virgatum* (smallflower blueberry). Vines include *Parthenocissus quinquefolia* (Virginia creeper), *Smilax bona-nox* (saw greenbrier), *Decumaria barbara* (woodvamp), and *Vitis aestivalis* (summer grape). Herbs include *Woodwardia virginica* (Virginia chainfern), *Hypoxis curtissii* (Curtis' star-grass), *Peltandra virginica* (green arrow arum), *Dichanthelium* (rosette grass) sp., *Osmunda regalis* (royal fern), *Carex* (sedge) sp., *Chasmanthium nitidum* (shiny woodoats), *Mitchella repens* (partridgeberry), *Osmunda cinnamomea* (cinnamon fern), *Solidago latissimifolia* (Elliott's goldenrod), and the epiphytic *Tillandsia bartramii* (Bartram's airplant). This type is described from Big Gum Swamp Wilderness, Osceola National Forest, and a stand from the Ocala National Forest is also assigned here.

Northeast Florida Coastal Scrub

Attributes, descriptions, a photo and a map are shown in Table C-4, and Figure C-4.

Table C-4. Attributes and descriptions of Northeast Florida Coastal Scrub.

Attribute	Description
CEGL Code	3821
Community Name	Northeast Florida Coastal Scrub
Color	Mix of reds and pinks with some small openings
Tone	Moderate to dark
Texture	Tight, small crowns with moderate coarseness
Pattern	Medium to coarse
Height	Tallest stratum 10 to 15 meters (32.8 to 49.2 ft)
Shape	Typically with relatively straight edges
Size	Various
Location	Variable
Association	–
Comments	Similar to 3825

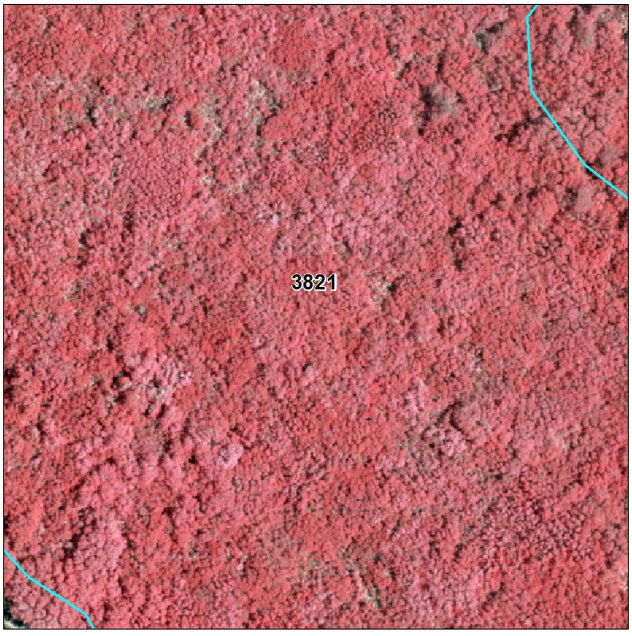


Figure C-4. Map showing Northeast Florida Coastal Scrub (3821).

Summary

Timucuan Ecological and Historic Preserve Vegetation

This association was not documented at Timucuan as part of this project, although it is likely that it does occur at the park.

Global Vegetation

Quercus geminata (sand live oak), *Quercus myrtifolia* (myrtle oak), *Serenoa repens* (saw palmetto), and *Persea borbonia* (redbay) dominate. Other characteristic species include *Morella cerifera* (wax myrtle), *Quercus chapmanii* (Chapman oak), *Osmanthus americanus* (devilwood), *Lyonia ferruginea* (rusty staggerbush), *Erythrina herbacea* (redcardinal), *Juniperus virginiana var. silicicola* (southern redcedar), and *Ilex vomitoria* (yaupon). Stands in northern Volusia County and on Cape Canaveral have dwarfed *Quercus virginiana* (live oak) present along with the usual scrub oaks.

Xeric Oak Shrubland

Attributes, descriptions, a photo and a map are shown in Table C-5, and Figure C-5.

Table C-5. Attributes and descriptions of Xeric Oak Shrubland.

Attribute	Description
CEGL Code	3825
Community Name	Xeric Oak Shrubland
Color	Reds, pinks, some gray showing in understory
Tone	Medium
Texture	Medium to coarse
Pattern	Large areas, occasionally linear
Height	Medium 10 to 15 meters (32.8–49.2 ft)
Shape	Typically with relatively straight edges
Size	–
Location	Shrub land found coastal areas or on sandy substrates
Association	–
Comments	Similar to 3821, but may have shorter canopy height, slightly more open canopy

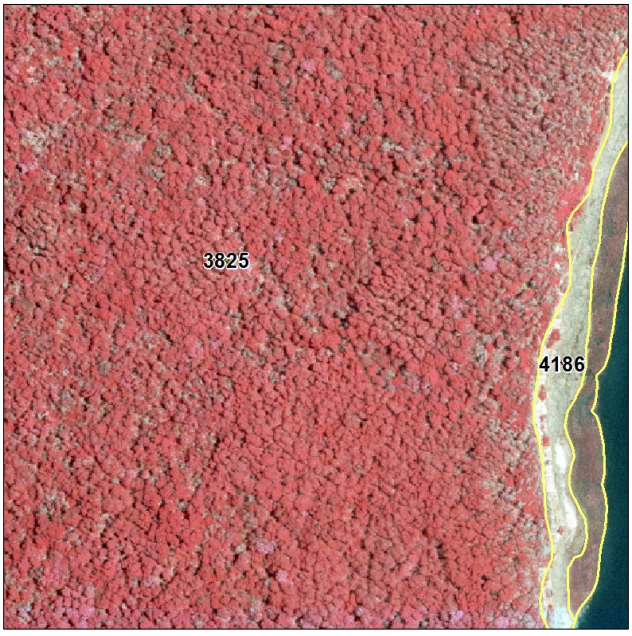


Figure C-5. Map showing Xeric Oak Shrubland (3825).

Summary

Timucuan Ecological and Historic Preserve Vegetation

Shrubs clearly dominate this community. However, there may be a very sparse (5% cover) emergent tree layer (5–15 meters [16.4–49.2 ft] tall) of *Quercus geminata* (sand live oak) and *Quercus myrtifolia* (myrtle oak). The sparse to closed (30–100%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is codominated by *Quercus chapmanii* (Chapman oak), *Quercus geminata* (sand live oak), and *Quercus myrtifolia* (myrtle oak); additional tall shrubs may include *Lyonia ferruginea* (rusty staggerbush), *Osmanthus americanus* (devilwood), *Persea borbonia* (redbay), *Quercus hemisphaerica* (Darlington oak), and *Ximenia americana* (tallow wood). The very dense to closed (90–100%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is made up of the same tall-shrub dominants and *Serenoa repens* (saw palmetto) and may also include other tall-shrub species as well as *Ceratiola ericoides* (sand heath), *Gaylussacia tomentosa* (hairytwig huckleberry), *Vaccinium myrsinites* (shiny blueberry), and *Vaccinium stamineum* (deerberry). The very sparse (5%) herbaceous layer is dominated by *Rhynchospora megalocarpa* (sandyfield beaksedge), the nonvascular layer (0–10%) by *Cladina subtenuis* (reindeer lichen). Vines (0–5%) include *Smilax auriculata* (earleaf greenbrier) and *Vitis rotundifolia* (muscadine).

Global Vegetation

This is a xeromorphic shrubby community consisting of evergreen scrub oaks (*Quercus myrtifolia* (myrtle oak), *Quercus chapmanii* (Chapman oak), *Quercus geminata* (sand live oak)), *Lyonia ferruginea* (rusty staggerbush), *Sabal etonia* (scrub palmetto), and *Serenoa repens* (saw palmetto). The 0.5- to 3.0-meter (1.6- to 9.8-ft) shrub layer ranges from very open to dense in patches, with a 25–60% cover. The herb layer (10–40%) is generally sparse and frequently dominated by lichens (*Cladonia leporina* (cup lichen), *Cladonia prostrata* (prostrate cup lichen), *Cladina evansii* (Evans' reindeer lichen), and *Cladina subtenuis* (reindeer lichen)). Much of the vegetation is rare or endemic to Florida scrub habitats.

Atlantic Coast Interdune Swale

Attributes, descriptions, a photo and a map are shown in Table C-6, and Figure C-6.

Table C-6. Attributes and descriptions of Atlantic Coast Interdune Swale.

Attribute	Description
CEGL Code	3839
Community Name	Atlantic Coast Interdune Swale
Color	Green-gray to light red
Tone	Light
Texture	Smooth to coarse
Pattern	Irregular
Height	Short
Shape	Varied
Size	Varied
Location	–
Association	Often found near 70111
Comments	–

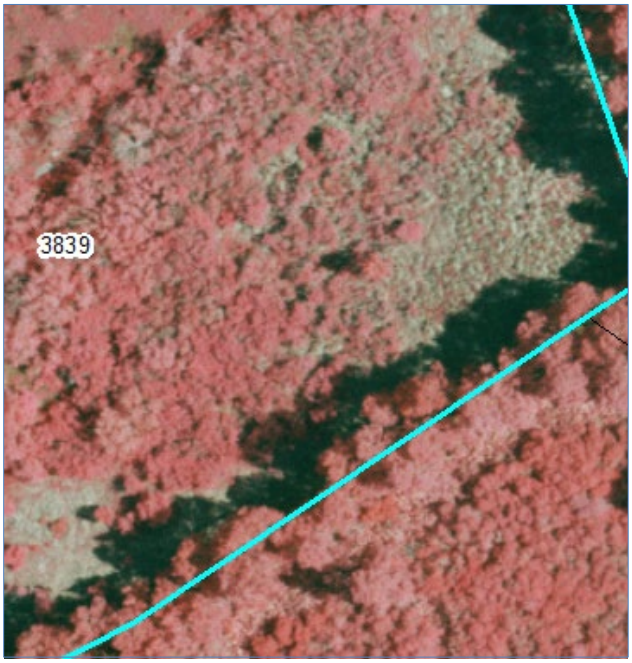


Figure C-6. Map showing Atlantic Coast Interdune Swale (3839).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The closed (100% cover) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is dominated by *Morella cerifera* (wax myrtle) and includes *Baccharis halimifolia* (eastern baccharis), *Juniperus virginiana var. silicicola* (southern redcedar), and *Sambucus canadensis* (common elderberry). This dense layer prevents much development of understory layers. However, in this example, there is a very sparse (5%) short-shrub layer (0.5–1 meter [1.6–3.3 ft]) and very sparse (5%) herbaceous layer that includes *Andropogon glomeratus* (bushy bluestem), *Eupatorium capillifolium* (dogfennel), *Hydrocotyle bonariensis* (largeleaf pennywort), *Polygonum hydropiperoides* (swamp smartweed), and *Physalis walteri* (Walter's groundcherry) (state-vulnerable and potentially statecritically imperiled). Vines (5–40%) include *Ampelopsis arborea* (peppervine) and *Smilax auriculata* (earleaf greenbrier).

Global Vegetation

This vegetation is characterized by a moderately open to densely closed canopy of *Morella cerifera* (wax myrtle). Other canopy associates include *Baccharis halimifolia* (eastern baccharis), *Morella pensylvanica* (northern bayberry) (from northern North Carolina northward), *Juniperus virginiana var. silicicola* (southern redcedar) (from North Carolina and possibly southern Virginia southward), and *Rhus copallinum* (flameleaf sumac). The herbaceous layer is characterized by *Spartina patens* (saltmeadow cordgrass). Other ground flora associates include *Toxicodendron radicans* (eastern poison ivy), *Panicum virgatum* (switchgrass), *Andropogon virginicus* (broomsedge bluestem), *Juncus dichotomus* (forked rush), *Solidago sempervirens* (seaside goldenrod), *Smilax* (greenbrier) spp., *Parthenocissus quinquefolia* (Virginia creeper), *Vitis* (grape) spp., and *Schoenoplectus pungens* (common threesquare). Small openings may have wetland graminoids, such as *Juncus roemerianus* (needlegrass rush), *Spartina patens* (saltmeadow cordgrass), *Fimbristylis castanea* (marsh fimbry), *Andropogon glomeratus var. pumilus* (bushy bluestem), *Muhlenbergia filipes* (gulfhairawn muhly), etc., and forbs, such as *Hydrocotyle bonariensis* (largeleaf pennywort), *Sabatia stellaris* (rose of Plymouth), *Polygonum hydropiperoides* (swamp smartweed), *Eleocharis* (spikerush) spp., etc. In other cases, few herbs are present, because of the dense, thicket-like shrub layer.

Coastal Salt Shrub Thicket

Attributes, descriptions, a photo and a map are shown in Table C-7, and Figure C-7.

Table C-7. Attributes and descriptions of Coastal Salt Shrub Thicket.

Attribute	Description
CEGL Code	3920
Community Name	Coastal Salt Shrub Thicket
Color	Light reds interspersed with patches of white and blue gray in sparse areas, light reds
Tone	Dark
Texture	Coarse
Pattern	Individual crowns can be seen
Height	Short
Shape	Irregular
Size	Small
Location	–
Association	–
Comments	Vegetation coverage varies between plots

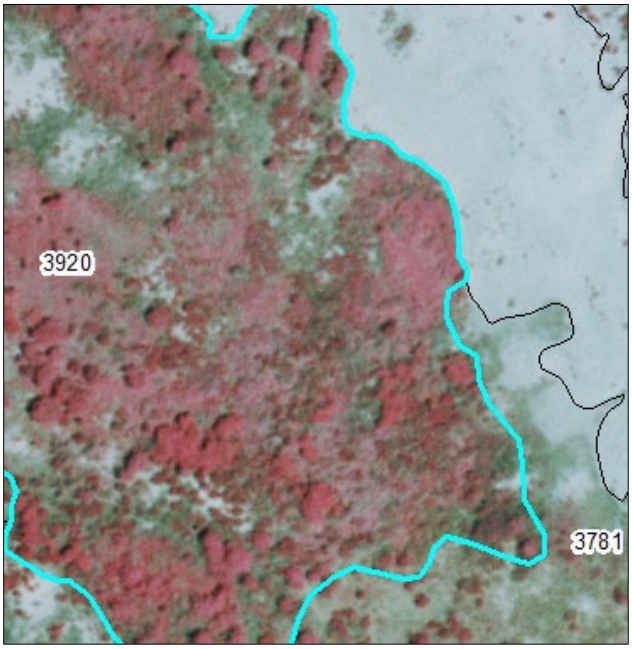


Figure C-7. Map showing Coastal Salt Shrub Thicket (3920).

Summary

Timucuan Ecological and Historic Preserve

This association was not documented at Timucuan as part of this project, although it is possible that it does occur at the park.

Global Summary

This shrubland, dominated by the nominal species, occurs in slightly elevated areas within salt flats and salt marshes as well as in marsh edges throughout much of the East Gulf, South Atlantic, and Mid-Atlantic coastal plains. This community is usually best developed at the upper limit of non-storm tidal inundation, on natural levees deposited by above-normal tides. The most common species are typically *Baccharis halimifolia* (eastern baccharis), *Morella cerifera* (wax myrtle), *Iva frutescens ssp. Frutescens* (Jesuit's bark), *Yucca gloriosa* (moundlily yucca), *Juniperus virginiana var. silicicola* (southern redcedar), *Lycium carolinianum* (Carolina desert-thorn), *Baccharis angustifolia* (saltwater false willow), and *Ilex vomitoria* (yaupon). Other species which may be present include *Borrichia frutescens* (bushy seaside tansy), *Fimbristylis castanea* (marsh fimbry), *Limonium carolinianum* (Carolina sealavender), and *Solidago sempervirens* (seaside goldenrod).

Southeast Florida Beach Dune

Attributes, descriptions, a photo and a map are shown in Table C-8, and Figure C-8.

Table C-8. Attributes and descriptions of Southeast Florida Beach Dune.

Attribute	Description
CEGL Code	4001
Community Name	Southeast Florida Beach Dune
Color	Olive green with inclusions of white or bright red
Tone	Light to dark
Texture	Irregular
Pattern	Irregular
Height	Generally less than 1 m but bright red patches may be 1 to 2 meters (3.3 to 6.6 ft)
Shape	Varies depending upon coast line from linear parallel to shore to rounder if at tip of peninsula
Size	Small
Location	Coastal
Association	Sand on ocean side; usually with shrubs on other side
Comments	–

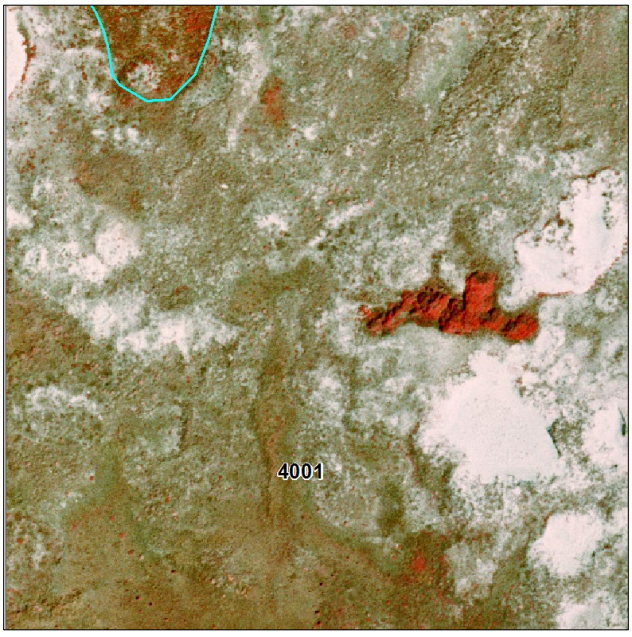


Figure C-8. Map showing Southeast Florida Beach Dune (4001).

Summary

Global Vegetation

Examples are dominated by *Iva imbricata* (seacoast marshelder) and *Uniola paniculata* (seaoats). Other common species include *Panicum amarum var. amarulum* (bitter panicgrass), *Ipomoea pes-caprae* (bayhops), *Spartina patens* (saltmeadow cordgrass), *Paspalum distichum* (knotgrass), *Sesuvium portulacastrum* (shoreline seapurslane), and *Heterotheca subaxillaris* (camphorweed). Scattered shrubs such as *Coccoloba uvifera* (seagrape), *Lantana depressa* (depressed shrubverbena), and *Sabal palmetto* (cabbage palmetto) may occur at low cover. Johnson et al. (1990) provide a species list for this community with abundance values for all taxa.

Sea-oats—Beach Pennywort Herbaceous Vegetation

Attributes, descriptions, a photo and a map are shown in Table C-9, and Figure C-9.

Table C-9. Attributes and descriptions of Sea-oats—Beach Pennywort Herbaceous Vegetation.

Attribute	Description
CEGL Code	4040
Community Name	Sea-oats—Beach Pennywort Herbaceous Vegetation
Color	Olive green to brown with small inclusions of bright red or bright white
Tone	Muted
Texture	Smooth
Pattern	Small inclusions of bright red patches of shrubbery or bright white of sand
Height	Generally less than 1 m but bright red patches may be 1 to 2 meters (3.3 to 6.6 ft)
Shape	Varies depending upon coast line from linear parallel to shore to rounder if at tip of peninsula
Size	Small
Location	Coastal
Association	Sand on ocean side, usually with shrubs on other side
Comments	–

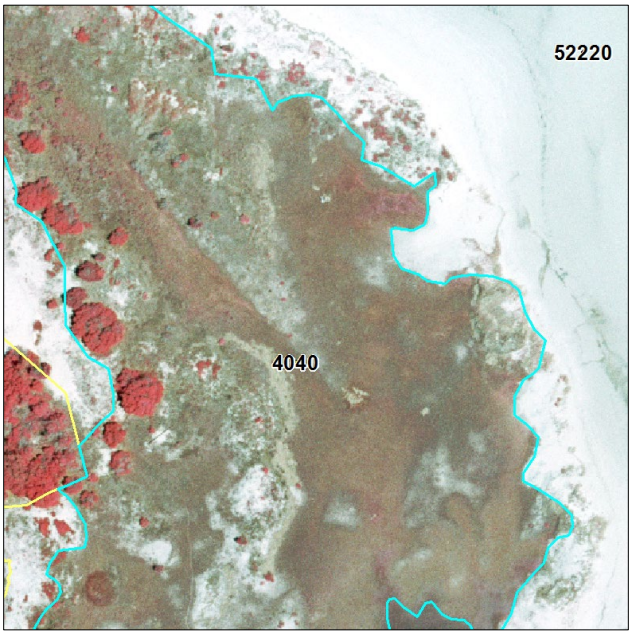


Figure C-9. Map showing Sea-oats—Beach Pennywort Herbaceous Vegetation (4040).

Summary

Timucuan Ecological and Historic Preserve Vegetation

Vegetation is dominated by the herbaceous layer (60–90% cover). However, there may be a very sparse (5–10%) shrub layer that includes tall shrubs (2–5 meters [6.6–16.4 ft]) *Persea borbonia* (redbay), *Prunus serotine* (black cherry), *Sabal palmetto* (cabbage palmetto), and *Zanthoxylum clava-herculis* (Hercules' club), and short shrubs (0.5–1 meters [1.6–3.3 ft]) *Iva imbricata* (seacoast marshelder) and *Morella cerifera* (wax myrtle). *Uniola paniculata* (seaoats) dominates the herbaceous layer; additional herbs may include *Heterotheca subaxillaris* (camphorweed), *Hydrocotyle bonariensis* (largeleaf pennywort), *Ipomoea pescaprae* (bayhops), *Oenothera humifusa* (seabeach evening-primrose), *Panicum amarum* (bitter panicgrass), *Phyllanthus abnormis* (Drummond's leaf-flower), *Physalis walteri* (Walter's groundcherry), and *Spartina patens* (saltmeadow cordgrass), among others. Cacti are *Opuntia pusilla* (cockspur pricklypear) and *Opuntia stricta* (erect pricklypear), and vines (0–5%) include *Smilax auriculata* (earleaf greenbrier). In addition, this community supports state-critically imperiled *Yucca gloriosa* (moundlily yucca).

Global Vegetation

Uniola paniculata (seaoats) is the dominant grass in this beach dune community. Other characteristic species include *Hydrocotyle bonariensis* (largeleaf pennywort), *Iva imbricata* (seacoast marshelder), *Spartina patens* (saltmeadow cordgrass), *Ipomoea imperati* (beach morning-glory), *Heterotheca subaxillaris* (camphorweed), and *Panicum amarum* (bitter panicgrass).

Southern Hairgrass—Saltmeadow Cordgrass—Dune Fingergrass Herbaceous Vegetation

Attributes, descriptions, a photo and a map are shown in Table C-10, and Figure C-10.

Table C-10. Attributes and descriptions of Southern Hairgrass—Saltmeadow Cordgrass—Dune Fingergrass Herbaceous Vegetation.

Attribute	Description
CEGL Code	4051
Community Name	Southern Hairgrass—Saltmeadow Cordgrass—Dune Fingergrass Herbaceous Vegetation
Color	Gray-green interspersed with light reds
Tone	Light
Texture	Mostly smooth, with irregular larger vegetation
Pattern	Irregular
Height	Short
Shape	Follows coast or tree line
Size	Medium
Location	Coastal
Association	–
Comments	Only two areas identified in park

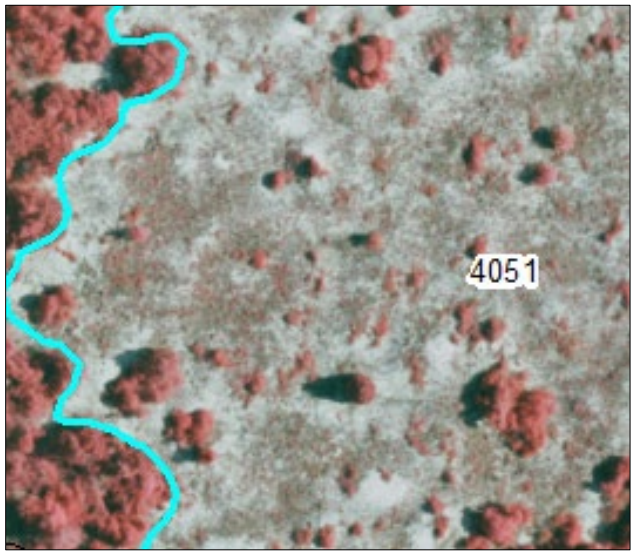


Figure C-10. Map showing Southern Hairgrass—Saltmeadow Cordgrass—Dune Fingergrass Herbaceous Vegetation (4051).

Summary

Timucuan Ecological and Historic Preserve Vegetation

Vegetation is made up of a continuous herbaceous layer (100% cover) dominated by *Muhlenbergia filipes* (gulfhairawn muhly); additional species found in small amounts include *Andropogon glomeratus* (bushy bluestem), *Juncus marginatus* (grassleaf rush), *Ludwigia maritima* (seaside primrose-willow), *Monarda punctata* (spotted beebalm), *Polypremum procumbens* (juniper leaf), and *Solidago sempervirens* (seaside goldenrod), among others. In addition, this example has a very sparse (10%) shrub layer (0.5–2 meters [1.6–6.6 ft]) that includes *Baccharis halimifolia* (eastern baccharis) and *Morella cerifera* (wax myrtle).

Global Vegetation

Vegetation is a sparse to very dense (20–100% cover) herbaceous layer (typically 0.5–1 meter [1.6–3.3 ft] tall) dominated by native grasses *Muhlenbergia filipes* (gulfhairawn muhly), *Spartina patens* (saltmeadow cordgrass), and *Eustachys petraea* (pinewoods fingergrass) (state-vulnerable). Additional graminoids may include lesser amounts of *Andropogon glomeratus* (bushy bluestem), *Eragrostis spectabilis* (purple lovegrass), *Eremochloa ophiuroides* (centipede grass) (exotic), *Juncus megacephalus* (bighead rush), *Schizachyrium littorale* (shore little bluestem), and *Uniola paniculata* (seaoats). Forbs may include *Centella erecta* (erect centella), *Gaillardia pulchella* (firewheel), *Heterotheca subaxillaris* (camphorweed), *Phyla nodiflora* (turkey tangle fogfruit), *Sisyrinchium atlanticum* (eastern blue-eyed grass), and *Solidago sempervirens* (seaside goldenrod). A sparse (0–10%) layer of emergent shrubs, including *Baccharis halimifolia* (eastern baccharis), *Morella cerifera* (wax myrtle), *Smilax bona-nox* (saw greenbrier), and *Smilax auriculata* (earleaf greenbrier), may also be present. This community also supports other species, including *Scleria verticillata* (low nutrush), *Chamaesyce bombensis* (dixie sandmat), *Iva imbricata* (seacoast marshelder), *Mitreola petiolata* (lax hornpod), *Opuntia pusilla* (cockspur pricklypear), *Phyla lanceolata* (lanceleaf fogfruit), *Physalis walteri* (Walter's groundcherry), *Scleria verticillate* (low nutrush), and *Spiranthes vernalis* (spring ladies'-tresses). In Florida, species associates of *Muhlenbergia filipes* (gulfhairawn muhly) include *Eragrostis* (lovegrass) spp., *Andropogon virginicus* (broomsedge bluestem), *Andropogon glomeratus* (bushy bluestem), *Juncus scirpoides* (needlepod rush), and *Fuirena scirpoidea* (southern umbrella-sedge). In addition, *Cladium mariscus ssp jamaicense* (Jamaica swamp sawgrass) often occupies the deeper portions of the swales. Some examples in North Carolina may also lack *Eustachys petraea* (pinewoods fingergrass) (M. Schafale pers. comm.). There may be 12 different dominants.

Needlerush High Marsh

Attributes, descriptions, a photo and a map are shown in Table C-11, and Figure C-11.

Table C-11. Attributes and descriptions of Needlerush High Marsh.

Attribute	Description
CEGL Code	4186
Community Name	Needlerush High Marsh
Color	Varies from dark rusty red to very light pink
Tone	Medium
Texture	Coarse
Pattern	Large areas
Height	Approximately 1 meter (3.3 ft)
Shape	Irregular with convoluted edges
Size	Small to Large
Location	Transition between tidal water and upland islands
Association	Mud or CEGL 4191 or Tidal Marsh Barren (52411)
Comments	–



Figure C-11. Map showing Needlerush High Marsh (4186).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The very dense vegetation (90% cover) is exclusively codominated by *Juncus roemerianus* (needlegrass rush) and *Spartina alterniflora* (smooth cordgrass).

Global Vegetation

The very dense vegetation is typically exclusively codominated by *Juncus roemerianus* (needlegrass rush) and *Spartina alterniflora* (smooth cordgrass). Tall and short growth-form zones have been noted in several areas (Kruczynski et al. 1978; Hackney and de la Cruz 1982; Stout 1984; Montague and Wiegert 1990). Associates that may occur at low cover include *Borrichia frutescens* (bushy seaside tansy), *Baccharis halimifolia* (eastern baccharis), *Spartina alterniflora* (smooth cordgrass), *Distichlis spicata* (inland saltgrass), *Schoenoplectus robustus* (sturdy bulrush), *Limonium carolinianum* (Carolina sealavender), *Symphyotrichum tenuifolium* (perennial saltmarsh aster), *Symphyotrichum subulatum* (eastern annual saltmarsh aster), and (in more southern occurrences) *Ipomoea sagittata* (saltmarsh morning-glory).

Southern Atlantic Coast Salt Marsh

Attributes, descriptions, a photo and a map are shown in Table C-12, and Figure C-12.

Table C-12. Attributes and descriptions of Southern Atlantic Coast Salt Marsh.

Attribute	Description
CEGL Code	4191
Community Name	Southern Atlantic Coast Salt Marsh
Color	Rust Red
Tone	Medium
Texture	Dense, regular relatively smooth
Pattern	Consistent
Height	1 to 2 meters (3.3 to 6.6 ft)
Shape	Irregular with convoluted edges
Size	Small to Large
Location	Transition between tidal water and upland islands
Association	Mud or CEGL 4186 or Tidal Marsh Barren (52411)
Comments	–

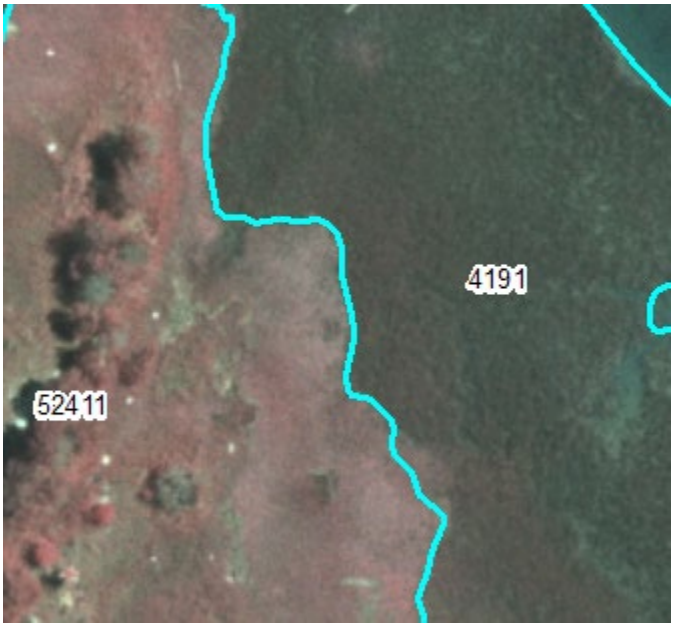


Figure C-12. Map showing Southern Atlantic Coast Salt Marsh (4191).

Summary

Timucuan Ecological and Historic Preserve Vegetation

Vegetation is a closed (100% cover) herbaceous layer made up almost exclusively of *Spartina alterniflora* (smooth cordgrass). Additional species in very small amounts include *Borrichia frutescens* (bushy seaside tansy), *Iva frutescens* (Jesuit's bark), *Distichlis spicata* (inland saltgrass), *Fimbristylis thermalis* (hot springs fimbry), *Juncus roemerianus* (needlegrass rush), *Limonium carolinianum* (Carolina sealavender), and *Sarcocornia perennis* (chickenclaws).

Global Vegetation

This community is commonly known as "low salt marsh," occurring as a tall grassland strongly dominated by *Spartina alterniflora* (smooth cordgrass). There is little variation in vascular plant species composition across the range. *Spartina alterniflora* (smooth cordgrass) occurs in nearly pure stands, occasionally with other low-stature species. *Salicornia* (pickleweed) sp. can be quite common mixed in with the *Spartina* (cordgrass), often becoming more apparent later in the growing season. *Limonium carolinianum* (Carolina sealavender) is another characteristic herb, but only as scattered individuals. More detailed information is needed on the composition of this vegetation and how it differs floristically from its northern equivalent, *Spartina alterniflora / (Ascophyllum nodosum)* Acadian/Virginian Zone Herbaceous Vegetation (CEGL004192).

Florida Swamp Privet Spoil Island

Attributes, descriptions, a photo and a map are shown in Table C-13, and Figure C-13.

Table C-13. Attributes and descriptions of Florida Swamp Privet Spoil Island.

Attribute	Description
CEGL Code	4237
Community Name	Florida Swamp Privet Spoil Island
Color	Mix of pinks, reds, and gray-blue
Tone	Medium to bright
Texture	Irregular
Pattern	Punctuated but varies by density of shrubs
Height	Generally, less than 2 meters (6.6 ft)
Shape	Irregular
Size	Small
Location	Frequently transition between upland and freshwater wetland areas
Association	–
Comments	May also be indicative of disturbance

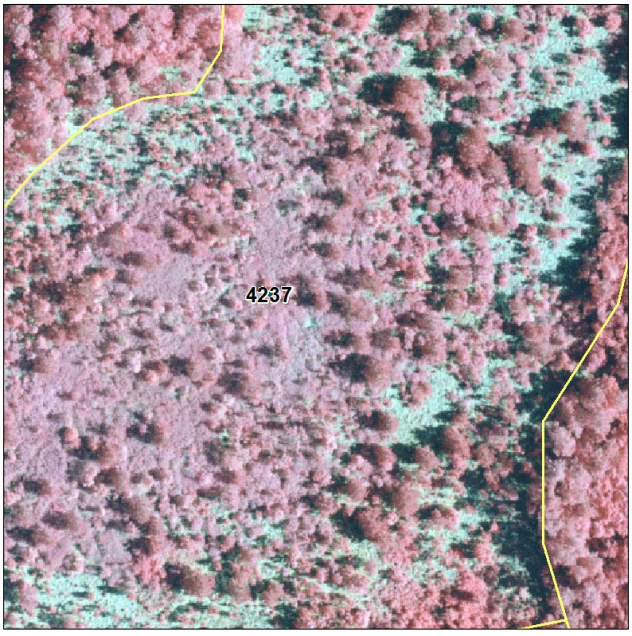


Figure C-13. Map showing Florida Swamp Privet Spoil Island (4237).

Summary

Global Vegetation:

This spoil island vegetation is dominated by *Forestiera segregata* (Florida swampprivet), *Juniperus virginiana var. silicicola* (southern redcedar), *Morella cerifera* (wax myrtle), and *Heterotheca subaxillaris* (camphorweed).

South Atlantic Coastal Plain Dry Longleaf Pine Sandhill

Attributes, descriptions, a photo and a map are shown in Table C-14, and Figure C-14.

Table C-14. Attributes and descriptions of South Atlantic Coastal Plain Dry Longleaf Pine Sandhill.

Attribute	Description
CEGL Code	4490
Community Name	South Atlantic Coastal Plain Dry Longleaf Pine Sandhill
Color	Purple-red to light red
Tone	Medium
Texture	Large canopy trees
Pattern	Rough
Height	20 to 30 meters (65.6 to 98.4 ft)
Shape	Surrounded by areas of human influence
Size	Small
Location	–
Association	–
Comments	–

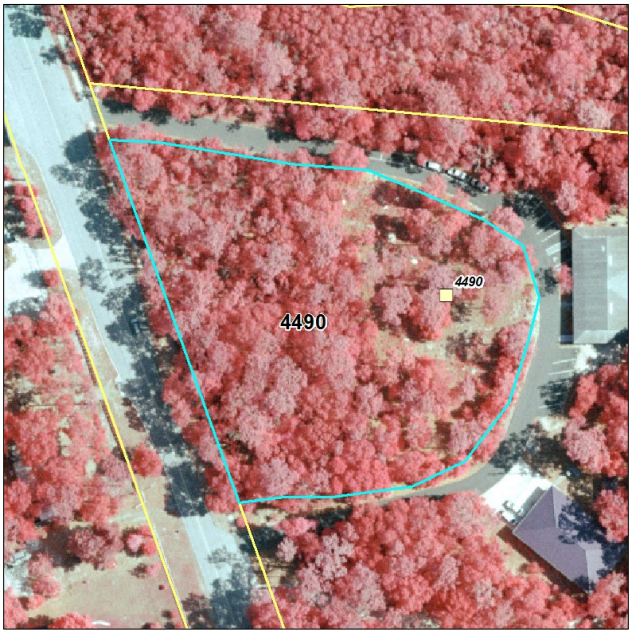


Figure C-14. Map showing South Atlantic Coastal Plain Dry Longleaf Pine Sandhill (4490).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The moderately sparse (30–40% cover) tree canopy, 10–20 meters (32.8–65.6 ft) tall, is dominated by *Pinus palustris* (longleaf pine) and may include *Quercus laevis* (turkey oak), although it more typically dominates the sparse (20–30%) subcanopy (5–15 meters [16.4–49.2 ft]), which may also include *Quercus geminata* (sand live oak) and *Quercus hemisphaerica* (Darlington oak). The very sparse (5%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is comprised of oak species, including *Quercus geminata* (sand live oak), *Quercus hemisphaerica* (Darlington oak), *Quercus incana* (bluejack oak), and *Quercus laevis* (turkey oak), and ericads *Vaccinium arboreum* (farkleberry) and *Vaccinium stamineum* (deerberry). The very sparse (10%) short-shrub layer (1–2 meters [3.3–16.4 ft]) includes small amounts of *Gaylussacia dumosa* (dwarf huckleberry), *Gaylussacia tomentosa* (hairytwig huckleberry), *Ilex opaca* (American holly), *Licania michauxii* (gopher apple), *Serenoa repens* (saw palmetto), *Vaccinium myrsinites* (shiny blueberry), *Vaccinium stamineum* (deerberry), and saplings of *Pinus palustris* (longleaf pine) and *Quercus* (oak) spp. The very sparse (5%) herbaceous layer is dominated by *Aristida beyrichiana* (Beyrich threeawn); additional herbs may include graminoids *Andropogon virginicus* (broomsedge bluestem), *Aristida mohrii* (Mohr's threeawn), *Aristida purpurascens var. purpurascens* (arrowfeather threeawn), *Dichanthelium aciculare* (needleleaf rosette grass), *Paspalum setaceum* (thin paspalum), *Sorghastrum secundum* (lopsided Indiangrass), and *Triplasis americana* perennial sandgrass). Forbs include *Carphephorus corymbosus* (coastalplain chaffhead), *Crotalaria rotundifolia* (rabbitbells), *Lechea sessiliflora* (pineland pinweed), *Liatris tenuifolia var. tenuifolia* (shortleaf blazing star), *Pityopsis graminifolia* (narrowleaf silkgrass), *Solidago odora* (anisescented goldenrod), and *Tephrosia florida* (Florida hoarypea), among others. Nonvascular species (5%) are lichens *Cladina subtenuis* (reindeer lichen) and *Cladonia leporina* (cup lichen), and vines (5%) include *Smilax auriculata* (earleaf greenbrier). This community also supports globally and state-vulnerable *Berlandiera subacaulis* (Florida greeneyes).

Global Vegetation:

This sandhill community is dominated by *Pinus palustris* (longleaf pine), *Quercus laevis* (turkey oak), and *Aristida beyrichiana* (Beyrich threeawn), along with *Andropogon* (bluestem) spp., *Aureolaria pectinata* (combleaf yellow false foxglove), *Commelina erecta* (whitemouth dayflower), *Dichanthelium acuminatum* (tapered rosette grass), *Licania michauxii* (gopher apple), *Opuntia humifusa* (devil's-tongue), *Quercus incana* (bluejack oak), *Serenoa repens* (saw palmetto), *Tephrosia virginiana* (Virginia tephrosia), and *Vaccinium stamineum* (deerberry).

Slash Pine Flatwoods (3643), Maritime Slash Pine Uplan Flatwoods (4658), Mid-Late Successional Slash Pine Managed Forest (7171)

Attributes, descriptions, a photo and a map are shown in Table C-15, and Figure C-15.

Table C-15. Attributes and descriptions of (3643) Slash Pine Flatwoods, (4658) Maritime Slash Pine Uplan Flatwoods, (7171) Mid-Late Successional Slash Pine Managed Forest.

Attribute	Description
CEGL Code	70111 (Combined 3643, 4658, 7171)
Community Name	(3643) Slash Pine Flatwoods, (4658) Maritime Slash Pine Uplan Flatwoods, (7171) Mid-Late Successional Slash Pine Managed Forest
Color	Predominately purple with some light red
Tone	Medium to dark, with darker tones predominating
Texture	Rough; tree crowns distinct
Pattern	Distinct crowns which are moderate in size
Height	20 to 35 meters (65.6 to 114.8 ft)
Shape	Irregular
Size	Large
Location	Upland, generally away from water
Association	–
Comments	This is a created combination of CEGL Codes (3643, 4658, 7171) due to lack of differentiation in spectral signature

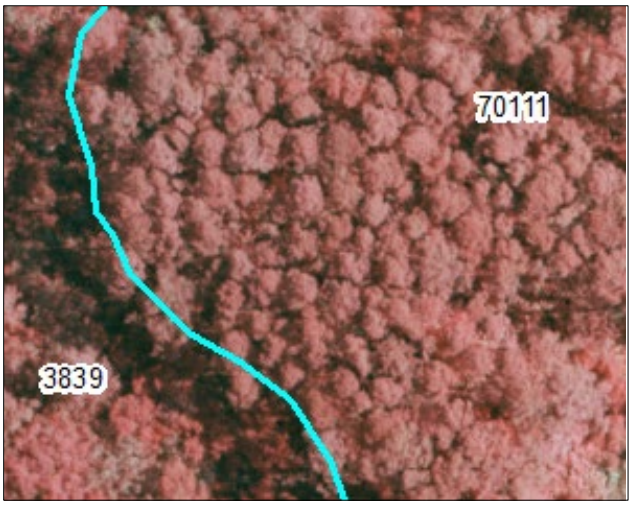


Figure C-15. Map showing (3643) Slash Pine Flatwoods, (4658) Maritime Slash Pine Uplan Flatwoods, (7171) Mid-Late Successional Slash Pine Managed Forest (70111).

Summary

Timucuan Ecological and Historic Preserve Vegetation

(3643)

The moderate to dense (60–80% cover) tree canopy, 15–35 meters (49.2–114.8 ft) tall, is dominated by *Pinus elliottii* (slash pine); one plot (much wetter than the others) is codominated by *Pinus serotina* (pond pine). The very sparse to moderate (5–50%) subcanopy (5–15 meters [16.4–49.2 ft]) is dominated by *Persea palustris* (swamp bay) and may include *Ilex cassine* (dahoon), *Quercus nigra* (water oak), and *Quercus virginiana* (live oak), among others. The sparse to moderate (10–60%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is dominated by *Ilex glabra* (inkberry), while the sparse to closed (20–100%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is dominated by *Serenoa repens* (saw palmetto). Additional shrubs may include *Lyonia fruticosa* (coastalplain staggerbush), *Morella cerifera* (wax myrtle), *Vaccinium corymbosum* (highbush blueberry), *Vaccinium myrsinites* (shiny blueberry), and saplings of species from the upper layers. The variable (0–50%) herbaceous layer is dominated by the fern *Pteridium aquilinum* (western brackenfern). *Smilax glauca* (cat greenbrier) is the dominant vine (5–20%); others may include *Gelsemium sempervirens* (evening trumpetflower), *Smilax auriculata* (earleaf greenbrier), and *Vitis rotundifolia* (muscadine).

(4658)

The moderate to very dense (50–90% cover) tree canopy, 15–35 meters (49.2–114.8 ft) tall, is dominated by *Pinus elliottii* (slash pine). The moderate (60–70%) subcanopy (10–15 meters [32.8–49.2 ft]) includes *Persea borbonia* (redbay), *Quercus hemisphaerica* (Darlington oak), *Quercus nigra* (water oak), *Quercus virginiana* (live oak), and *Sabal palmetto* (cabbage palmetto). The sparse to moderate (40–70%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is dominated by *Ilex vomitoria* (yaupon) and includes most tree species as well as possible *Arundinaria gigantea* (giant cane) and *Morella cerifera* (wax myrtle). The very sparse to moderate (10–50%) shortshrub layer (1–2 meters [3.3–6.6 ft]) is made up of saplings of species from the upper layers and may include *Ilex glabra* (inkberry), *Prunus caroliniana* (Carolina laurelcherry), *Serenoa repens* (saw palmetto), and *Vaccinium corymbosum* (highbush blueberry). The very sparse (0–5%) herbaceous layer includes *Salvia lyrata* (lyreleaf sage). Vines (5–30%) are *Smilax auriculata* (earleaf greenbrier) and *Vitis rotundifolia* (muscadine).

(7171)

This association was not documented at Timucuan as part of this project, although it is likely that it does occur at the park.

Global Vegetation

(3643)

Pinus elliottii var. elliottii (Honduras pine) dominates the generally open canopy. *Pinus palustris* (longleaf pine) or *Gordonia lasianthus* (loblolly bay) and *Pinus serotina* (pond pine) can be present, even codominant. The dense shrub stratum consists primarily of *Ilex glabra* (inkberry) and *Serenoa repens* (saw palmetto). Other common shrubs include *Persea palustris* (swamp bay), *Gaylussacia nana* (Confederate huckleberry), *Gaylussacia dumosa* (dwarf huckleberry), *Gaylussacia tomentosa* (hairytwig huckleberry), *Photinia pyrifolia* (red chokeberry), *Quercus minima* (dwarf live oak), *Ilex*

coriacea (large gallberry), *Vaccinium elliottii* (Elliott's blueberry), *Acer rubrum* (red maple), *Vaccinium formosum* (southern blueberry), *Befaria racemose* (tarflower), *Lyonia ferruginea* (rusty staggerbush), *Lyonia fruticosa* (coastalplain staggerbush), *Morella cerifera* (wax myrtle), *Kalmia hirsuta* (hairy laurel), *Vaccinium myrsinites* (shiny blueberry), and *Lyonia lucida* (fetterbush lyonia) (NatureServe Ecology unpubl. data). The most common vine is *Smilax laurifolia* (laurel greenbrier); other vines are *Smilax auriculata* (earleaf greenbrier), *Smilax glauca* (cat greenbrier), and *Vitis rotundifolia* (muscadine). The herbaceous flora is generally sparse or patchy, including *Aristida*

(4658)

Pinus elliottii var. elliottii (Honduras pine) dominates, sometimes with an admixture of *Pinus palustris* (longleaf pine). In the past, canopy structure in natural stands was open, but now it varies to a more closed structure. A subcanopy is sometimes present and can include *Quercus virginiana* (live oak), *Quercus geminata* (sand live oak), *Quercus hemisphaerica* (Darlington oak), and *Magnolia grandiflora* (southern magnolia). Typical understory species include *Ilex vomitoria* (yaupon), *Serenoa repens* (saw palmetto), and *Morella cerifera* (wax myrtle). Other common shrubs and woody vines are *Smilax bona-nox* (saw greenbrier), *Smilax auriculata* (earleaf greenbrier), *Smilax laurifolia* (laurel greenbrier), *Rhus copallinum var. leucantha* (winged sumac), *Vitis rotundifolia* (muscadine), *Vaccinium arboreum* (farkleberry), and *Persea borbonia* (redbay). The herb stratum is typically poorly developed but may include *Solidago odora var. odora* (anisescented goldenrod) and *Tragia urens* (wavyleaf noseburn).

(7171)

These are planted stands dominated by Pinus elliottii var. elliottii (Honduras pine) (typically monospecific), within and outside of its natural range.

Temperate Hydric Hammock

Attributes, descriptions, a photo and a map are shown in Table C-16, and Figure C-16.

Table C-16. Attributes and descriptions of Temperate Hydric Hammock.

Attribute	Description
CEGL Code	4674
Community Name	Temperate Hydric Hammock
Color	Light pinks with reds
Tone	Bright to medium
Texture	Small, tight tree crowns
Pattern	Tight circles, closed
Height	20 to 30 meters (65.6 to 98.4 ft)
Shape	Linear
Size	Small
Location	Freshwater
Association	Mesic sites; frequently on edge of islands
Comments	–

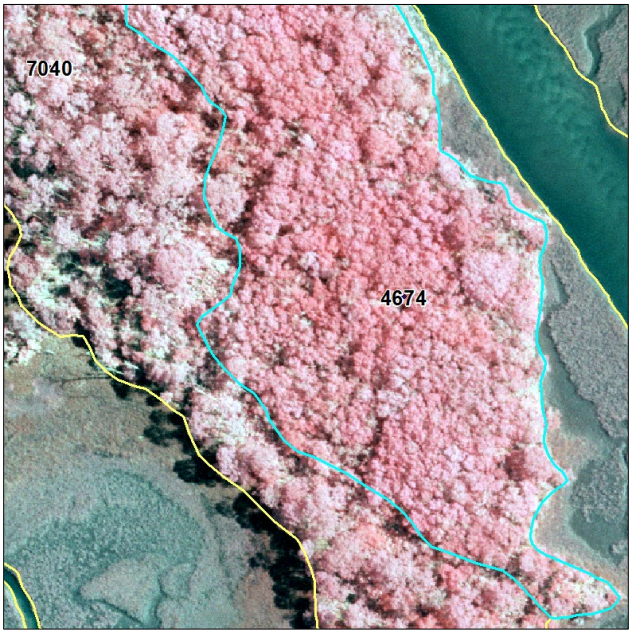


Figure C-16. Map showing Temperate Hydric Hammock (4674).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The very dense (80–90% cover) tree canopy, 20–35 meters (65.6–114.8 ft) tall, may include *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Magnolia grandiflora* (southern magnolia), *Magnolia virginiana* (sweetbay), *Quercus virginiana* (live oak), *Sabal palmetto* (cabbage palmetto), and *Ulmus americana* (American elm). The moderate (40–70%) subcanopy (10–15 meters [32.8–49.2 ft]) may include *Carpinus caroliniana* (American hornbeam), *Ilex cassine* (dahoon), *Persea palustris* (swamp bay), and *Sabal palmetto* (cabbage palmetto). The sparse to dense (20–80%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is dominated by *Sabal palmetto* (cabbage palmetto) and may include *Agarista populifolia* (Florida hobblebush), *Euonymus americanus* (strawberry bush), *Ilex vomitoria* (yaupon), *Itea virginica* (Virginia sweetspire), *Morella cerifera* (wax myrtle), and *Persea palustris* (swamp bay). The moderate (50–70%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is made up of tall-shrub species as well as *Arundinaria gigantea* (giant cane), *Lyonia lucida* (fetterbush lyonia), *Serenoa repens* (saw palmetto), and *Vaccinium corymbosum* (highbush blueberry). The moderately dense (70–80%) herbaceous layer is dominated by ferns *Dryopteris ludoviciana* (southern woodfern) and *Thelypteris kunthii* (Kunth's maiden fern). *Vitis rotundifolia* (muscadine) forms a sparse (5%) vine layer. In addition, this community supports state-critically imperiled *Cicuta maculata* (spotted water hemlock).

Global Vegetation

This vegetation is characterized by a moderately diverse canopy, usually composed of *Sabal palmetto* (cabbage palmetto), *Quercus virginiana* (live oak), *Quercus laurifolia* (laurel oak), *Magnolia virginiana* (sweetbay), *Ulmus americana* (American elm), and sometimes also *Pinus taeda* (loblolly pine), *Acer rubrum* (red maple), *Quercus nigra* (water oak), *Celtis laevigata* (sugarberry), *Liquidambar styraciflua* (sweetgum), *Fraxinus pennsylvanica* (green ash), and others (NatureServe Ecology unpubl. data). Typical understory species can include *Carpinus caroliniana ssp. caroliniana* (American hornbeam), *Cornus foemina* (stiff dogwood), *Diospyros virginiana* (common persimmon), *Magnolia virginiana* (sweetbay), *Persea palustris* (swamp bay), *Gordonia lasianthus* (loblolly bay), *Nyssa biflora* (swamp tupelo), and canopy species. Typical shrubs and woody vines include *Sabal minor* (dwarf palmetto), *Rhapidophyllum hystrix* (needle palm), *Viburnum obovatum* (small-leaf arrowwood), *Berchemia scandens* (Alabama supplejack), *Lyonia lucida* (fetterbush lyonia), *Morella cerifera* (wax myrtle), *Ilex cassine* (dahoon), *Serenoa repens* (saw palmetto), *Vaccinium elliottii* (Elliott's blueberry), *Arundinaria gigantea* (giant cane), *Callicarpa americana* (American beautyberry), *Ampelopsis arborea* (peppervine), *Persea palustris* (swamp bay), and *Toxicodendron radicans* (eastern poison ivy). Some important herbaceous species are *Mitchella repens* (partridgeberry), *Thelypteris kunthii* (Kunth's maiden fern), *Dichanthelium sabulorum var. thinium* (hemlock rosette grass), *Woodwardia virginica* (Virginia chainfern), *Chasmanthium nitidum* (shiny woodoats), *Osmunda cinnamomea* (cinnamon fern), *Oplismenus hirtellus ssp. setarius* (bristle basketgrass), *Chasmanthium sessiliflorum* (longleaf woodoats), *Saururus cernuus* (lizard's tail), and *Burmannia biflora* (northern bluethread).

Southeastern Florida Maritime Hammock

Attributes, descriptions, a photo and a map are shown in Table C-17, and Figure C-17.

Table C-17. Attributes and descriptions of Southeastern Florida Maritime Hammock.

Attribute	Description
CEGL Code	7020
Community Name	Southeastern Florida Maritime Hammock
Color	Reds and oranges; lacking purple representing pines
Tone	Medium
Texture	Tight, closed tree crowns
Pattern	Dense
Height	20 to 30 meters (65.6 to 98.4 ft)
Shape	Irregular
Size	Small to large areas
Location	Drier upland areas
Association	*Quercus geminata* tends to be associated with drier, sandy sites.
Comments	–

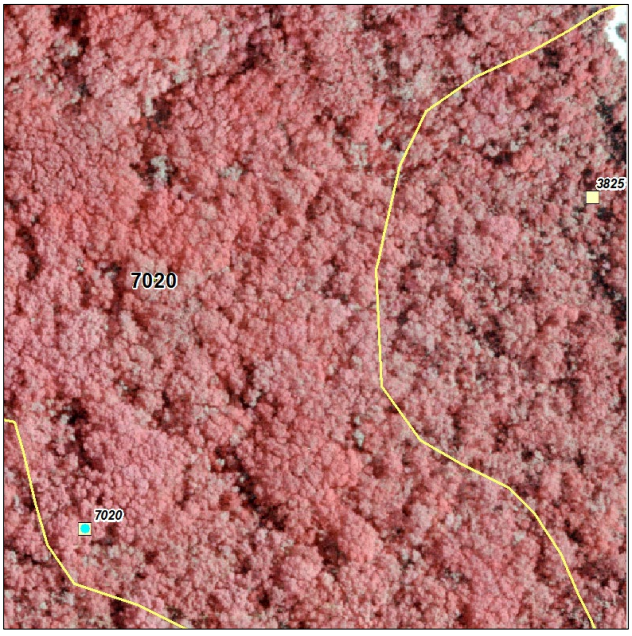


Figure C-17. Map showing Southeastern Florida Maritime Hammock (7020).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The structure of this community is variable among the sampled plots. The very dense to closed canopy (80–100% cover) ranges in height from 5 to 20 meters (16.4 to 65.6 ft). In addition, one plot has a sparse (20%) emergent layer 20–35 meters (65.6–114.8 ft) tall. *Quercus geminata* (sand live oak) dominates; additional species may include *Pinus elliottii* (slash pine), *Quercus nigra* (water oak), *Quercus hemisphaerica* (Darlington oak), and *Quercus myrtifolia* (myrtle oak). The sparse (10–40%) tall-shrub layer (2–10 meters [6.6–32.8 ft]) is made up of canopy tree saplings along with *Lyonia ferruginea* (rusty staggerbush), *Morella cerifera* (wax myrtle), *Osmanthus americanus* (devilwood), *Persea borbonia* (redbay), *Quercus chapmanii* (Chapman oak), *Vaccinium arboreum* (farkleberry), and *Vaccinium stamineum* (deerberry). The very dense to closed (90–100%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is dominated by *Serenoa repens* (saw palmetto) and includes saplings of species from the upper layers, as well as *Gaylussacia tomentosa* (hairytwig huckleberry), *Ilex glabra* (inkberry), *Lyonia lucida* (fetterbush lyonia), and *Vaccinium myrsinites* (shiny blueberry). The very sparse (5%) herbaceous layer may contain small amounts of *Galactia elliottii* (Elliott's milkpea), *Pteridium aquilinum* (western brackenfern), and *Rhynchospora megalocarpa* (sandyfield beaksedge). Nonvascular species (5%) found here are *Cladina evansii* (Evans' reindeer lichen) and *Cladina subtenuis* (reindeer lichen). Vines (5%) include *Smilax auriculata* (earleaf greenbrier), *Smilax glauca* (cat greenbrier), and *Vitis rotundifolia* (muscadine), and epiphytes include *Pleopeltis polypodioides* (resurrection fern), *Tillandsia recurvata* (small ballmoss), and *Tillandsia usneoides* (Spanish moss).

Global Vegetation

The overstory is dominated by *Quercus geminata* (sand live oak); *Quercus virginiana* (live oak) may also be present, along with *Quercus myrtifolia* (myrtle oak). The dense shrub layer includes *Serenoa repens* (saw palmetto), *Lyonia fruticose* (coastalplain staggerbush), *Lyonia ferruginea* (rusty staggerbush), *Osmanthus americanus var. americanus* (devilwood), *Persea borbonia* (redbay), and *Morella cerifera* (wax myrtle). An understory of *Sabal palmetto* (cabbage palmetto) may also be present.

Maritime Live Oak Hammock

Attributes, descriptions, a photo and a map are shown in Table C-18, and Figure C-18.

Table C-18. Attributes and descriptions of Maritime Live Oak Hammock.

Attribute	Description
CEGL Code	7032
Community Name	Maritime Live Oak Hammock
Color	Predominantly red with some purple and pink
Tone	Medium
Texture	Tight, distinct tree crowns
Pattern	Dense
Height	20 to 30 meters (65.6 to 98.4 ft)
Shape	Irregular
Size	Small to very large areas
Location	Varies, can occur near areas of human influence
Association	–
Comments	–

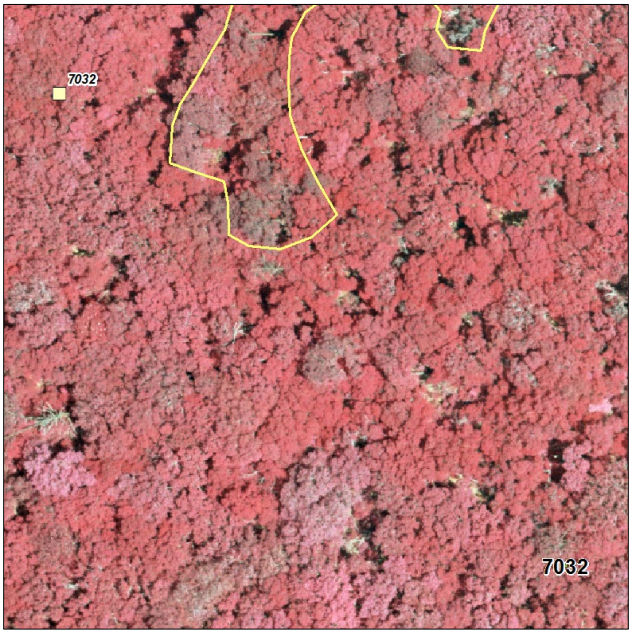


Figure C-18. Map showing Maritime Live Oak Hammock (7032).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The very dense to closed (90–100% cover) tree canopy, 15–35 meters [49.2–114.8 ft] tall, is dominated by *Quercus virginiana* (live oak); additional canopy species may include *Carya glabra* (pignut hickory), *Juniperus virginiana var. silicicola* (southern redcedar), *Magnolia grandiflora* (southern magnolia), *Quercus hemisphaerica* (Darlington oak), and *Sabal palmetto* (cabbage palmetto). The sparse to dense (20–80%) subcanopy (5–15 meters [16.4–49.2 ft]) is made up of canopy species and may include *Celtis laevigata* (sugarberry), *Fraxinus americana* (white ash), *Ilex opaca* (American holly), *Ostrya virginiana* (hophornbeam), and *Persea borbonia* (redbay). The sparse to dense (20–80%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is dominated by *Ilex vomitoria* (yaupon) and may include *Cornus foemina* (stiff dogwood), *Forestiera ligustrina* (upland swampprivet), *Forestiera segregata* (Florida swampprivet), *Osmanthus americanus* (devilwood), *Prunus caroliniana* (Carolina laurelcherry), and *Ximenia americana* (tallow wood), among others. The sparse to very dense (30–90%) short-shrub layer (1–2 meters [3.3–6.6 ft]) is dominated by *Ilex vomitoria* (yaupon) and *Sabal palmetto* (cabbage palmetto) and may include other tall-shrub species as well as *Psychotria nervosa* (Seminole balsamo), *Ptelea trifoliata* (common hoptree), and *Serenoa repens* (saw palmetto). The very sparse to moderate (5–50%) herbaceous layer may be dominated by *Chasmanthium sessiliflorum* (longleaf woodoats), *Pteridium aquilinum* (western brackenfern), or *Toxicodendronradicans* (eastern poison ivy). Additionally, this community supports state-imperiled *Peperomia humilis* (Polynesian peperomia) and state-vulnerable *Monotropa uniflora* (Indianpipe). Vines (5–40%) are dominated by *Cynanchum scoparium* (leafless swallow-wort). Epiphytes include *Pleopeltis polypodioides* (resurrection fern) and *Tillandsia usneoides* (Spanish moss). Stands of this community can be rather diverse with up to 70 species recorded from a single plot.

Global Vegetation

This forest has a low to moderately high tree canopy, often stunted and pruned by salt spray into streamlined shapes. The canopy is mostly closed with well-developed subcanopy and shrub layers and a sparse herb layer. The canopy along the seaward edge of this community tends to be quite low in stature with shrub species grading smoothly into the dominant canopy species. Vines are often an important component of this community. Species that may be found in the canopy, subcanopy or shrub layers include *Quercus virginiana* (live oak), *Sabal palmetto* (cabbage palmetto), *Pinus elliottii var. elliottii* (Honduras pine), *Pinus taeda* (loblolly pine), *Magnolia grandiflora* (southern magnolia), *Persea borbonia* (redbay), *Quercus hemisphaerica* (Darlington oak), *Quercus nigra* (water oak), *Quercus phellos* (willow oak), *Magnolia virginiana* (sweetbay), *Acer rubrum var. drummondii* (Drummond's maple), *Liquidambar styraciflua* (sweetgum), *Juniperus virginiana var. silicicola* (southern redcedar), *Celtis laevigata* (sugarberry), *Morella cerifera* (wax myrtle), *Ilex vomitoria* (yaupon), *Osmanthus americanus var. americanus* (devilwood), *Sabal minor* (dwarf palmetto), *Serenoa repens* (saw palmetto), *Ilex opaca var. opaca* (American holly), *Carpinus caroliniana ssp. caroliniana* (American hornbeam), *Cornus florida* (flowering dogwood), *Prunus caroliniana* (Carolina laurelcherry), *Zanthoxylum clava-herculis* (Hercules' club), *Callicarpa americana* (American beautyberry), *Baccharis halimifolia* (eastern baccharis), *Baccharis angustifolia* (saltwater false willow), *Lyonia lucida* (fetterbush lyonia), *Sageretia minutiflora* (smallflower mock

buckthorn), *Sideroxylon tenax* (tough bully), *Vaccinium arboreum* (farkleberry), *Forestiera segregata* (Florida swampprivet), and *Opuntia humifusa var. humifusa* (devil's-tongue). Typical vines and herbaceous species include *Toxicodendron radicans* (eastern poison ivy), *Smilax* (greenbrier) spp., *Vitis rotundifolia* (muscadine), *Parthenocissus quinquefolia* (Virginia creeper), *Houstonia procumbens* (roundleaf bluet), *Bignonia capreolata* (crossvine), *Mitchella repens* (partridgeberry), *Berchemia scandens* (Alabama supplejack), *Ampelopsis arborea* (peppervine), *Oplismenus hirtellus ssp. setarius* (bristle basketgrass), *Boehmeria cylindrica* (smallspike false nettle), *Galium pilosum* (hairy bedstraw), *Dichanthelium commutatum* (variable panicgrass), *Elephantopus nudatus* (smooth elephantsfoot), *Passiflora incarnata* (purple passionflower), *Passiflora lutea* (yellow passionflower), *Scleria triglomerata* (whip nutrush), *Piptochaetium avenaceum* (blackseed speargrass), *Panicum* (panicgrass) spp., *Chasmanthium laxum* (slender woodoats), *Juncus* (rush) spp., *Asplenium platyneuron var. bacculum-rubrum* (ebony spleenwort), *Osmunda cinnamomea* (cinnamon fern), and *Woodwardia virginica* (Virginia chainfern). In general, from Cape Fear, North Carolina, south to mid-South Carolina, the canopy is dominated by *Quercus virginiana* (live oak) and *Pinus taeda* (loblolly pine) occurring with *Sabal palmetto* (cabbage palmetto). Farther south, *Pinus elliottii var. elliottii* (Honduras pine) replaces *Pinus taeda* (loblolly pine), and *Sabal palmetto* (cabbage palmetto) becomes more prominent. Some floristic elements of the Georgia islands, such as *Lyonia ferruginea* (rusty staggerbush) and *Forestiera segregata* (Florida swampprivet), are completely absent from barrier islands in the Carolinas. *Serenoa repens* (saw palmetto) does not occur on the North Carolina barrier islands. In mid-Florida, tropical species begin to dominate the understory, while temperate species retain canopy dominance. South of Martin County, Florida, tropical species such as *Bursera simaruba* (gumbo limbo)*, Sideroxylon foetidissimum* (false mastic), and *Ficus aurea* (Florida strangler fig) begin to dominate the forest canopy and mark the northern limits of the Tropical Barrier Island Forest community. At the northern limit of the range of this type, *Persea palustris* (swamp bay) may replace *Persea borbonia* (redbay).

Palmetto—Live Oak Hydric Hammock

Attributes, descriptions, a photo and a map are shown in Table C-19, and Figure C-19.

Table C-19. Attributes and descriptions of Palmetto—Live Oak Hydric Hammock.

Attribute	Description
CEGL Code	7040
Community Name	Palmetto – Live Oak Hydric Hammock
Color	Light pinks and purples
Tone	Dull
Texture	Tight, distinct tree crowns
Pattern	Dense
Height	Tall
Shape	Irregular
Size	Mostly small, with a few large areas in park
Location	Often near marshes
Association	–
Comments	–

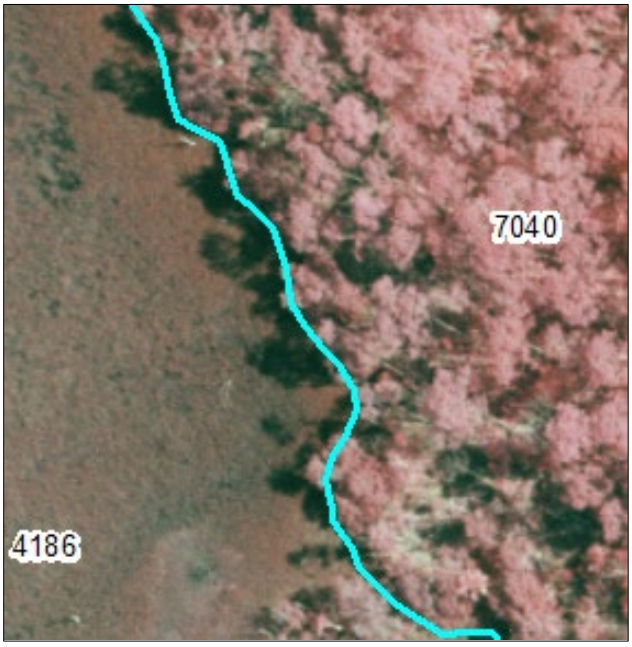


Figure C-19. Map showing Palmetto—Live Oak Hydric Hammock (7040).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The very dense (90% cover) tree canopy, 20–35 meters [65.6–114.8 ft] tall, is dominated by *Quercus virginiana* (live oak) and *Sabal palmetto* (cabbage palmetto), along with lesser amounts of *Acer rubrum* (red maple), *Pinus elliottii* (slash pine), *Pinus taeda* (loblolly pine), and *Quercus laurifolia* (laurel oak). The sparse (30%) subcanopy (5–15 meters [16.4–49.2 ft]) includes *Persea palustris* (swamp bay), *Sabal palmetto* (cabbage palmetto), and *Ulmus americana* (American elm). The very dense (90%) tallshrub layer (2–5 meters [6.6–16.4 ft]) and the sparse (30%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are dominated by *Morella cerifera* (wax myrtle) and *Sabal palmetto* (cabbage palmetto); additional shrubs include *Baccharis halimifolia* (eastern baccharis), *Ilex cassine* (dahoon), *Ilex vomitoria* (yaupon), *Sabal minor* (dwarf palmetto), *Serenoa repens* (saw palmetto), and *Viburnum obovatum* (small-leaf arrowwood). The moderate (50%) herbaceous layer is dominated by *Chasmanthium laxum* (slender woodoats). Vines (5%) include *Smilax bona-nox* (saw greenbrier), *Smilax tamnoides* (bristly greenbrier), and *Toxicodendron radicans* (eastern poison ivy).

Global Vegetation:

Sabal palmetto (cabbage palmetto) and *Quercus virginiana* (live oak) generally share canopy dominance, and few other trees except *Juniperus virginiana var. silicicola* (southern redcedar) are commonly encountered. *Sabal palmetto* (cabbage palmetto) or the other two primary canopy species (*Quercus virginiana* (live oak) or *Juniperus virginiana var. silicicola* (southern redcedar)) may strongly dominate local patches. *Morella cerifera* (wax myrtle) is a typical shrub or small tree. *Sapindus saponaria* (wingleaf soapberry) can be a shrub and subcanopy codominant on limestone in the Florida peninsula. An example attributed to this type on Ocala National Forest (Rocky Point) was dominated by *Quercus virginiana* (live oak) and *Sabal palmetto* (cabbage palmetto) with some *Carya aquatica* (water hickory) and *Celtis laevigata* (sugarberry) (NatureServe Ecology unpubl. data). *Sabal palmetto* (cabbage palmetto) and *Sapindus saponaria* (wingleaf soapberry) are important in the subcanopy and shrub strata; other shrubs present are *Sabal minor* (dwarf palmetto), *Morus rubra* (red mulberry), *Callicarpa americana* (American beautyberry), *Sageretia minutiflora* (smallflower mock buckthorn), *Sideroxylon reclinatum* (Florida bully), *Juniperus virginiana var. silicicola* (southern redcedar), and *Persea palustris* (swamp bay). Herbs are dominated by *Oplismenus hirtellus ssp. setarius* (bristle basketgrass). Vines are common, including *Campsis radicans* (trumpet creeper), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax bona-nox* (saw greenbrier), *Toxicodendron radicans* (eastern poison ivy), *Smilax auriculata* (earleaf greenbrier), *Cocculus carolinus* (Carolina coralbead), *Matelea gonocarpos* (angularfruit milkvine), and *Gelsemium sempervirens* (evening trumpetflower). Epiphytes are dominated by *Tillandsia usneoides* (Spanish moss), with *Tillandsia recurvata* (small ballmoss) and *Pleopeltis polypodioides ssp. michauxiana* (resurrection fern).

Loblolly-bay Forest

Attributes, descriptions, a photo and a map are shown in Table C-20, and Figure C-20.

Table C-20. Attributes and descriptions of Loblolly-bay Forest.

Attribute	Description
CEGL Code	7044
Community Name	Loblolly-bay Forest
Color	Brown to muted reds and pale pinks
Tone	Dull
Texture	Coarse
Pattern	Dense
Height	Medium to Tall
Shape	Irregular
Size	Small
Location	–
Association	–
Comments	–

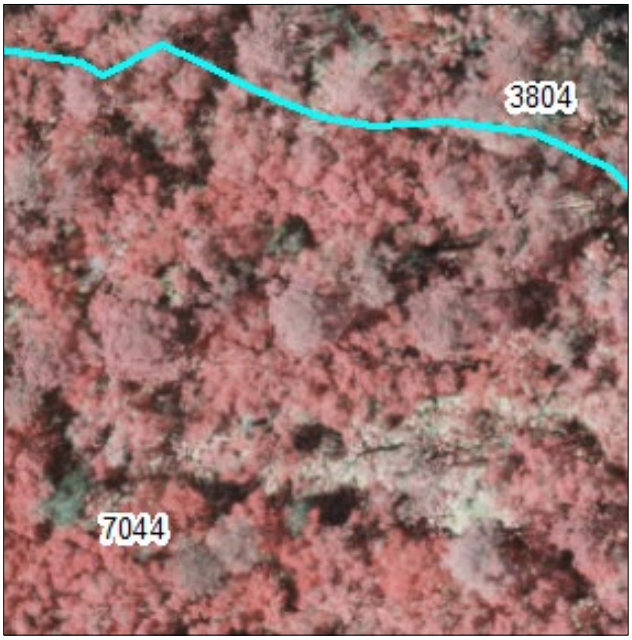


Figure C-20. Map showing Palmetto—Live Oak Hydric Hammock (7044).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The moderate to closed (70–100% cover) tree canopy, 20–35 meters [65.6–114.8 ft] tall, is made up of various combinations of *Gordonia lasianthus* (loblolly bay), *Magnolia virginiana* (sweetbay), and *Persea palustris* (swamp bay); additional canopy species may include *Liquidambar styraciflua* (sweetgum), *Nyssa biflora* (swamp tupelo), *Pinus elliottii* (slash pine), *Quercus laurifolia* (laurel oak), and *Quercus nigra* (water oak). The moderate (40–50%) subcanopy (10–15 meters [32.8–49.2 ft]) is dominated by canopy species and may also include *Acer rubrum* (red maple) and *Ilex cassine* (dahoon). The highly variable (10–90%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) again contains substantial amounts of the canopy dominants and may include *Ilex coriacea* (large gallberry), *Itea virginica* (Virginia sweetspire), *Lyonia lucida* (fetterbush lyonia), *Morella cerifera* (wax myrtle), and *Vaccinium corymbosum* (highbush blueberry). The highly variable short-shrub layer (1–2 meters [3.3–6.6 ft]) which may be absent of closed (0–100%) is made up of species from the upper layers along with possible *Sabal palmetto* (cabbage palmetto) and *Serenoa repens* (saw palmetto). The very sparse (0–5%) herbaceous layer is dominated by ferns, including *Osmunda cinnamomea* (cinnamon fern), *Osmunda regalis* (royal fern), *Pteridium aquilinum* (western brackenfern), and *Woodwardia virginica* (Virginia chainfern). Nonvascular species (up to 20%) include *Sphagnum* (sphagnum) spp. Vines (5%) are quite common and include *Gelsemium sempervirens* (evening trumpetflower), *Smilax auriculata* (earleaf greenbrier), *Smilax glauca* (cat greenbrier), *Smilax laurifolia* (laurel greenbrier), and *Vitis rotundifolia* (muscadine). Epiphytes present in small amounts are *Phoradendron leucarpum* (oak mistletoe), *Pleopeltis polypodioides* (resurrection fern), and *Tillandsia usneoides* (Spanish moss).

Global Vegetation

The closed, broad-leaved evergreen canopy is composed of *Magnolia virginiana* (sweetbay), *Persea palustris* (swamp bay), and *Gordonia lasianthus* (loblolly bay). A patchy understory of shrubs *Cyrilla racemiflora* (swamp titi), *Clethra alnifolia* (coastal sweetpepperbush), *Itea virginica* (Virginia sweetspire), *Lyonia lucida* (fetterbush lyonia), and *Ilex glabra* (inkberry) and vines *Smilax laurifolia* (laurel greenbrier), *Smilax glauca* (cat greenbrier), and *Vitis rotundifolia* (muscadine) occurs with an abundant to sparse layer of ferns *Woodwardia areolata* (netted chainfern) and *Osmunda cinnamomea* (cinnamon fern). *Sphagnum* (sphagnum) mats are interlaced with exposed tree roots. Additional species found on Ocala National Forest include *Quercus nigra* (water oak), *Pinus serotina* (pond pine), *Vaccinium fuscatum* (black highbush blueberry), *Gelsemium sempervirens* (eveningtrumpetflower), *Morella cerifera* (wax myrtle), *Nyssa biflora* (swamp tupelo), *Serenoa repens* (saw palmetto), *Ilex cassine* (dahoon), *Smilax smallii* (lanceleaf greenbrier), and *Viburnum nudum* (possumhaw).

Longleaf/Slash Pine Scrubby Flatwoods

Attributes, descriptions, a photo and a map are shown in Table C-21, and Figure C-21.

Table C-21. Attributes and descriptions of Longleaf/Slash Pine Scrubby Flatwoods.

Attribute	Description
CEGL Code	7714
Community Name	Longleaf/Slash Pine Scrubby Flatwoods
Color	Muted purple-red with light red
Tone	Dark
Texture	Coarse
Pattern	Irregular
Height	Short to medium
Shape	Irregular
Size	Medium to large areas
Location	–
Association	–
Comments	–

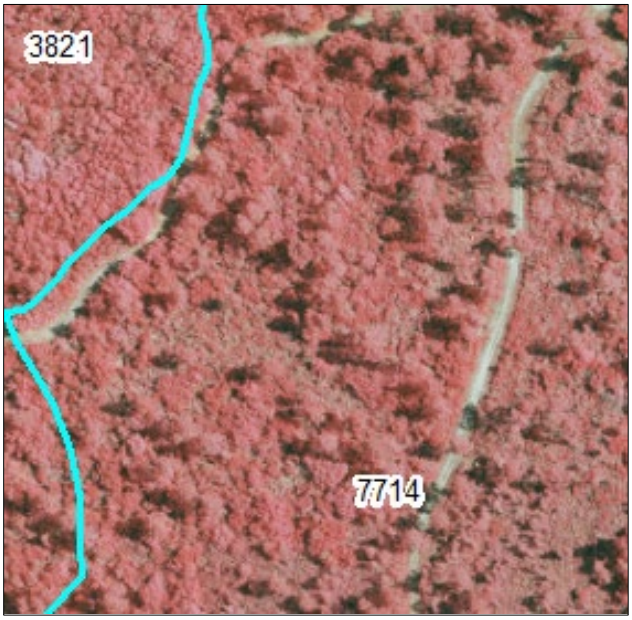


Figure C-21. Map showing Longleaf/Slash Pine Scrubby Flatwoods (7714).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The general appearance of this community is of a very dense (90–100% cover) short-shrub thicket (1–2 meters [3.3–6.6 ft] tall) dominated by *Serenoa repens* (saw palmetto) with a very sparse (5–20%) emergent (5–20 meters [16.4–65.6 ft]) tree layer of *Pinus palustris* (longleaf pine), *Pinus elliottii* (slash pine), *Quercus geminata* (sand live oak), and/or *Quercus laevis* (turkey oak). Additional shrubs may include *Befaria racemosa* (tarflower), *Gaylussacia dumosa* (dwarf huckleberry), *Ilex glabra* (inkberry), *Lyonia ferruginea* (rusty staggerbush), *Lyonia fruticosa* (coastalplain staggerbush), *Morella cerifera* (wax myrtle), *Quercus chapmanii* (Chapman oak), *Quercus geminata* (sand live oak), *Quercus myrtifolia* (myrtle oak), *Vaccinium myrsinites* (shiny blueberry), and *Vaccinium stamineum* (deerberry). The very sparse (5–20%) herbaceous layer is dominated by *Aristida beyrichiana* (Beyrich threeawn). Nonvascular species include lichens *Cladina evansii* (Evans' reindeer lichen), *Cladina subtenuis* (reindeer lichen), and *Cladonia leporina* (cup lichen). *Smilax auriculata* (earleaf greenbrier) forms a very sparse (5%) vine layer.

Global Vegetation

The open canopy is dominated by *Pinus palustris* (longleaf pine), possibly with or replaced by *Pinus elliottii* (slash pine). Beneath this is a shrubby understory typically dominated by some combination of *Quercus geminata* (sand live oak) and/or *Quercus myrtifolia* (myrtle oak). *Serenoa repens* (saw palmetto) is also a typical component. Other shrubs which may be present include *Licania michauxii* (gopher apple), *Quercus pumila* (running oak), *Ilex glabra* (inkberry), *Ilex coriacea* (large gallberry), *Quercus minima* (dwarf live oak), *Gaylussacia dumosa* (dwarf huckleberry), *Kalmia hirsuta* (hairy laurel), *Lyonia lucida* (fetterbush lyonia), *Polygonella polygama* (October flower), and *Lyonia ferruginea* (rusty staggerbush). Near-coastal Panhandle Florida examples may contain *Conradina canescens* (false rosemary). *Krameria lanceolata* (trailing krameria) is also present. *Aristida beyrichiana* (Beyrich threeawn) is common; other herbs may include *Aristida spiciformis* (bottlebrush threeawn), *Seymeria cassioides* (yaupon blacksenna), and *Carphephorus odoratissimus* (vanillaleaf).

Peninsular Florida Scrubby Flatwoods

Attributes, descriptions, a photo and a map are shown in Table C-22, and Figure C-22.

Table C-22. Attributes and descriptions of Peninsular Florida Scrubby Flatwoods.

Attribute	Description
CEGL Code	7750
Community Name	Peninsular Florida Scrubby Flatwoods
Color	Reds with small areas of brown
Tone	Medium
Texture	Coarse with tight tree crowns
Pattern	Dense
Height	Tall
Shape	Varies
Size	Small areas
Location	–
Association	Found near CEGL 3825 in park
Comments	–

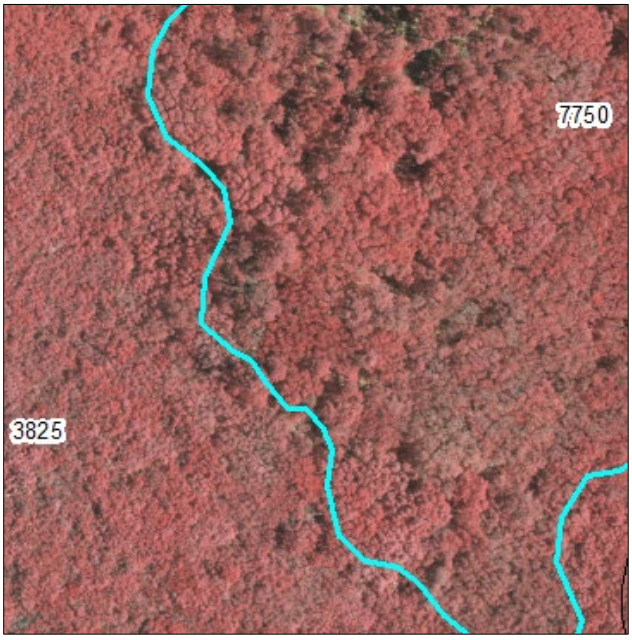


Figure C-22. Map showing Peninsular Florida Scrubby Flatwoods (7750).

Summary

Global Vegetation

The canopy of stands can contain predominantly *Pinus palustris* (longleaf pine), *Pinus elliottii var. elliottii* (Honduras pine), or a variable combination of both. According to Huffman and Judd (1998), who documented this type at Myakka River State Park (in both Manatee and Sarasota counties, Florida), other shrubs and woody vines include *Amorpha herbacea var. herbacea* (clusterspike false indigo), *Licania michauxii* (gopher apple), *Lyonia fruticosa* (coastalplain staggerbush), *Palafoxia integrifolia* (coastalplain palafox), *Pinus clausa* (sand pine), *Quercus geminata* (sand live oak), *Quercus incana* (bluejack oak), *Quercus laevis* (turkey oak), *Quercus minima* (dwarf live oak), *Sideroxylon reclinatum* (Florida bully), *Smilax glauca* (cat greenbrier), *Smilax pumila* (sarsparilla vine), *Vaccinium arboreum* (farkleberry), *Ximenia americana* (tallow wood), and *Yucca filamentosa* (Adam's needle), and other herbaceous species include *Asclepias feayi* (Florida milkweed), *Aureolaria pectinata* (combleaf yellow false foxglove), *Balduina angustifolia* (coastalplain honeycombhead), *Coelorachis cylindrica* (cylinder jointtail grass), *Cyperus lupulinus* (Great Plains flatsedge), *Dalea adenopoda* (Tampa prairie clover), *Helianthemum corymbosum* (pinebarren frostweed), *Lechea divaricata* (drysand pinweed), *Liatris tenuifolia* (shortleaf blazing star), *Lygodesmia aphylla* (rose rush), *Opuntia humifusa var. humifusa* (devil's-tongue), *Phoebanthus grandiflorus* (Florida false sunflower), *Rhynchosia michauxii* (Michaux's snoutbean), *Rhynchospora megalocarpa* (sandyfield beaksedge), *Rhynchospora plumosa* (plumed beaksedge), *Seymeria pectinata* (piedmont blacksenna), *Sporobolus junceus* (pineywoods dropseed), *Tillandsia recurvata* (small ballmoss), and *Tillandsia utriculata* (spreading airplant).

Cedar-Live Oak-Cabbage Palm Marsh Hammock

Attributes, descriptions, a photo and a map are shown in Table C-23, and Figure C-23.

Table C-23. Attributes and descriptions of Cedar-Live Oak-Cabbage Palm Marsh Hammock.

Attribute	Description
CEGL Code	7813
Community Name	Cedar-Live Oak-Cabbage Palm Marsh Hammock
Color	Brownish red, with areas of lighter red and greenish brown
Tone	Dull
Texture	Coarse
Pattern	Individual tree crowns can be seen
Height	Medium
Shape	Usually semi-circular or oblong
Size	Small
Location	Generally surrounded by marshes
Association	–
Comments	–

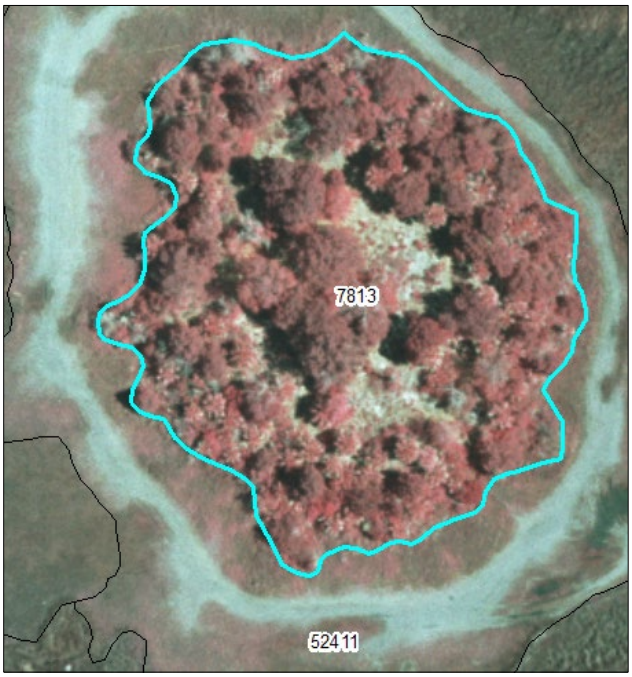


Figure C-23. Map showing Cedar-Live Oak-Cabbage Palm Marsh Hammock (7813).

Summary

Timucuan Ecological and Historic Preserve Vegetation

This association was not documented at Timucuan as part of this project, although it is likely that it does occur at the park.

Global Vegetation

Juniperus virginiana var. silicicola (southern redcedar) typically dominates the canopy, while other species, such as *Quercus virginiana* (live oak), *Sabal palmetto* (cabbage palmetto), and *Celtis laevigata var. laevigata* (sugarberry), may be present. Exotic species, such as *Triadica sebifera* (tallowtree), *Tamarix* (tamarisk) spp., and *Melia azedarach* (Chinaberrytree), can be invasive in these communities. On Ocala National Forest a plot attributed to this association is additionally characterized by *Quercus hemisphaerica* (Darlington oak), *Callicarpa americana* (American beautyberry), *Persea borbonia* (redbay), *Morella caroliniensis* (southern bayberry), *Ageratina aromatica* (lesser snakeroot), *Dichondra carolinensis* (Carolina ponysfoot), *Oplismenus hirtellus ssp. setarius* (bristle basketgrass), *Chasmanthium sessiliflorum* (longleaf woodoats), *Thelypteris kunthii* (Kunth's maiden fern), *Parthenocissus quinquefolia* (Virginia creeper), *Bignonia capreolata* (crossvine), *Toxicodendron radicans* (eastern poison ivy), *Smilax smallii* (lanceleaf greenbrier), and *Vitis aestivalis* (summer grape) (NatureServe Ecology unpubl. data).

Sweetgum—Red Maple—(Swamp Blackgum)/Virginia Chainfern Forest

Attributes, descriptions, a photo and a map are shown in Table C-24, and Figure C-24.

Table C-24. Attributes and descriptions of Sweetgum—Red Maple—(Swamp Blackgum)/Virginia Chainfern Forest.

Attribute	Description
CEGL Code	7848
Community Name	Sweetgum – Red Maple – (Swamp Blackgum)/Virginia Chainfern Forest
Color	Purple and reds
Tone	Dark
Texture	Coarse
Pattern	Tight, individual tree crowns apparent
Height	Medium
Shape	Irregular
Size	Small to large areas
Location	–
Association	–
Comments	–



Figure C-24. Map showing Sweetgum—Red Maple—(Swamp Blackgum)/Virginia Chainfern Forest (7848).

Summary

Timucuan Ecological and Historic Preserve Vegetation

The very dense (90% cover) tree canopy, 10–15 meters (32.8–49.2 ft) tall, is dominated by *Acer rubrum* (red maple) and *Liquidambar styraciflua* (sweetgum), as is the moderate (50%) subcanopy (5–10 meters [16.4–32.8 ft]). Additional tree species include *Pinus elliottii* (slash pine), *Ilex cassine* (dahoon), *Ilex opaca* (American holly), *Persea palustris* (swamp bay), and *Sabal palmetto* (cabbage palmetto). The sparse (20%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) and very sparse (10%) short-shrub layer (1–2 meters [3.3–6.6 ft]) are dominated by *Cephalanthus occidentalis* (common buttonbush) and *Sabal palmetto* (cabbage palmetto); additional shrubs include *Itea virginica* (Virginia sweetspire), *Lyonia lucida* (fetterbush lyonia), *Morella cerifera* (wax myrtle), *Serenoa repens* (saw palmetto), and *Vaccinium corymbosum* (highbush blueberry). The very sparse (5%) herbaceous layer is dominated by *Woodwardia virginica* (Virginia chainfern). Epiphytes include *Pleopeltis polypodioides* (resurrection fern) and *Tillandsia usneoides* (Spanish moss).

Global Vegetation

Stands of this association have *Liquidambar styraciflua* (sweetgum) and *Acer rubrum* (red maple) as the constant dominants, sometimes with an admixture of *Nyssa biflora* (swamp tupelo). Scattered shrubs may occur, usually on logs, including *Itea virginica* (Virginia sweetspire), *Vaccinium formosum* (southern blueberry), and *Leucothoe racemosa* (swamp doghobble). *Woodwardia areolata* (netted chainfern) dominates the herb layer, at least in the marginal portions of the pond where water is ponded more shallowly and for shorter periods of time; deeper ponds have a ring of *Woodwardia* (chainfern), while shallower ponds are *Woodwardia* (chainfern)-dominated all the way across.

Pond Pine—Bay Swamp

Attributes, descriptions, a photo and a map are shown in Table C-25, and Figure C-25.

Table C-25. Attributes and descriptions of Pond Pine—Bay Swamp.

Attribute	Description
CEGL Code	7996
Community Name	Pond Pine—Bay Swamp
Color	Purples with reds
Tone	Dark
Texture	Coarse
Pattern	Dense
Height	Tall
Shape	Irregular
Size	Medium
Location	–
Association	–
Comments	Only one area identified in park

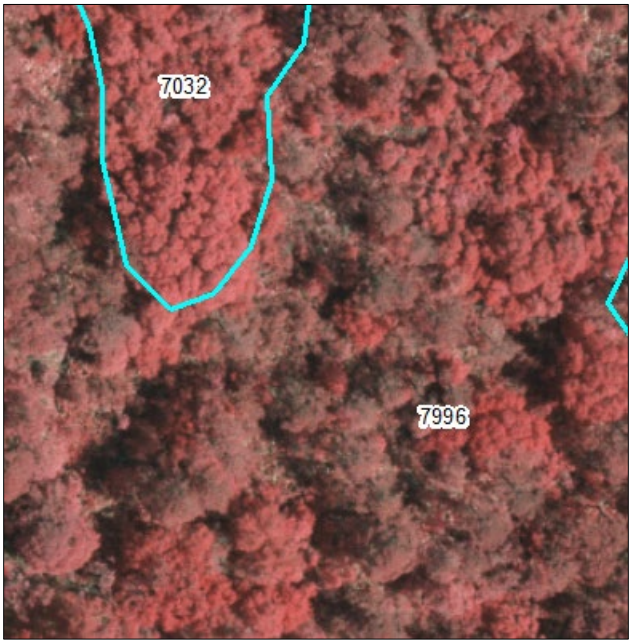


Figure C-25. Map showing Pond Pine—Bay Swamp (7996).

Summary

Timucuan Ecological and Historic Preserve Vegetation:

The dense (80% cover) tree canopy, 15–20 meters (49.2–65.6 ft) tall, is dominated exclusively by Pinus serotina (pond pine). The sparse (20%) subcanopy (5–10 meters [16.4–32.8 ft]) is made up of Ilex cassine (dahoon) and Persea palustris (swamp bay). The dense (80%) tall-shrub layer (2–5 meters [6.6–16.4 ft]) is dominated by Lyonia lucida (fetterbush lyonia), and the closed (100%) short-shrub layer (1–2 meters [3.3–6.6 ft]) by Serenoa repens (saw palmetto). Additional shrubs present in lesser amounts include Gordonia lasianthus (loblolly bay), Ilex glabra (inkberry), Lyonia ferruginea (rusty staggerbush), Morella cerifera (wax myrtle), Persea palustris (swamp bay), Photinia pyrifolia (red chokeberry), Rhus copallinum (flameleaf sumac), and Vaccinium corymbosum (highbush blueberry). No herbaceous layer exists due to the dense shrub layers. Vines (5%) include Smilax auriculata (earleaf greenbrier), Smilax glauca (cat greenbrier), and Vitis rotundifolia (muscadine).

Global Vegetation:

A canopy of Pinus serotina (pond pine) (typically of 50% cover or less) overtops a subcanopy of Persea palustris (swamp bay), Gordonia lasianthus (loblolly bay), and Magnolia virginiana (sweetbay). Occasionally Pinus elliottii (slash pine) may occur in the canopy with Pinus serotina (pond pine). The community is typically dense with midstory and understory shrubs, which include Persea palustris (swamp bay), Gordonia lasianthus (loblolly bay), Cyrilla racemiflora (swamp titi), Ilex coriacea (large gallberry), Viburnum nudum (possumhaw), Lyonia lucida (fetterbush lyonia), Magnolia virginiana (sweetbay), Morella (bayberry) spp., and occasional Agarista populifolia (Florida hobblebush). At Ocala National Forest, the additional shrubs Lyonia fruticosa (coastalplain staggerbush), Vaccinium myrsinites (shiny blueberry), Befaria racemosa (tarflower), Leucothoe racemosa (swamp doghobble), Ilex cassine (dahoon), Gaylussacia tomentosa (hairytwig huckleberry), Gaylussacia nana (Confederate huckleberry), Toxicodendron vernix (poison sumac), Toxicodendron radicans (eastern poison ivy), Photinia pyrifolia (red chokeberry), Ilex glabra (inkberry), and Lyonia ligustrina (maleberry) were present. The ferns Osmunda cinnamomea (cinnamon fern) and Woodwardia areolata (netted chainfern) are sometimes present. The vine Smilax laurifolia (laurel greenbrier) is usually found in small amounts; Smilax auriculata (earleaf greenbrier) and Vitis rotundifolia (muscadine) can also be present. One plot near the St. Johns River (Ocala National Forest) had the epiphyte Tillandsia usneoides (Spanish moss).

CEGL Combined Graminoid Wetlands

Attributes, descriptions, a photo and a map are shown in Table C-26, and Figure C-26.

Table C-26. Attributes and descriptions of CEGL Combined Graminoid Wetlands.

Attribute	Description
SWAP Code	21119
Community Name	CEGL Combined Graminoid Wetlands Combination of CEGL codes 3940 (Central Florida Sawgrass Marsh), 3960 (Elephantgrass Herbaceous Vegetation), 3988 (South Florida Cattail Marsh), 4114 (Crowngrass Interdune Swale), 4511 (Herbaceous Vegetation Sand Cordgrass Interdune Swale), 4527 (Watershield Pond)
Color	Dull gray with bluish undertones, sparse areas of pink
Tone	Dull
Texture	Slight mottling
Pattern	Consistently mottled with irregular patches of pink
Height	1 to 2 meters (3.3 to 6.6 ft)
Shape	Irregular
Size	Small to large
Location	Variable, but usually in micro topographic depressions
Association	Variable; can be situated within forested areas or form more extensive linear features
Comments	–



Figure C-26. Map showing CEGL Combined Graminoid Wetlands (21119).

Summary

Timucuan Ecological and Historic Preserve Vegetation

(4511)

Vegetation is dominated by a very dense to total (90-100% cover) herbaceous layer dominated by *Spartina bakeri* (sand cordgrass). Additional species in lesser amounts may include *Eleocharis vivipara* (viviparous spikerush), *Eupatorium capillifolium* (dogfennel), *Juncus effusus* (common rush), *Panicum hemitomon* (maidencane), *Panicum verrucosum* (warty panicgrass), *Polygonum hydropiperoides* (swamp smartweed), *Rhynchospora inundata* (narrowfruit horned beaksedge), and *Sacciolepis striata* (American cupscale). In addition, in fire-suppressed examples, there may be a very sparse (0–5%) tree layer (5–10 meters [16.4–32.8 ft] tall) of *Pinus elliottii* (slash pine), *Pinus taeda* (loblolly pine), and *Salix caroliniana* (coastal plain willow). There may also be a sparse (0–20%) shrub layer (1–2 meters [3.3–6.6 ft]) of these same species as well as *Diospyros virginiana* (common persimmon) and *Sabal palmetto* (cabbage palmetto).

Global Vegetation

(3940)

More information is needed on the species composition of this type, especially as it compareswith related sawgrass marsh of tropical Florida. It is presumed that due to the more northerly occurrence, this type has some floristic indicators either lacking or rare in the tropical community. Both types are generally described as being "dense" sawgrass communities (Kushlan 1990). Although the St. Johns region was beyond their study area, Hilsenbeck et al. (1979) noted that sawgrass marshes vary in a north-south pattern, with denser types (those with more robust individual plants) found in more northern areas.

(3988)

According to Hilsenbeck et al. (1979) and Kushlan (1990), relatively few other species are associated with this community. These include *Pontederia cordata* (pickerelweed), *Eleocharis cellulosa* (Gulf Coast spikerush), *Cladium mariscus ssp. jamaicense* (Jamaica swamp sawgrass), *Utricularia gibba* (humped bladderwort), and *Sagittaria lancifolia* (bulltongue arrowhead).

(4114)

This vegetation is dominated by *Paspalum vaginatum* (seashore paspalum). In addition, *Sesuvium portulacastrum* (shoreline seapurslane) may be present.

(4511)

Stands of this type are dominated by *Spartina bakeri* (sand cordgrass), or at least with substantial cover of it. *Muhlenbergia filipes* (gulfhairawn muhly) may be codominant; *Andropogon glomeratus* (bushy bluestem) and *Aristida* (threeawn) sp. are occasionally present. A variety of wetland herbs are present in the wetter swales, including *Rhynchospora colorata* (starrush whitetop), *Sagittaria lancifolia* (bulltongue arrowhead), *Eupatorium mikanioides* (semaphore thoroughwort) (a Florida endemic), *Setaria magna* (giant bristlegrass), *Cladium mariscus ssp. jamaicense* (Jamaica swamp sawgrass), *Phyla nodiflora* (turkey tangle fogfruit), *Sabatia stellaris* (rose of Plymouth), and *Pluchea rosea* (rosy camphorweed). *Nostoc*, a cyanobacterium, forms a wet, slippery, dark green ground cover during wet periods and a thick, black crust during dry spells. An alga, *Chara* sp., is also present in pools in wet swales. Exotic species found in some swales include *Schinus terebinthifolius* (Brazilian peppertree) and *Catharanthus roseus* (Madagascar periwinkle). A stand assigned here in the Ocala National Forest (Farles Prairie) is strongly dominated by *Spartina bakeri* (sand cordgrass), with *Ludwigia suffruticosa* (shrubby primrose-willow), *Amphicarpum muehlenbergianum* (Muhlenberg maidencane), *Dichanthelium* (rosette grass) sp., *Smilax pumila* (sarsparilla vine), *Centella erecta* (erect centella), *Rhexia mariana* (Maryland meadowbeauty), *Pluchea rosea* (rosy camphorweed), *Andropogon brachystachyus* (shortspike bluestem), *Andropogon capillipes* (chalky bluestem), and *Ludwigia repens* (creeping primrose-willow). The shrubs *Vaccinium darrowii* (Darrow's blueberry) and *Hypericum myrtifolium* (myrtleleaf St. Johnswort) are present here at low cover values. In fire-suppressed examples, there may be a very sparse tree layer (5–10 meters [16.4–32.8 ft] tall) of *Pinus elliottii* (slash pine), *Pinus taeda* (loblolly pine), and *Salix caroliniana* (coastal plain willow). There may also be a sparse shrub layer (1–2 meters [3.3–6.6 ft]) of these same species, as well as *Diospyros virginiana* (common persimmon) and *Sabal palmetto* (cabbage palmetto).

(4527)

Brasenia schreberi (watershield), a floating aquatic native to Florida that has become naturalized throughout much of the eastern and western U.S. and Canada, is the dominant plant species; other species may include *Leersia oryzoides* (rice cutgrass), *Lemna valdiviana* (valdivia duckweed), *Juncus effusus* (common rush), *Stuckenia pectinata* (sago pondweed), *Nymphaea odorata* (American white waterlily), and *Spirodela polyrrhiza* (common duckmeat). Other floating aquatics present include *Nelumbo lutea* (American lotus), *Nymphaea odorata* (American white waterlily), *Nymphaea mexicana* (yellow waterlily), and *Utricularia* (bladderwort) spp., along with submersed aquatics such as *Cabomba caroliniana* (Carolina fanwort) and *Ceratophyllum demersum* (coon's tail) and rooted aquatics such as *Pontederia cordata* (pickerelweed) and *Zizaniopsis miliacea* (giant cutgrass).

Mowed Grass/Weedy, Nonresidential setting

Attributes, descriptions, a photo and a map are shown in Table C-27, and Figure C-27.

Table C-27. Attributes and descriptions of Mowed Grass/Weedy, Nonresidential setting.

Attribute	Description
SWAP Code	18100
Community Name	Mowed Grass/Weedy, Nonresidential setting
Color	Variable, depending upon moisture and time since mowing
Tone	Grays to Pinks
Texture	Variable but usually smooth unless mow patterns obvious
Pattern	Can exhibit line pattern from mowing
Height	Short
Shape	Irregular, but usually with distinct edges
Size	Small
Location	–
Association	Usually near some anthropogenic land-use
Comments	May be successional community to shrubs or trees

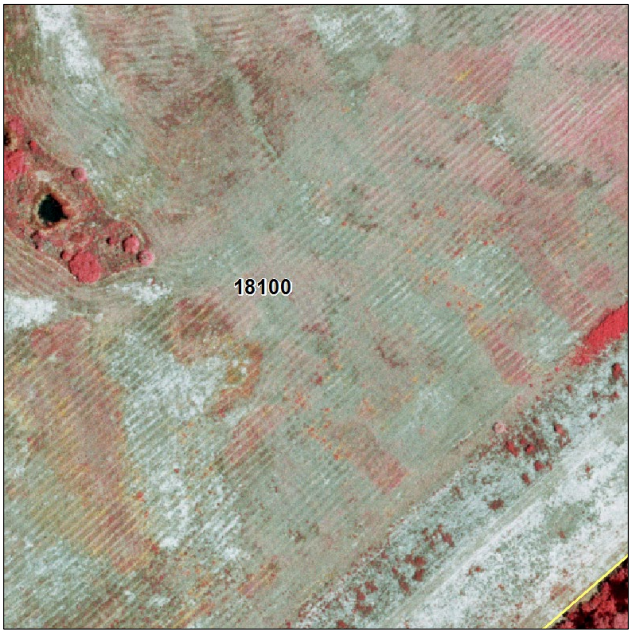


Figure C-27. Map showing Mowed Grass/Weedy, Nonresidential setting (18100).

Low Intensity Urban, <2 dwellings per ha

Attributes, descriptions, a photo and a map are shown in Table C-28, and Figure C-28.

Table C-28. Attributes and descriptions of Low Intensity Urban, < 2 dwellings per hectare (2.5 ac).

Attribute	Description
SWAP Code	18212
Community Name	Low Intensity Urban, <2 dwellings per hectare (2.5 ac)
Color	Variable depending upon canopy (trees or mowed grass)
Tone	–
Texture	Variable
Pattern	–
Height	Variable depending upon if trees or mowed grass
Shape	Some edges tend to be distinct
Size	Small to medium
Location	–
Association	Road access
Comments	–

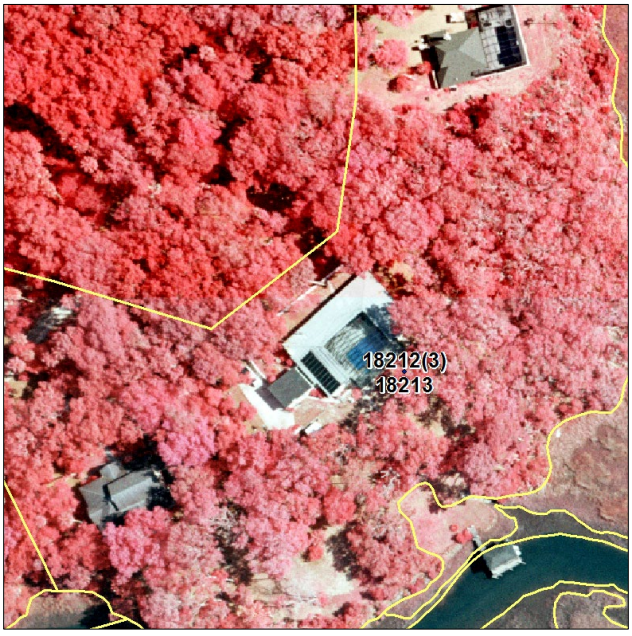


Figure C-28. Map showing Low Intensity Urban, <2 dwellings per ha (18212).

Residential, Medium Density 2 to 5 units per hectare

Attributes, descriptions, a photo and a map are shown in Table C-29, and Figure C-29.

Table C-29. Attributes and descriptions of Residential, Medium Density 2 to 5 units per hectare (2.5 ac).

Attribute	Description
SWAP Code	18221
Community Name	Residential, Medium Density 2 to 5 units per hectare (2.5 ac)
Color	–
Tone	–
Texture	–
Pattern	–
Height	Variable depending upon tree canopy
Shape	Irregular because of roads, but usually with distinct external boundaries
Size	Medium
Location	Variable but concentrated in eastern portion of TIMU
Association	Road Access
Comments	Docks common near rivers. Inland, may have stormwater retention ponds.



Figure C-29. Map showing Residential, Medium Density 2 to 5 units per hectare (18221).

Mud (Tidally inundated with water)

Attributes, descriptions, a photo and a map are shown in Table C-30, and Figure C-30.

Table C-30. Attributes and descriptions of Mud (Tidally inundated with water).

Attribute	Description
SWAP Code	52210
Community Name	Mud (Tidally inundated with water)
Color	Gray with brownish undertones
Tone	Dark
Texture	Smooth
Pattern	Irregular but distinct edges May have small inclusions of vegetation
Height	Less than 1 meter (3.3 ft)
Shape	Irregular to linear; can be quite convoluted.
Size	Small to Large
Location	More concentrated, and convoluted in central and southern part of TIMU
Association	Transition between tidal rivers and salt marshes (4186, 4191), tidal marsh barrens (52411)
Comments	–

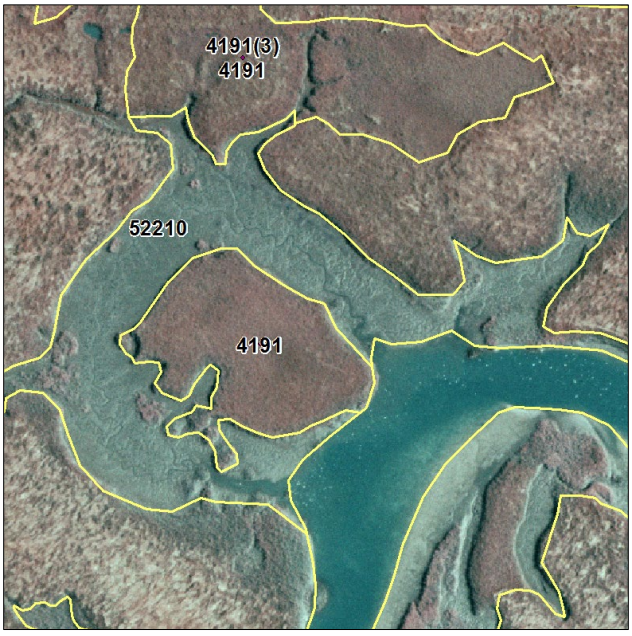


Figure C-30. Map showing Mud (Tidally inundated with water; 52210).

Sand

Attributes, descriptions, a photo and a map are shown in Table C-31, and Figure C-31.

Table C-31. Attributes and descriptions of Sand.

Attribute	Description
SWAP Code	52220
Community Name	Sand
Color	Bright white to gray depending upon saturation
Tone	Bright
Texture	Smooth to rippled
Pattern	–
Height	Less than 1 meter (3.3 ft)
Shape	Irregular inland to linear along coast
Size	Small to medium
Location	Adjacent to water
Association	Rivers or Marine
Comments	–



Figure C-31. Map showing Sand (52220).

Salt Pan

Attributes, descriptions, a photo and a map are shown in Table C-32, and Figure C-32.

Table C-32. Attributes and descriptions of Salt pan.

Attribute	Description
SWAP Code	52410
Community Name	Salt pan
Color	White with gray/blue
Tone	Bright
Texture	Smooth to dotted
Pattern	–
Height	Less than 1 m
Shape	Irregular to gradual
Size	Small to medium
Location	More extensive in north-central part
Association	Generally surrounded by 4186 or 4191
Comments	–

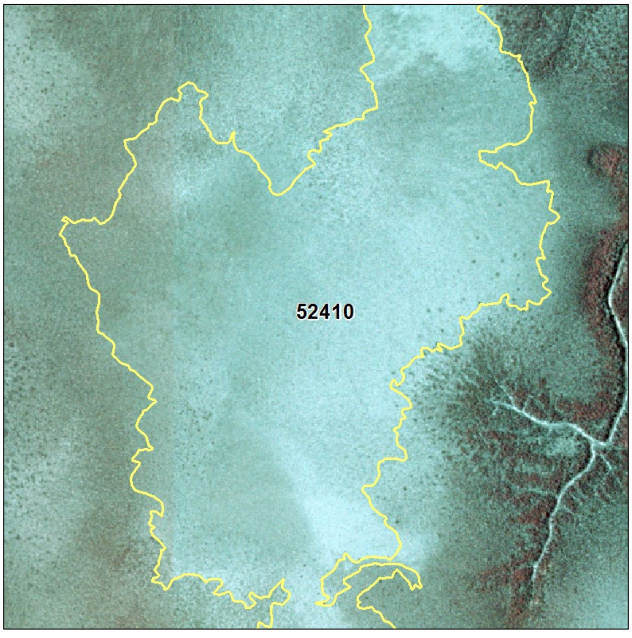


Figure C-32. Map showing Salt pan (52410).

CEGL Combined Tidal Marsh Barren

Attributes, descriptions, a photo and a map are shown in Table C-33, and Figure C-33.

Table C-33. Attributes and descriptions of CEGL Combined Tidal Marsh Barren.

Attribute	Description
CEGL Code	52411
Community Name	CEGL Combined Tidal Marsh Barren Combination of 5 CEGL codes (2278 (Salt Flat (Woody Glasswort Type)), 3924 (Seaside Oxeye Tidal Shrub Flat), 3956 (Saltwort - Woody Glasswort Dwarf-shrubland), 7663 (Saltmarsh Dropseed - Saltgrass Herbaceous Vegetation), 7694 (Saltgrass - (Saltmarsh Dropseed) Herbaceous Vegetation))
Color	Varies from brown to bright pink
Tone	Bright
Texture	Smooth
Pattern	Fine
Height	Less than 1 m
Shape	Irregular to Linear
Size	Small to medium, occasional large area
Location	Transitional between uplands to tidal marsh or inclusions within tidal marsh
Association	–
Comments	Species dominance can be very mixed and is likely to shift between years, shifting CEGL code

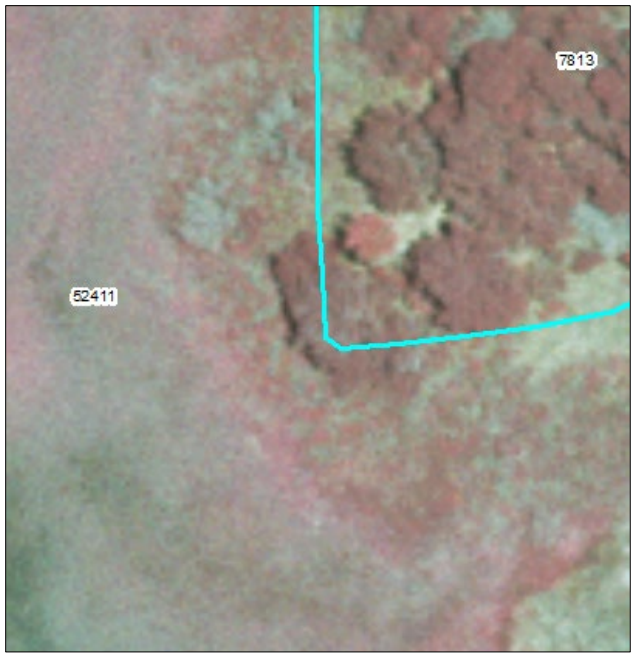


Figure C-33. Map showing CEGL Combined Tidal Marsh Barren (52411).

Summary

Timucuan Ecological and Historic Preserve Vegetation

(2278)

The dwarf-shrub *Sarcocornia perennis* (chickenclaws) dominates the very dense vegetation (90% cover); additional species include the dwarf-shrub *Batis maritima* (turtleweed), the forb *Limonium carolinianum* (Carolina sealavender), and graminoids *Juncus roemerianus* (needlegrass rush) and *Spartina alterniflora* (smooth cordgrass).

(3924)

This association was not documented at Timucuan as part of this project, although it is possible that it does occur at the park.

(3956)

The dwarf-shrub *Batis maritima* (turtleweed) dominates the closed herbaceous layer (100% cover); additional species include *Sarcocornia perennis* (chickenclaws), *Borrichia frutescens* (bushy seaside tansy), *Avicennia germinans* (black mangrove), and the graminoid *Spartina alterniflora* (smooth cordgrass).

(7663)

Vegetation is made up almost entirely of *Sporobolus virginicus* (seashore dropseed) with small amounts of other herbs, including *Eustachys petraea* (pinewoods fingergrass), *Limonium carolinianum* (Carolina sealavender), and *Sesuvium portulacastrum* (shoreline seapurslane). In addition, in this example, there is a very sparse emergent layer of *Juniperus virginiana var. silicicola* (southern redcedar), *Ilex vomitoria* (yaupon), and *Iva frutescens* (Jesuit's bark).

(7694)

Vegetation is a closed (100% cover) herbaceous layer made up almost exclusively of *Distichlis spicata* (inland saltgrass). Additional species in very small amounts include *Borrichia frutescens* (bushy seaside tansy), *Iva frutescens* (Jesuit's bark), *Juncus roemerianus* (needlegrass rush), *Spartina patens* (saltmeadow cordgrass), and *Sarcocornia perennis* (chickenclaws).

Global Vegetation

(2278)

This community is dominated by the halophytic, succulent dwarf-shrub *Sarcocornia perennis* (chickenclaws) and other halophytes, including *Salicornia bigelovii* (dwarf saltwort), *Distichlis spicata* (inland saltgrass), and sometimes stunted *Spartina alterniflora* (smooth cordgrass). Other typical species can include *Suaeda* (seepweed) spp., *Sporobolus virginicus* (seashore dropseed), *Sesuvium portulacastrum* (shoreline seapurslane), and *Limonium carolinianum* (Carolina sealavender). Algal mats are characteristically present, visible even in densely vegetated pannes. Blue-green algae may contribute significantly more biomass than vascular species. Texas examples, of alternately wet and dry saline soils along the Gulf Coast, may contain *Monanthochloe littoralis* (shoregrass), *Rayjacksonia phyllocephala* (camphor daisy), *Borrichia frutescens* (bushy seaside tansy), *Maytenus phyllanthoides* (Florida mayten), *Suaeda* (seepweed) spp., *Sesuvium portulacastrum* (shoreline seapurslane), and *Sporobolus virginicus* (seashore dropseed).

(3924)

This community is strongly dominated by *Borrichia frutescens* (bushy seaside tansy). Other characteristic species may include *Spartina patens* (saltmeadow cordgrass), *Iva frutescens* (Jesuit's bark), *Distichlis spicata* (inland saltgrass), *Schoenoplectus robustus* (sturdy bulrush), *Sporobolus virginicus* (seashore dropseed), *Monanthochloe littoralis* (shoregrass), *Sarcocornia perennis* (chickenclaws), *Limonium carolinianum* (Carolina sealavender), *Lycium carolinianum var. quadrifidum* (Carolina desert-thorn), *Rayjacksonia phyllocephala* (camphor daisy), and *Batis maritima* (turtleweed). In Texas, *Spartina patens* (saltmeadow cordgrass) is a less important component of this community, but it often forms a fringe along the upper margin.

(3956)

This community is dominated by *Batis maritima* (turtleweed) sometimes in association with *Sarcocornia perennis* (chickenclaws), *Sporobolus virginicus* (seashore dropseed), *Borrichia frutescens* (bushy seaside tansy), *Suaeda linearis* (annual seepweed), *Suaeda conferta* (beach seepweed) (in southern Texas), *Lycium carolinianum* (Carolina desert-thorn), *Spartina spartinae* (gulf cordgrass), *Sesuvium portulacastrum* (shoreline seapurslane), and *Blutaparon vermiculare* (silverhead). Algal mats of blue-green and sometimes green algae are characteristically present, visible even in densely vegetated pannes.

(7663)

This community is dominated by *Sporobolus virginicus* (seashore dropseed), with other species including *Distichlis spicata* (inland saltgrass), *Limonium carolinianum* (Carolina sealavender), and *Sesuvium portulacastrum* (shoreline seapurslane).

(7694)

This association is dominated by *Distichlis spicata* (inland saltgrass), often mixed with other halophytic grasses and succulents such as *Sporobolus virginicus* (seashore dropseed), *Sarcocornia perennis* (chickenclaws), *Batis maritima* (turtleweed), *Lycium carolinianum* (Carolina desert-thorn), *Heliotropium curassavicum* (salt heliotrope), and others. In some Florida high marshes this type may occur in distinct monotypic zones with *Paspalum vaginatum* (seashore paspalum), *Batis maritima* (turtleweed), and *Salicornia* (pickleweed) spp., and in other cases these species intermingle (Montague and Wiegert 1990).

Community Recreation

Attributes, descriptions, a photo and a map are shown in Table C-34, and Figure C-34.

Table C-34. Attributes and descriptions of Community Recreation.

Attribute	Description
SWAP Code	182135
Community Name	Community Recreation
Color	Variable depending upon vegetation
Tone	Variable depending upon vegetation
Texture	Variable depending upon vegetation, buildings, other structures including vehicles
Pattern	Variable
Height	Variable
Shape	Variable, but edges tend to be distinct unless canopy closure.
Size	Smaller
Location	Anywhere with road access
Association	Roads, water
Comments	–



Figure C-34. Map showing Community Recreation (182135).

Coniferous Tree Plantation

Attributes, descriptions, a photo and a map are shown in Table C-35, and Figure C-35.

Table C-35. Attributes and descriptions of Coniferous Tree Plantation.

Attribute	Description
SWAP Code	183332
Community Name	Coniferous Tree Plantation
Color	Red interspersed with gray
Tone	Bright
Texture	Coarse
Pattern	Linear stripes
Height	Variable depending upon age of pines
Shape	Distinct edges
Size	Large
Location	Rural areas, but with road access
Association	–
Comments	–

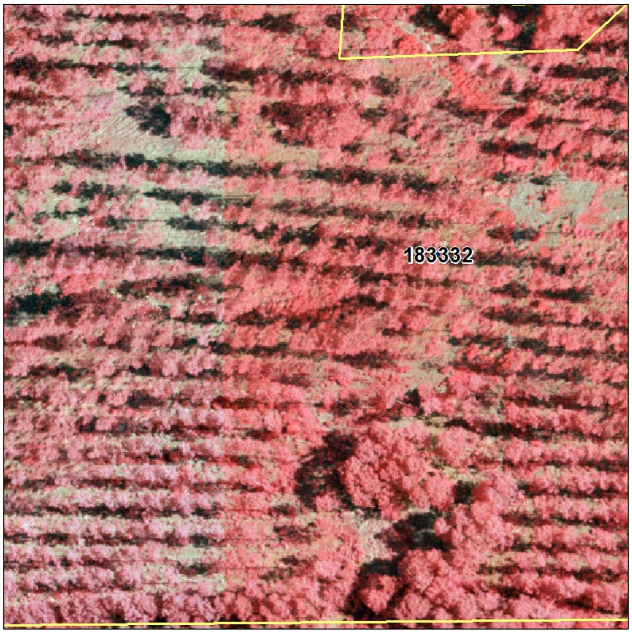


Figure C-35. Map showing Community Recreation (183332).

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Appendix D. Accuracy Assessment

Table D-1. Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_000100	TIMU_AA_000100	2016-02-24	ja np	CEGL003821	–	Daniel Gwartney	Yes
TIMU_AA_000200	TIMU_AA_000200	2016-02-24	ja np	CEGL004789	–	Daniel Gwartney	Yes
TIMU_AA_000300	TIMU_AA_000300	2016-02-24	ja np	CEGL004789	–	Daniel Gwartney	Yes
TIMU_AA_000400	TIMU_AA_000400	2016-02-24	ja np	CEGL004789	–	Daniel Gwartney	Yes
TIMU_AA_000500	TIMU_AA_000500	2016-02-28	ja jm	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_000700	TIMU_AA_000700	2016-02-08	IW JP	CEGL004186	Juncus marsh with spartina fringe	Daniel Gwartney	Yes
TIMU_AA_000800	TIMU_AA_000800	2016-02-08	IW JP	CEGL004186	Juncus marsh. Spartina fringe	Daniel Gwartney	Yes
TIMU_AA_000900	TIMU_AA_000900	2016-02-08	IW JP	CEGL004191	Primarily spartina marsh, juncus patches and fringe	Daniel Gwartney	Yes
TIMU_AA_001000	TIMU_AA_001000	2016-02-08	IW JP	CEGL004186	Key adequate.	Daniel Gwartney	Yes
TIMU_AA_001100	TIMU_AA_001100	2016-02-08	IW JP	CEGL004186	Juncus, Spartina mosaic marsh	Daniel Gwartney	Yes
TIMU_AA_001200	TIMU_AA_001200	2016-02-08	IW JP	CEGL004186	Juncus, Spartina mosaic	Daniel Gwartney	Yes
TIMU_AA_001300	TIMU_AA_001300	2016-02-08	IW JP	CEGL004191	Key adequate. Juncus at higher elevation	Daniel Gwartney	Yes
TIMU_AA_001400	TIMU_AA_001400	2016-02-03	i weber n panico	CEGL004186	prmarily juncus with small patches of spartina near edges of marsh	Daniel Gwartney	Yes
TIMU_AA_001600	TIMU_AA_001600	2016-02-09	JR KB	CEGL003839	sm clump Zanthoxylom. Much dried brown vegetation could not ID.	Daniel Gwartney	Yes
TIMU_AA_001700	TIMU_AA_001700	2016-02-09	JR KB	CEGL007694	–	Daniel Gwartney	Yes
TIMU_AA_001800	TIMU_AA_001800	2016-02-09	jr kb	CEGL004040	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_001900	TIMU_AA_001900	2016-02-09	jr kb	CEGL004040	–	Daniel Gwartney	Yes
TIMU_AA_002000	TIMU_AA_002000	2016-02-09	JR KB	CEGL004040	–	Daniel Gwartney	Yes
TIMU_AA_002100	TIMU_AA_002100	2016-02-09	jr kb	CEGL004040	some vegetation dried and brown, could not ID.	Daniel Gwartney	Yes
TIMU_AA_002200	TIMU_AA_002200	2016-02-09	JR KB	CEGL007694	–	Daniel Gwartney	Yes
TIMU_AA_002300	TIMU_AA_002300	2016-02-09	JR KB	CEGL004040	low growing asteracea could not ID. Tall graminoid brown and flattened, could not ID.No hydrocotyle here.	Daniel Gwartney	Yes
TIMU_AA_002400	TIMU_AA_002400	2016-02-09	JR KB	CEGL004040	–	Daniel Gwartney	Yes
TIMU_AA_002500	TIMU_AA_002500	2016-02-09		CEGL004040	much dried dead vegetation, could not ID.	Daniel Gwartney	Yes
TIMU_AA_002600	TIMU_AA_002600	2016-02-09	jr kb	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_002700	TIMU_AA_002700	2016-02-09	jr kb	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_002800	TIMU_AA_002800	2016-02-09	JR KB	CEGL004040	–	Daniel Gwartney	Yes
TIMU_AA_002900	TIMU_AA_002900	2016-02-09	JR KB	CEGL004040	–	Daniel Gwartney	Yes
TIMU_AA_003000	TIMU_AA_003000	2016-02-09	jr kb	CEGL003924	–	Daniel Gwartney	Yes
TIMU_AA_003100	TIMU_AA_003100	2016-02-09	JR KB	CEGL004040	–	Daniel Gwartney	Yes
TIMU_AA_003200	TIMU_AA_003200	2016-02-03	iw np	CEGL004186	forested island juniperus classification	Daniel Gwartney	Yes
TIMU_AA_003300	TIMU_AA_003300	2016-02-28	ja jm	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_003400	TIMU_AA_003400	2016-02-28	ja jm	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_003500	TIMU_AA_003500	2016-03-07	JA NP	CEGL004191	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_003600	TIMU_AA_003600	2016-02-03	iw np	CEGL007694	near cedar island	Daniel Gwartney	Yes
TIMU_AA_003700	TIMU_AA_003700	2016-02-25	ja jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_003800	TIMU_AA_003800	2016-02-08	IW JP	CEGL004186	Split between two classifications	Daniel Gwartney	Yes
TIMU_AA_003900	TIMU_AA_003900	2016-02-11	jr kb	CEGL004191	Juncus was observed near shore only	Daniel Gwartney	Yes
TIMU_AA_004000	TIMU_AA_004000	2016-02-10	jr kb	CEGL004197	–	Daniel Gwartney	Yes
TIMU_AA_004100	TIMU_AA_004100	2016-02-03	iw np	CEGL003525	woodland patch w/in saltgras/juncus marsh	Daniel Gwartney	Yes
TIMU_AA_004200	TIMU_AA_004200	2016-02-03	iw np	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_005700	TIMU_AA_005700	2016-02-10	jr kb	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_005800	TIMU_AA_005800	2016-02-11	jr kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_005900	TIMU_AA_005900	2016-02-08	IW JP	CEGL007032	Observed from boat. Private island	Daniel Gwartney	Yes
TIMU_AA_006000	TIMU_AA_006000	2016-02-08	IW JP	CEGL007032	Key adequate. Observed from boat due to private property	Daniel Gwartney	Yes
TIMU_AA_006100	TIMU_AA_006100	2016-02-10	jr kb	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_006200	TIMU_AA_006200	2016-02-10	jr kb	CEGL004674	–	Daniel Gwartney	Yes
TIMU_AA_006300	TIMU_AA_006300	2016-02-09	jr kb	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_006400	TIMU_AA_006400	2016-02-09	jr kb	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_006500	TIMU_AA_006500	2016-02-09	jr kb	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_006600	TIMU_AA_006600	2016-02-10	jr kb	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_006700	TIMU_AA_006700	2016-02-11	jr kb	CEGL004674	–	Daniel Gwartney	Yes
TIMU_AA_006800	TIMU_AA_006800	2016-02-10	JR KB	CEGL004788	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_006900	TIMU_AA_006900	2016-02-10	JR KB	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_007000	TIMU_AA_007000	2016-02-10	jr kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_007100	TIMU_AA_007100	2016-02-22	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_007200	TIMU_AA_007200	2016-03-01	iw jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_007300	TIMU_AA_007300	2016-02-10	jr kb	CEGL004700	–	Daniel Gwartney	Yes
TIMU_AA_007400	TIMU_AA_007400	2016-02-10	jr kb	CEGL004700	–	Daniel Gwartney	Yes
TIMU_AA_007500	TIMU_AA_007500	2016-02-25	ja jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_007600	TIMU_AA_007600	2016-02-28	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_007700	TIMU_AA_007700	2016-02-03	IW NP	CEGL004191	solid spatina in all directions	Daniel Gwartney	Yes
TIMU_AA_008000	TIMU_AA_008000	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_008100	TIMU_AA_008100	2016-02-03	IW NP	CEGL003525	SURROUNDED BY MARSH	Daniel Gwartney	Yes
TIMU_AA_008200	TIMU_AA_008200	2016-02-03	IW NP	CEGL003525	WOODLAND PT BORDERED BY BATIS SHRUBLAND STRIP TRANS TO DISTICHLIS MARSH AND SPARTINA	Daniel Gwartney	Yes
TIMU_AA_008300	TIMU_AA_008300	2016-02-03	IW NP	CEGL003525	Reindeer moss patches throughout	Daniel Gwartney	Yes
TIMU_AA_008400	TIMU_AA_008400	2016-02-03	IW NP	CEGL004658	FEW SLASH PINE. TRANS TO JUNIPERUS CLASS	Daniel Gwartney	Yes
TIMU_AA_008500	TIMU_AA_008500	2016-02-03	IW NP	CEGL007694	SMALL PATCH W/IN SPARTINA MARSH	Daniel Gwartney	Yes
TIMU_AA_008600	TIMU_AA_008600	2016-02-03	IW NP	CEGL007694	–	Daniel Gwartney	Yes
TIMU_AA_008700	TIMU_AA_008700	2016-02-03	IW NP	CEGL003525	woodland surrounded by juncus marsh	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_009100	TIMU_AA_009100	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_009200	TIMU_AA_009200	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_009300	TIMU_AA_009300	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_009400	TIMU_AA_009400	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_009500	TIMU_AA_009500	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_009600	TIMU_AA_009600	2016-02-25	ja jm	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_009700	TIMU_AA_009700	2016-02-25	ja jm	CEGL007040	–	Daniel Gwartney	Yes
TIMU_AA_009800	TIMU_AA_009800	2016-02-25	ja np	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_009900	TIMU_AA_009900	2016-02-12	IW JP	CEGL007848	Key sufficient. Pt on edge of liquidambar community and pinus community	Daniel Gwartney	Yes
TIMU_AA_010000	TIMU_AA_010000	2016-02-05	IW NP	CEGL003662	–	Daniel Gwartney	Yes
TIMU_AA_010100	TIMU_AA_010100	2016-02-23	ja np	CEGL003825	–	Daniel Gwartney	Yes
TIMU_AA_010200	TIMU_AA_010200	2016-02-10	jr kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_010300	TIMU_AA_010300	2016-02-10	jr kb	CEGL004674	–	Daniel Gwartney	Yes
TIMU_AA_010400	TIMU_AA_010400	2016-02-10	jr kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_010500	TIMU_AA_010500	2016-02-25	ja jm	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_010600	TIMU_AA_010600	2016-02-23	iw jm	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_010700	TIMU_AA_010700	2016-02-05	IW NP	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_010800	TIMU_AA_010800	2016-02-10	jr kb	CEGL007663	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_011000	TIMU_AA_011000	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_011100	TIMU_AA_011100	2016-02-11	jr kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_011200	TIMU_AA_011200	2016-02-11	JR KB	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_011300	TIMU_AA_011300	2016-02-11	JR KB	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_011400	TIMU_AA_011400	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_011500	TIMU_AA_011500	2016-02-10	jr kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_011600	TIMU_AA_011600	2016-02-12	IW JP	CEGL007714	Likely fire supresson area	Daniel Gwartney	Yes
TIMU_AA_011700	TIMU_AA_011700	2016-02-12	IW JP	CEGL007714	see pt116	Daniel Gwartney	Yes
TIMU_AA_011800	TIMU_AA_011800	2016-02-12	IW JP	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_011900	TIMU_AA_011900	2016-02-12	IW JP	CEGL003643	Keys correctly w/ presence of ilex	Daniel Gwartney	Yes
TIMU_AA_012000	TIMU_AA_012000	2016-02-12	iw jp	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_012100	TIMU_AA_012100	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_012200	TIMU_AA_012200	2016-02-05	IW NP	CEGL007714	–	Daniel Gwartney	Yes
TIMU_AA_012300	TIMU_AA_012300	2016-02-05	IW NP	CEGL007714	–	Daniel Gwartney	Yes
TIMU_AA_012400	TIMU_AA_012400	2016-02-05	IW NP	CEGL003662	–	Daniel Gwartney	Yes
TIMU_AA_012500	TIMU_AA_012500	2016-02-12	IW JP	CEGL007714	–	Daniel Gwartney	Yes
TIMU_AA_012600	TIMU_AA_012600	2016-02-05	iw np	CEGL007714	–	Daniel Gwartney	Yes
TIMU_AA_012700	TIMU_AA_012700	2016-02-25	ja jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_012800	TIMU_AA_012800	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_012900	TIMU_AA_012900	2016-02-25	ja jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_013000	TIMU_AA_013000	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_013100	TIMU_AA_013100	2016-02-25	ja jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_013200	TIMU_AA_013200	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_013300	TIMU_AA_013300	2016-02-25	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_013600	TIMU_AA_013600	2016-02-05	iw np	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_013700	TIMU_AA_013700	2016-02-05	IW NP	CEGL007714	–	Daniel Gwartney	Yes
TIMU_AA_013800	TIMU_AA_013800	2016-02-05	IW NP	CEGL007714	–	Daniel Gwartney	Yes
TIMU_AA_013900	TIMU_AA_013900	2016-02-05	IW NP	CEGL003821	–	Daniel Gwartney	Yes
TIMU_AA_014000	TIMU_AA_014000	2016-02-05	iw np	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_014100	TIMU_AA_014100	2016-02-05	iw np	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_014200	TIMU_AA_014200	2016-02-05	iw nnp	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_014300	TIMU_AA_014300	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_014400	TIMU_AA_014400	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_014500	TIMU_AA_014500	2016-02-28	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_014600	TIMU_AA_014600	2016-02-23	ja np	CEGL007171	–	Daniel Gwartney	Yes
TIMU_AA_015200	TIMU_AA_015200	2016-02-12	jr kb	CEGL003825	–	Daniel Gwartney	Yes
TIMU_AA_015300	TIMU_AA_015300	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_015400	TIMU_AA_015400	2016-02-12	jr kb	CEGL007032	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_015500	TIMU_AA_015500	2016-02-12	JR KB	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_015600	TIMU_AA_015600	2016-02-12	jr kb	CEGL007032	Q. Laurifolia appears to be dying.	Daniel Gwartney	Yes
TIMU_AA_015700	TIMU_AA_015700	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_015800	TIMU_AA_015800	2016-02-15	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_015900	TIMU_AA_015900	2016-02-12	jr kb	CEGL004490	k key	Daniel Gwartney	Yes
TIMU_AA_016000	TIMU_AA_016000	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_016100	TIMU_AA_016100	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_016200	TIMU_AA_016200	2016-02-15	6	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_016300	TIMU_AA_016300	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_016400	TIMU_AA_016400	2016-02-15	iw ja	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_016500	TIMU_AA_016500	2016-02-12	jr kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_016600	TIMU_AA_016600	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_016700	TIMU_AA_016700	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_016900	TIMU_AA_016900	2016-02-28	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_017000	TIMU_AA_017000	2016-03-01	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_017100	TIMU_AA_017100	2016-02-04	iw np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_017200	TIMU_AA_017200	2016-02-04	iw np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_017300	TIMU_AA_017300	2016-02-11	lw jp	CEGL004191	mosaic of juncus and spartina marsh	Daniel Gwartney	Yes
TIMU_AA_017400	TIMU_AA_017400	2016-03-01	ja np	CEGL007032	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_017500	TIMU_AA_017500	2016-03-01	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_017600	TIMU_AA_017600	2016-03-01	ja np	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_017700	TIMU_AA_017700	2016-02-24	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_017800	TIMU_AA_017800	2016-02-24	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_017900	TIMU_AA_017900	2016-02-03	IW NP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_018000	TIMU_AA_018000	2016-02-16	iw ja	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_018100	TIMU_AA_018100	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_018200	TIMU_AA_018200	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_018300	TIMU_AA_018300	2016-02-03	IW	CEGL004658	possible loblolly within. Primarily slash pine	Daniel Gwartney	Yes
TIMU_AA_018400	TIMU_AA_018400	2016-02-03	IW NP	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_018500	TIMU_AA_018500	2016-02-03	IW NP	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_018600	TIMU_AA_018600	2016-02-03	IW NP	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_018700	TIMU_AA_018700	2016-02-04	IW NP	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_018800	TIMU_AA_018800	2016-02-04	IW NP	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_018900	TIMU_AA_018900	2016-02-04	IW NP	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_019000	TIMU_AA_019000	2016-02-04	iw np	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_019100	TIMU_AA_019100	2016-02-08	IW JP	CEGL007813	Boardered by marsh	Daniel Gwartney	Yes
TIMU_AA_019200	TIMU_AA_019200	2016-02-08	IW JP	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_019300	TIMU_AA_019300	2016-02-08	IW JP	CEGL007813	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_019400	TIMU_AA_019400	2016-02-08	IW JP	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_019500	TIMU_AA_019500	2016-02-08	IW JP	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_019600	TIMU_AA_019600	2016-02-08	IW JP	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_019700	TIMU_AA_019700	2016-02-04	iw np	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_019800	TIMU_AA_019800	2016-02-12	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_020100	TIMU_AA_020100	2016-02-12	IW JP	CEGL007813	near marsh, but not a shell island	Daniel Gwartney	Yes
TIMU_AA_020200	TIMU_AA_020200	2016-02-12	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_020500	TIMU_AA_020500	2016-02-12	IW JP	CEGL007032	no community dominated by laurel oak/water oak	Daniel Gwartney	Yes
TIMU_AA_020700	TIMU_AA_020700	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_020800	TIMU_AA_020800	2016-02-12	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_021000	TIMU_AA_021000	2016-02-12	iw jp	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_021100	TIMU_AA_021100	2016-02-15	jp kb	CEGL007020	significant number of sweet bays	Daniel Gwartney	Yes
TIMU_AA_021200	TIMU_AA_021200	2016-02-15	jp kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_021300	TIMU_AA_021300	2016-02-16	jp kb	CEGL007020	pretty sort canopy 15 ft tall	Daniel Gwartney	Yes
TIMU_AA_021400	TIMU_AA_021400	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_021500	TIMU_AA_021500	2016-02-18	jp kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_021600	TIMU_AA_021600	2016-02-16	jp kb	CEGL007020	dominant oak is live oak	Daniel Gwartney	Yes
TIMU_AA_021700	TIMU_AA_021700	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_021800	TIMU_AA_021800	2016-02-15	jp kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_021900	TIMU_AA_021900	2016-02-15	jp kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_022000	TIMU_AA_022000	2016-02-16	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_022100	TIMU_AA_022100	2016-02-16	jp kb	CEGL007032	very mature live oak canopy	Daniel Gwartney	Yes
TIMU_AA_022200	TIMU_AA_022200	2016-02-16	jp kb	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_022300	TIMU_AA_022300	2016-02-16	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_022400	TIMU_AA_022400	2016-02-16	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_022500	TIMU_AA_022500	2016-02-12	jr kb	CEGL007020	Bare sand beach with many dead trees	Daniel Gwartney	Yes
TIMU_AA_022600	TIMU_AA_022600	2016-02-13	jp kb	CEGL003812	–	Daniel Gwartney	Yes
TIMU_AA_022700	TIMU_AA_022700	2016-02-13	jp kb	CEGL003821	–	Daniel Gwartney	Yes
TIMU_AA_022800	TIMU_AA_022800	2016-02-13	jp kb	CEGL003812	–	Daniel Gwartney	Yes
TIMU_AA_022900	TIMU_AA_022900	2016-02-16	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_023000	TIMU_AA_023000	2016-02-16	jp kb	CEGL003643	mixed forested community	Daniel Gwartney	Yes
TIMU_AA_023100	TIMU_AA_023100	2016-02-16	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_023200	TIMU_AA_023200	2016-02-16	jp kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_023400	TIMU_AA_023400	2016-02-22	ja np	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_023500	TIMU_AA_023500	2016-02-22	ja np	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_023600	TIMU_AA_023600	2016-02-22	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_023700	TIMU_AA_023700	2016-02-22	ja np	CEGL003956	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_023800	TIMU_AA_023800	2016-02-03	IW NP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_023900	TIMU_AA_023900	2016-02-13	jp kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_024000	TIMU_AA_024000	2016-02-13	jp kb	CEGL003821	–	Daniel Gwartney	Yes
TIMU_AA_024100	TIMU_AA_024100	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_024200	TIMU_AA_024200	2016-02-15	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_024300	TIMU_AA_024300	2016-02-12	jr kb	CEGL003825	–	Daniel Gwartney	Yes
TIMU_AA_024400	TIMU_AA_024400	2016-02-15	jp kb	CEGL007032	very thin canopy	Daniel Gwartney	Yes
TIMU_AA_024500	TIMU_AA_024500	2016-02-15	kb jp	CEGL007032	mixed woodland, very transitional	Daniel Gwartney	Yes
TIMU_AA_024600	TIMU_AA_024600	2016-02-15	iw ja	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_024700	TIMU_AA_024700	2016-02-15	jp kb	CEGL007020	even canopy height	Daniel Gwartney	Yes
TIMU_AA_024800	TIMU_AA_024800	2016-02-15	iw ja	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_024900	TIMU_AA_024900	2016-02-15	iw ja	CEGL003821	–	Daniel Gwartney	Yes
TIMU_AA_025000	TIMU_AA_025000	2016-02-15	jp kb	CEGL007020	ilex glabra insread of lyonia	Daniel Gwartney	Yes
TIMU_AA_025100	TIMU_AA_025100	2016-02-18	IW JA	CEGL004789	–	Daniel Gwartney	Yes
TIMU_AA_025200	TIMU_AA_025200	2016-02-18	iw ja	CEGL004511	–	Daniel Gwartney	Yes
TIMU_AA_025300	TIMU_AA_025300	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_025400	TIMU_AA_025400	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_025500	TIMU_AA_025500	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_025600	TIMU_AA_025600	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_025700	TIMU_AA_025700	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_025800	TIMU_AA_025800	2016-02-28	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_025900	TIMU_AA_025900	2016-02-28	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_026000	TIMU_AA_026000	2016-02-28	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_026100	TIMU_AA_026100	2016-02-15	jp kb	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_026200	TIMU_AA_026200	2016-02-16	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_026300	TIMU_AA_026300	2016-02-16	jp kb	CEGL007032	only difference is the pressence of saw palmetto	Daniel Gwartney	Yes
TIMU_AA_026400	TIMU_AA_026400	2016-02-22	ja np	CEGL007020	–	Daniel Gwartney	Yes
TIMU_AA_026500	TIMU_AA_026500	2016-02-16	jp kb	CEGL007020	no lyonia more small bays	Daniel Gwartney	Yes
TIMU_AA_026600	TIMU_AA_026600	2016-02-22	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_026700	TIMU_AA_026700	2016-02-16	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_026800	TIMU_AA_026800	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_026900	TIMU_AA_026900	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_027200	TIMU_AA_027200	2016-02-22	iw jm	CEGL007032	edge of two communities	Daniel Gwartney	Yes
TIMU_AA_027300	TIMU_AA_027300	2016-02-22	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_027400	TIMU_AA_027400	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_027500	TIMU_AA_027500	2016-02-22	lw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_027600	TIMU_AA_027600	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_027700	TIMU_AA_027700	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_027800	TIMU_AA_027800	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_027900	TIMU_AA_027900	2016-02-22	iw jm	CEGL003956	narrow strip of batis comm btwn quercus and partina comms	Daniel Gwartney	Yes
TIMU_AA_028000	TIMU_AA_028000	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028100	TIMU_AA_028100	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028200	TIMU_AA_028200	2016-02-22	ja np	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_028300	TIMU_AA_028300	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028400	TIMU_AA_028400	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028500	TIMU_AA_028500	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028600	TIMU_AA_028600	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028700	TIMU_AA_028700	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028800	TIMU_AA_028800	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_028900	TIMU_AA_028900	2016-02-22	iw jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_029000	TIMU_AA_029000	2016-02-09	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_029100	TIMU_AA_029100	2016-02-16	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_029200	TIMU_AA_029200	2016-02-15	jp kb	CEGL007020	spot on	Daniel Gwartney	Yes
TIMU_AA_029300	TIMU_AA_029300	2016-02-15	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_029400	TIMU_AA_029400	2016-02-15	jp kb	CEGL007032	no slash pine	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_029500	TIMU_AA_029500	2016-02-15	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_029600	TIMU_AA_029600	2016-02-15	kb jp	CEGL007032	one loan slash pine	Daniel Gwartney	Yes
TIMU_AA_029700	TIMU_AA_029700	2016-02-24	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_029800	TIMU_AA_029800	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_029900	TIMU_AA_029900	2016-02-26	iw np	CEGL004191	from boat, veg continuous	Daniel Gwartney	Yes
TIMU_AA_030000	TIMU_AA_030000	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_030100	TIMU_AA_030100	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_030200	TIMU_AA_030200	2016-02-09	iw jp	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_030300	TIMU_AA_030300	2016-02-09	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_030400	TIMU_AA_030400	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_030500	TIMU_AA_030500	2016-02-08	IW JP	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_030600	TIMU_AA_030600	2016-02-26	iw np	CEGL007694	–	Daniel Gwartney	Yes
TIMU_AA_030700	TIMU_AA_030700	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_030800	TIMU_AA_030800	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_030900	TIMU_AA_030900	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031000	TIMU_AA_031000	2016-02-16	iw ja	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031100	TIMU_AA_031100	2016-02-09	iw jp	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031200	TIMU_AA_031200	2016-02-09	iw jp	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031300	TIMU_AA_031300	2016-02-09	iw jp	CEGL004191	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_031400	TIMU_AA_031400	2016-02-09	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031500	TIMU_AA_031500	2016-02-09	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031600	TIMU_AA_031600	2016-03-01	iw jm	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031700	TIMU_AA_031700	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_031800	TIMU_AA_031800	2016-02-11	IW JP	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_031900	TIMU_AA_031900	2016-02-26	iw np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_032000	TIMU_AA_032000	2016-02-26	ja jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_032100	TIMU_AA_032100	2016-02-26	iw np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_032200	TIMU_AA_032200	2016-02-26	iw np	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_032300	TIMU_AA_032300	2016-02-26	iw np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_032400	TIMU_AA_032400	2016-02-26	iw np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_032500	TIMU_AA_032500	2016-02-26	ja jm	CEGL004674	–	Daniel Gwartney	Yes
TIMU_AA_032600	TIMU_AA_032600	2016-02-26	ja jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_032700	TIMU_AA_032700	2016-02-26	ja jm	CEGL003920	–	Daniel Gwartney	Yes
TIMU_AA_032800	TIMU_AA_032800	2016-02-09	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_032900	TIMU_AA_032900	2016-02-08	IW JP	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_033000	TIMU_AA_033000	2016-02-08	IW JP	CEGL004511	Did not key correctly possibly due to small area	Daniel Gwartney	Yes
TIMU_AA_033100	TIMU_AA_033100	2016-02-08	IW JP	CEGL004511	Key sufficient. Quarter hectare plot	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_033200	TIMU_AA_033200	2016-02-15	iw ja	CEGL007032	Serenoa in dense patches, variable	Daniel Gwartney	Yes
TIMU_AA_033300	TIMU_AA_033300	2016-02-09	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_033400	TIMU_AA_033400	2016-02-09	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_033500	TIMU_AA_033500	2016-02-16	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_033600	TIMU_AA_033600	2016-02-16	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_033700	TIMU_AA_033700	2016-02-13	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_033800	TIMU_AA_033800	2016-02-13	jp kb	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_033900	TIMU_AA_033900	2016-02-09	IW JP	CEGL007032	Keyed to Martime live oak hammock	Daniel Gwartney	Yes
TIMU_AA_034000	TIMU_AA_034000	2016-02-09	IW JP	CEGL007032	Edge of road	Daniel Gwartney	Yes
TIMU_AA_034100	TIMU_AA_034100	2016-02-07	IW JP	CEGL004234	KEYS TO CEGL004197 MID ATLANTIC HIGH SALT MARSH. NOT IN DROPDOWN	Daniel Gwartney	Yes
TIMU_AA_034200	TIMU_AA_034200	2016-02-26	ja jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_034300	TIMU_AA_034300	2016-02-26	ja jm	CEGL004789	–	Daniel Gwartney	Yes
TIMU_AA_034400	TIMU_AA_034400	2016-02-26	iw np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_034600	TIMU_AA_034600	2016-02-26	iw np	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_034700	TIMU_AA_034700	2016-02-26	iw np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_034800	TIMU_AA_034800	2016-02-26	ja jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_034900	TIMU_AA_034900	2016-02-26	iw np	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_035000	TIMU_AA_035000	2016-02-26	iw np	CEGL004658	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_035100	TIMU_AA_035100	2016-02-26	iw np	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_035200	TIMU_AA_035200	2016-02-26	ja jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_035300	TIMU_AA_035300	2016-02-26	ja jm	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_035400	TIMU_AA_035400	2016-02-29	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_035500	TIMU_AA_035500	2016-02-26	ja jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_035600	TIMU_AA_035600	2016-02-26	ja jm	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_035700	TIMU_AA_035700	2016-02-29	ja np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_035800	TIMU_AA_035800	2016-02-26	ja jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_035900	TIMU_AA_035900	2016-02-26	ja jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_036000	TIMU_AA_036000	2016-02-26	iw np	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_036100	TIMU_AA_036100	2016-02-11	IW JP	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_036200	TIMU_AA_036200	2016-02-11	IW JP	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_036300	TIMU_AA_036300	2016-02-11	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_036400	TIMU_AA_036400	2016-02-11	IW JP	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_036500	TIMU_AA_036500	2016-02-11	IW JP	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_036600	TIMU_AA_036600	2016-02-11	IW JP	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_036700	TIMU_AA_036700	2016-02-11	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_036800	TIMU_AA_036800	2016-02-11	IW JP	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_036900	TIMU_AA_036900	2016-02-11	IW JP	CEGL007813	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_037000	TIMU_AA_037000	2016-02-09	iw jp	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_037900	TIMU_AA_037900	2016-02-24	iw jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_038100	TIMU_AA_038100	2016-02-10	IW JP	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_038200	TIMU_AA_038200	2016-02-09	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_038300	TIMU_AA_038300	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_038400	TIMU_AA_038400	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_038500	TIMU_AA_038500	2016-02-26	iw np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_038600	TIMU_AA_038600	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_038700	TIMU_AA_038700	2016-02-09	iw jp	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_038800	TIMU_AA_038800	2016-02-11	IW JP	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_038900	TIMU_AA_038900	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_039000	TIMU_AA_039000	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_039100	TIMU_AA_039100	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_039200	TIMU_AA_039200	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_039300	TIMU_AA_039300	2016-02-29	ja np	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_039400	TIMU_AA_039400	2016-02-23	ja np	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_039500	TIMU_AA_039500	2016-02-29	ja np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_039600	TIMU_AA_039600	2016-02-29	iw jm	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_039700	TIMU_AA_039700	2016-02-24	iw jm	CEGL004186	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_039900	TIMU_AA_039900	2016-02-26	iw np	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_040000	TIMU_AA_040000	2016-02-17	iw ja	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040100	TIMU_AA_040100	2016-02-18	iw ja	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040200	TIMU_AA_040200	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040300	TIMU_AA_040300	2016-02-19	ja iw	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040400	TIMU_AA_040400	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040500	TIMU_AA_040500	2016-02-19	jp kb	CEGL004178	–	Daniel Gwartney	Yes
TIMU_AA_040600	TIMU_AA_040600	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040700	TIMU_AA_040700	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040800	TIMU_AA_040800	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_040900	TIMU_AA_040900	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_041000	TIMU_AA_041000	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_041100	TIMU_AA_041100	2016-02-24	ja np	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_041200	TIMU_AA_041200	2016-02-19	jp kb	CEGL007171	–	Daniel Gwartney	Yes
TIMU_AA_041300	TIMU_AA_041300	2016-02-17	jp kb	CEGL007848	proper community not available	Daniel Gwartney	Yes
TIMU_AA_041400	TIMU_AA_041400	2016-02-17	jp kab	CEGL004186	mixed herbaceous community	Daniel Gwartney	Yes
TIMU_AA_041500	TIMU_AA_041500	2016-02-17	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_041600	TIMU_AA_041600	2016-02-17	jp kb	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_041700	TIMU_AA_041700	2016-02-17	ja iw	CEGL004197	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_041800	TIMU_AA_041800	2016-02-17	ja iw	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_041900	TIMU_AA_041900	2016-03-01	iw jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_042000	TIMU_AA_042000	2016-03-01	iw jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_042100	TIMU_AA_042100	2016-02-16	iw ja	CEGL004720	key sufficient	Daniel Gwartney	Yes
TIMU_AA_042200	TIMU_AA_042200	2016-02-17	jp kb	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_042300	TIMU_AA_042300	2016-02-28	iw jm	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_042800	TIMU_AA_042800	2016-02-10	IW JP	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_043100	TIMU_AA_043100	2016-02-10	IW JP	CEGL004186	S patens classificationnot in drop down database	Daniel Gwartney	Yes
TIMU_AA_043200	TIMU_AA_043200	2016-02-10	IW JP	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_043300	TIMU_AA_043300	2016-02-10	iw jp	CEGL003839	no morella/spartina in key	Daniel Gwartney	Yes
TIMU_AA_044000	TIMU_AA_044000	2016-02-10	IW JP	CEGL003920	Key unclear	Daniel Gwartney	No
TIMU_AA_044200	TIMU_AA_044200	2016-02-10	iw jp	CEGL003839	not enough juniper to be a juniper woodland	Daniel Gwartney	Yes
TIMU_AA_044500	TIMU_AA_044500	2016-02-10	IW JP	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_044600	TIMU_AA_044600	2016-02-19	jp kb	CEGL007171	–	Daniel Gwartney	Yes
TIMU_AA_044700	TIMU_AA_044700	2016-02-19	jp kb	CEGL007171	–	Daniel Gwartney	Yes
TIMU_AA_044800	TIMU_AA_044800	2016-02-19	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_044900	TIMU_AA_044900	2016-02-19	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_045000	TIMU_AA_045000	2016-02-19	jp kb	CEGL003643	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_045100	TIMU_AA_045100	2016-02-19	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_045200	TIMU_AA_045200	2016-02-19	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_045300	TIMU_AA_045300	2016-02-19	jp kb	CEGL007171	–	Daniel Gwartney	Yes
TIMU_AA_045400	TIMU_AA_045400	2016-02-19	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_045500	TIMU_AA_045500	2016-02-19	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_045600	TIMU_AA_045600	2016-02-19	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_045700	TIMU_AA_045700	2016-02-19	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_045800	TIMU_AA_045800	2016-02-19	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_045900	TIMU_AA_045900	2016-02-19		CEGL007049	–	Daniel Gwartney	Yes
TIMU_AA_046000	TIMU_AA_046000	2016-02-19	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_046100	TIMU_AA_046100	2016-02-19	iw ja	CEGL003839	class not in key	Daniel Gwartney	Yes
TIMU_AA_046200	TIMU_AA_046200	2016-02-19	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_046300	TIMU_AA_046300	2016-02-19	jp kb	CEGL004191	–	Daniel Gwartney	Yes
TIMU_AA_046400	TIMU_AA_046400	2016-02-19	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_046500	TIMU_AA_046500	2016-02-19	iw ja	CEGL003839	key inneffective	Daniel Gwartney	Yes
TIMU_AA_046600	TIMU_AA_046600	2016-02-17	ja iw	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_046700	TIMU_AA_046700	2016-02-18	iw ja	CEGL007848	small nyssa/acer swamp w/inpinus woodland.	Daniel Gwartney	Yes
TIMU_AA_046800	TIMU_AA_046800	2016-02-28	iw jm	CEGL003804	–	Daniel Gwartney	Yes
TIMU_AA_046900	TIMU_AA_046900	2016-02-18	iw ja	CEGL003643	no ilex	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_047000	TIMU_AA_047000	2016-02-18	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_047100	TIMU_AA_047100	2016-02-18	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_047200	TIMU_AA_047200	2016-02-18	jp kb	CEGL003643	old managed pine now being preserved	Daniel Gwartney	Yes
TIMU_AA_047300	TIMU_AA_047300	2016-02-18	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_047400	TIMU_AA_047400	2016-02-28	iw jm	CEGL003804	only trees listed in veg due to veg beig determined from a distance	Daniel Gwartney	Yes
TIMU_AA_047500	TIMU_AA_047500	2016-02-18	ja iw	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_047600	TIMU_AA_047600	2016-02-18	iw ja	CEGL007044	Small pocket of baygall forest within larger pinus woodland	Daniel Gwartney	Yes
TIMU_AA_047700	TIMU_AA_047700	2016-02-17	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_047800	TIMU_AA_047800	2016-02-18	jp kb	CEGL007171	–	Daniel Gwartney	Yes
TIMU_AA_047900	TIMU_AA_047900	2016-02-18	jp kb	CEGL007848	–	Daniel Gwartney	No
TIMU_AA_048000	TIMU_AA_048000	2016-02-18	ja iw	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_048100	TIMU_AA_048100	2016-02-28	iw jm	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_049300	TIMU_AA_049300	2016-02-18	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_049400	TIMU_AA_049400	2016-02-18	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_049500	TIMU_AA_049500	2016-02-19	ja iw	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_049600	TIMU_AA_049600	2016-02-19	ja iw	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_049700	TIMU_AA_049700	2016-02-10	IW JP	CEGL003920	Key unclear	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_049800	TIMU_AA_049800	2016-02-10	IW JP	CEGL003839	Probably trasitional between woodland and shrubland	Daniel Gwartney	Yes
TIMU_AA_049900	TIMU_AA_049900	2016-02-10	IW JP	CEGL004186	Sparse woodland w/in larger marsh complex	Daniel Gwartney	Yes
TIMU_AA_050000	TIMU_AA_050000	2016-02-10	IJ JP	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_050600	TIMU_AA_050600	2016-02-28	iw jm	CEGL003643	view frm a dtance w/ binoculars de to no access. Could not positively id ilex sp from distance	Daniel Gwartney	Yes
TIMU_AA_050700	TIMU_AA_050700	2016-02-17	iw ja	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_050800	TIMU_AA_050800	2016-02-17	iw ja	CEGL007171	best fit classification (s bakeri) not in key	Daniel Gwartney	Yes
TIMU_AA_050900	TIMU_AA_050900	2016-02-17	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_051000	TIMU_AA_051000	2016-02-17	iw ja	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_051100	TIMU_AA_051100	2016-02-18	iw ja	CEGL007044	small magnolia area w/in larger pinus forest	Daniel Gwartney	Yes
TIMU_AA_051200	TIMU_AA_051200	2016-02-18	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_051300	TIMU_AA_051300	2016-02-17	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_051400	TIMU_AA_051400	2016-02-17	jp kb	CEGL004658	–	Daniel Gwartney	Yes
TIMU_AA_051500	TIMU_AA_051500	2016-02-17	jp kb	CEGL007714	impacts from highway	Daniel Gwartney	Yes
TIMU_AA_051600	TIMU_AA_051600	2016-02-17	ja iw	CEGL004658	Difficult to key as this is a mixed community in a transitional zone	Daniel Gwartney	Yes
TIMU_AA_051700	TIMU_AA_051700	2016-02-17	jp kb	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_051800	TIMU_AA_051800	2016-02-17	jp kb	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_051900	TIMU_AA_051900	2016-02-17	jp kb	CEGL003643	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_052000	TIMU_AA_052000	2016-02-16	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_052100	TIMU_AA_052100	2016-02-18	jp kb	CEGL003643	doesn't work well for areas historically logged	Daniel Gwartney	Yes
TIMU_AA_052200	TIMU_AA_052200	2016-02-18	jp kb	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_052300	TIMU_AA_052300	2016-02-16	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_052400	TIMU_AA_052400	2016-02-16	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_052500	TIMU_AA_052500	2016-02-16	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_052600	TIMU_AA_052600	2016-02-17	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_052700	TIMU_AA_052700	2016-02-17	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_052800	TIMU_AA_052800	2016-02-17	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_052900	TIMU_AA_052900	2016-02-17	iw ja	CEGL004178	Key difficult to use when low shrub cover. Key does not account for invasive plants	Daniel Gwartney	Yes
TIMU_AA_053000	TIMU_AA_053000	2016-02-17	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_053100	TIMU_AA_053100	2016-02-17	ja iw	CEGL007813	–	Daniel Gwartney	Yes
TIMU_AA_053200	TIMU_AA_053200	2016-02-16	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_053300	TIMU_AA_053300	2016-02-10	IW JP	CEGL003920	best fit classificaion (morella /spartina) not in key	Daniel Gwartney	Yes
TIMU_AA_053400	TIMU_AA_053400	2016-02-28	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_053500	TIMU_AA_053500	2016-02-10	IW JP	CEGL003839	Not in key	Daniel Gwartney	Yes
TIMU_AA_053600	TIMU_AA_053600	2016-02-10	IW JP	CEGL004186	Small wood/shrubland w/ingreater marsh	Daniel Gwartney	Yes
TIMU_AA_053700	TIMU_AA_053700	2016-02-10	IW JP	CEGL004186	juncus/ S bakeri mosaic	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_053800	TIMU_AA_053800	2016-02-16	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_053900	TIMU_AA_053900	2016-02-28	iw jm	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_054000	TIMU_AA_054000	2016-03-01	iw jm	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_054100	TIMU_AA_054100	2016-02-16	iw ja	CEGL007032	–	Daniel Gwartney	Yes
TIMU_AA_054300	TIMU_AA_054300	2016-02-29	IW JM	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_054400	TIMU_AA_054400	2016-02-29	iw jm	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_054500	TIMU_AA_054500	2016-02-10	IW JP	CEGL003839	Best fit is morella/patens shrubland. Keys to morella/toxicodendron shrubland	Daniel Gwartney	Yes
TIMU_AA_054600	TIMU_AA_054600	2016-02-10	IW JP	CEGL003839	not in key	Daniel Gwartney	Yes
TIMU_AA_054700	TIMU_AA_054700	2016-02-18	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_054800	TIMU_AA_054800	2016-02-18	jp kb	CEGL007171	unusual wetland	Daniel Gwartney	No
TIMU_AA_054900	TIMU_AA_054900	2016-02-19	iw ja	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_055400	TIMU_AA_055400	2016-02-19	iw ja	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_055600	TIMU_AA_055600	2016-02-29	iw jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_055700	TIMU_AA_055700	2016-02-29	iw jm	CEGL004186	–	Daniel Gwartney	Yes
TIMU_AA_055800	TIMU_AA_055800	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_055900	TIMU_AA_055900	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056000	TIMU_AA_056000	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056100	TIMU_AA_056100	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_056200	TIMU_AA_056200	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056300	TIMU_AA_056300	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056400	TIMU_AA_056400	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056500	TIMU_AA_056500	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056600	TIMU_AA_056600	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056700	TIMU_AA_056700	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056800	TIMU_AA_056800	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_056900	TIMU_AA_056900	2016-02-23	ja np	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_057000	TIMU_AA_057000	2016-02-10	IW JP	CEGL003525	forested area surrounded by marsh	Daniel Gwartney	Yes
TIMU_AA_057100	TIMU_AA_057100	2016-02-10	IW JP	CEGL003525	–	Daniel Gwartney	Yes
TIMU_AA_057200	TIMU_AA_057200	2016-02-18	ja iw	CEGL003839	–	Daniel Gwartney	Yes
TIMU_AA_057300	TIMU_AA_057300	2016-02-18	ja iw	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_057400	TIMU_AA_057400	2016-02-24	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_057500	TIMU_AA_057500	2016-02-24	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_057600	TIMU_AA_057600	2016-02-24	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_057700	TIMU_AA_057700	2016-02-24	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_057800	TIMU_AA_057800	2016-02-24	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_057900	TIMU_AA_057900	2016-02-24	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_058000	TIMU_AA_058000	2016-02-24	ja np	CEGL003643	–	Daniel Gwartney	Yes

Table D-1 (continued). Data points acquired between February 3, 2016 and March 7, 2016 by J. Ryan and N. Panico.

AA_Event	AA_Code	Event_Date	Surveyors	Primary_Co	General_Co	Plot_User	Plot_Photo
TIMU_AA_058100	TIMU_AA_058100	2016-02-24	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_058200	TIMU_AA_058200	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_058300	TIMU_AA_058300	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_058400	TIMU_AA_058400	2016-02-17	ja iw	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_058500	TIMU_AA_058500	2016-02-17	ja iw	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_058600	TIMU_AA_058600	2016-02-17	ja iw	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_058700	TIMU_AA_058700	2016-02-19	ja iw	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_058800	TIMU_AA_058800	2016-02-19	Ja iw	CEGL007848	–	Daniel Gwartney	Yes
TIMU_AA_058900	TIMU_AA_058900	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059000	TIMU_AA_059000	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059100	TIMU_AA_059100	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059200	TIMU_AA_059200	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059300	TIMU_AA_059300	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059400	TIMU_AA_059400	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059500	TIMU_AA_059500	2016-02-23	IW JM	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059600	TIMU_AA_059600	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059700	TIMU_AA_059700	2016-02-23	iw jm	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059800	TIMU_AA_059800	2016-02-23	ja np	CEGL003643	–	Daniel Gwartney	Yes
TIMU_AA_059900	TIMU_AA_059900	2016-02-10	jr kb	CEGL004700	–	Daniel Gwartney	Yes

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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